

POLLUTION PREVENTION

Reducing Mercury in Our Environment



Provided by:

Pinellas County Department of Environmental Management

Air Quality Division Pollution Prevention Program

300 S. Garden Ave.

Clearwater, FL 33756

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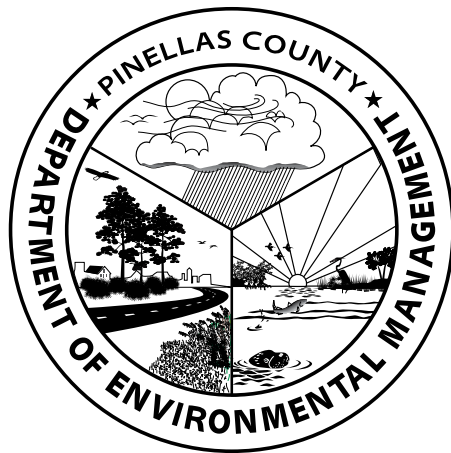
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Pinellas County Department
of
Environmental Management's

V I S I O N

The Department of Environmental Management is dedicated to providing responsible leadership necessary to manage our natural and urban environment to meet the needs of our present and future Pinellas County citizens.



About This Manual

This manual is part of a series of manuals designed to provide educational information to help all interested parties in the handling of hazardous materials and to assist with their waste reduction measures. Excessive waste is an indicator of inefficient use of raw materials and resources. Proper education and training can minimize the amount of liquid, solid, and gaseous waste in Pinellas County.



This and other self-help manuals are developed by the Pinellas County Department of Environmental Managements Air Quality Division's P2 Program. Staff provide information on new technologies, process modifications, substitute products, and current industry-specific Best Management Practices (BMPs). Staff can help citizens and assist businesses in their efforts to become more efficient, profitable, and competitive, while complying with regulatory requirements, (the P2 program is a non-regulatory program that provides waste reduction technical assistance). As a Pinellas County business, or citizen, no fees are charged for using the P2 Program's services. On-site emissions reduction assistance is available by contacting program staff at (727) 464-4422.

Mercury, the toxic metal that's all around us!

Why is it a problem?

Mercury is a neurotoxin (toxic to the human nervous system) that negatively impacts humans and natural ecosystems. Children under six are at high risk, especially unborn children. Mercury is known to cross the placenta and has been detected in human milk. Exposure can result in damage to the central nervous system, kidneys and liver.

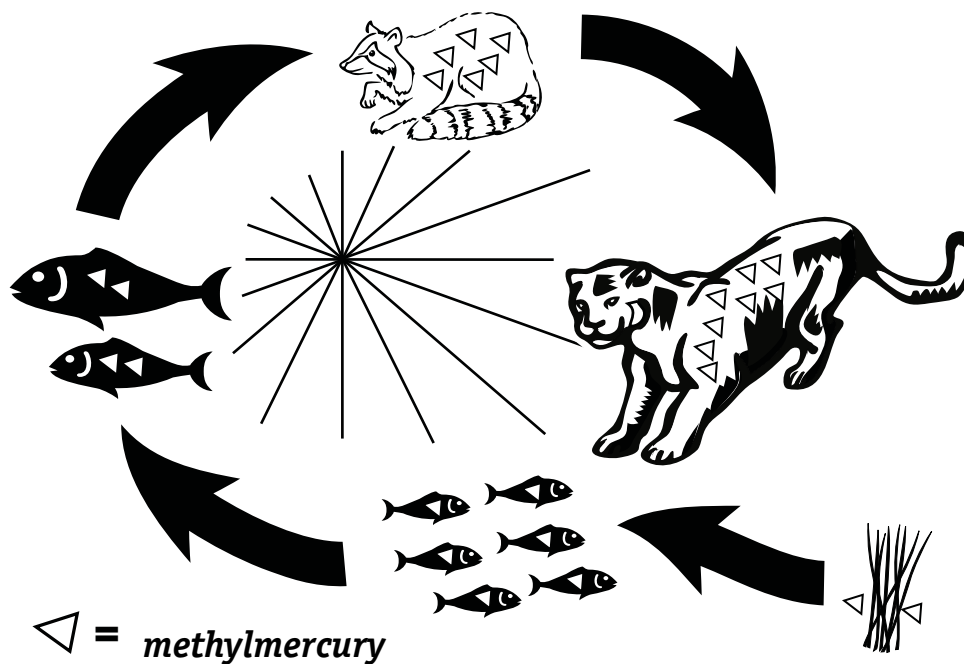
Two kinds of mercury can impact human health: elemental mercury and organic mercury, also called methylmercury (MeHg).

Elemental mercury is most toxic in its vapor form and is the type of mercury that is most likely to cause kidney damage, in addition to the other health problems associated with mercury poisoning. The vapor from spilled mercury

can seriously poison children playing with it and in warm weather, mercury easily evaporates, sometimes contaminating entire rooms and their contents.

Organic mercury is particularly dangerous because it is more chemically compatible with biological systems. This means that our bodies and the bodies of other plants and animals more readily absorb it. The negative effects of organic mercury tend to be in the nervous system, including such symptoms as tingling in the extremities, tremors, loss of hearing or vision, coma and death.¹

The bacteria living on the bottom of lakes and streams can change elemental mercury into organic mercury. Through simple settling, the mud at the bottom of a lake or stream may have many times the elemental mercury concentration found in the water or in the air. Once in the sediments bacteria converts much of the elemental mercury into organic mercury. The organic mercury tends to further increase, or bioaccumulate, as it moves up the food chain. Small plants and animals living on the bottom are contaminated with this type of mercury. These organisms are eaten by larger animals that are eaten by still larger ones, concentrating the mercury at each level. A large fish gets mercury from its environment and as well as through the other fish it eats. As a result some large fish contain concentrations of mercury that are more than 100,000 times greater than the water in which they live.²



What are the sources of mercury?

Medical Industry

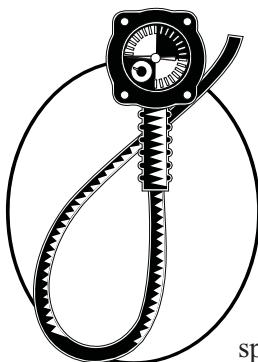
Mercury is used by the **medical industry** in lab analysis, thermometers, feeding tubes, blood pressure and other measuring devices, medicines, intraocular pressure devices, antiseptics, electrical equipment, etc. Occasionally, these items find their way into medical waste incinerators. Unfortunately, waste incinerators don't get rid of mercury. Mercury is an element; it can't be burned, it just evaporates into the atmosphere where it enters the hydrologic cycle and the organisms in the environment, including us!



Hospitals and other medical facilities can replace, reduce and/or control the mercury in their systems by first identifying and inventorying the mercury they have. Once they know where the mercury is, it is easier to track, control, and if possible, remove the mercury.

Vehicle and Engine Production and Repair

Mercury is used by the **automotive industry and mechanics** in switches (such as the switches that turn on hood and trunk lights) and anti-lock brakes. If these materials are not removed when the car is junked, the mercury can be released into the atmosphere by the smelter when the automobile's metal is recycled. Automobile manufacturers are phasing out mercury switches (which are the largest source of mercury in vehicles). In the future, this source of mercury pollution should significantly diminish.

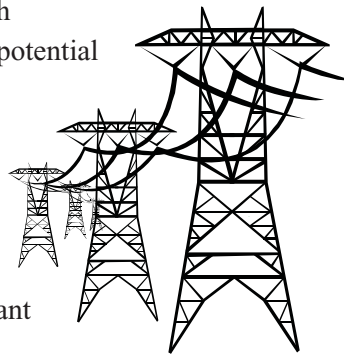


An old technology used on marine outboard engines and motorcycles to balance the vacuum pressure of multiple carburetors was a device called a mercury carburetor synchronizer. Exposure to mercury may occur in two ways while using a mercury carburetor synchronizer. Mercury carburetor synchronizers (gauges) contain about 40 grams of mercury that can be spilled if these gauges are not handled or stored properly.

Also, improper engine tuning can cause mercury to be sucked into the engine and released instantly in high concentrations from the exhaust system. There are mercury-free devices available that are a little more expensive, but considering the health and financial costs of mercury pollution these devices are far less costly.³

Energy/Fuel Production

Mercury is a naturally occurring element commonly found in oil and coal. As a result, mercury is normally released during **energy production**, especially in oil and coal burning power plants, and petroleum refiners. This is why the use of fluorescent lighting is encouraged. Although fluorescent bulbs contain mercury and there is the potential for mercury contamination if they are broken or improperly disposed of, the energy reduction from their use prevents the release of larger amounts of mercury by the burning of these fuels.



Pinellas County produces energy by burning solid waste; for this reason it is particularly important to ensure that mercury-containing devices such as thermostats, thermometers, fluorescent bulbs, et cetera are disposed of at the County's "Household Electronics & Chemical Collection Center" (HEC3) located at 2990 - 110th Avenue North, St. Petersburg, FL 33716.

Chemical Industry

The **chemical industry** sometimes uses the mercury cell method in the production of chlorine, hydrogen gas, and caustic soda. The release of mercury has been reduced as this process has been modernized. Although this method of production is commonly used, alternative techniques for the production of these materials are available.

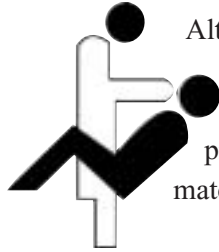


Schools

Mercury can often be found in **school systems**, particularly in their science labs. Many people have stories about playing with elemental mercury or "quicksilver" when they were in school. While short duration handling of mercury is not likely to cause any immediately apparent health problems, it is risky

behavior and can cause kidney damage, especially if the person handling it breathes in the fumes (elemental mercury is absorbed slowly through the skin, but only 25% of an inhaled dose is exhaled⁴.) Mercury can also evaporate, so any left in an unsealed container could potentially contaminate an entire room and its contents.

Dental Facilities



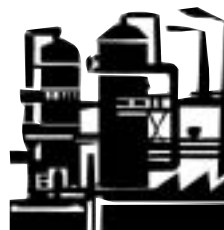
Although mercury-free fillings are available, dentists sometimes use a mercury amalgam for filling teeth. **Dental facilities** should train their personnel in the proper handling of mercury and mercury-containing material and they should take care to:

- * NEVER place amalgam waste of any kind in the biohazard (red) bag, the trash, or the sharps container
- * NEVER rinse traps, filters, or screens over or down the drain or into a wastebasket
- * NEVER disinfect teeth or any item containing amalgam with any method that uses heat
- * NEVER use household bleach or other oxidizing cleaner
- * NEVER decant liquid in which amalgam has been stored down the drain
- * NEVER rinse tools used to place or carve amalgams over the drain⁵

All amalgam and other mercury wastes should be recycled.

Other Commercial Users of Mercury

Various facilities and operations, such as metal producing, coating, and recycling industries use mercury. These businesses and industries should carefully monitor their use of mercury. Where possible, the use of alternative technologies and procedures may help to avoid the health, environmental, and financial cost of mercury use.



Household Sources

Mercury is in our **homes!** It is often used in sump pumps, children's shoes, thermostats, light switches, medical thermometers, medicines, fluorescent lighting, Mercurochrome™, batteries, old pesticides, paint, etc. If any of these items are thrown into the garbage, they will go to the County incinerator and could potentially end up in the atmosphere.



Ubiquitous Sources

There are some mercury-containing devices and materials that are used throughout our community. They are not concentrated in any particular profession or location. They are found in our homes, offices, and industries; nearly everywhere! These mercury sources include: computers, batteries, thermometers, thermostats, silent light switches, lighting, TVs, old latex paint, and contact lens solution. Other widespread sources of mercury emission include wood burning, waste incineration, boat bilge pumps, and home and business heating systems.



Not all sources of mercury are discussed in this manual. Some mercury in our environment has historical origins, such as gold mining, cattle dipping, etc. The sources of mercury discussed in this manual are those that we, as citizens, can have some impact upon. Together we can work to reduce some of the sources and mechanisms that introduce mercury into the environment, into the food chain and into us.

Getting Mercury Out of Our Environment

Our Homes, Our Workplace, Our Food, and Our Bodies!

Besides the industry or business specific measures mentioned above, there are actions or cautions that can be observed to help control the release of mercury into our environment.

Some mercury devices such as fluorescent lights actually reduce the amount of mercury in the environment. This is because the energy they save allows a reduction in the burning of mercury emitting fuels by power plants. If the bulbs are disposed of **properly**, fluorescent lights are actually good for the environment!



Most mercury-containing devices do not create a problem when used in the task they were originally designed for. These devices become a problem at disposal time or if they break during operation.

In Pinellas County, our garbage is incinerated in a “waste-to-energy” plant. If mercury-containing waste makes its way undiscovered to the incinerator, then some of that mercury will end up in the emissions of the power plant. If citizens and businesses take care to separate mercury from the waste stream, the amount of mercury discharged into the environment could be reduced.

An even better solution would be to use devices that do not contain mercury. In the vast majority of its uses, there are acceptable substitutions.

To do your part in protecting the environment and human health:

- * Identify mercury-containing devices in your home and work place
- * When substitutes are available, buy “**mercury-free**” products for your home and workplace
- * Properly dispose of mercury-containing devices

Homeowners in Pinellas County can dispose of mercury-containing wastes and any other household chemicals at the “Household Electronics and Chemical Collection Center” (HEC3) at 2990 - 110th Avenue North, St. Petersburg, FL 33716. HEC3 is open Mondays from 9am-5pm, Thursdays from 10am-6pm, and the third Saturday of each month from 9am-4pm. For information about HEC3 and periodic mobile collections call 464-7500 or visit their website at <http://utility.co.pinellas.fl.us/pcuweb/solidwaste/hc3/hccc1.html>

Small businesses that produce small volumes of waste may also have collection days, call for more details.

For any additional information, please contact the Pinellas County Department of Environmental Management's Pollution Prevention and Resource Recovery Program at (727) 464-4761.

Additional Useful Phone Numbers

Pinellas County

Department of Environmental Management,
Air Quality Division(727) 464-4422

Household Electronics and Chemical Collection Center
24 hour Hotline(727) 464-4623

Utilities/Solid Waste(727) 464-7500

State of Florida

Department of Environmental Protection
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Main Switchboard(850) 488-0300

Emergency State Warning Point(800) 320-0519

Florida Small Business Assistance Program (800) 722-7457

Pollution Prevention Information Clearinghouse..... (202) 260-1023

Earth's 911 for community assistance(800) 947-3873

United States

Environmental Protection Agency

Region IV, Atlanta	(404) 562-9900
Small Business Assistance Ombudsman	(800) 368-5888
Waste Reduction Resource Center	(800) 476-8686
Education and Outreach	(800) 241-1754
RCRA/Superfund Hotline Phone	(800) 424-9346

Websites

Mercury in Schools <http://www.mercuryinschools.uwex.edu/>

Florida Department of Environmental Protection, Mercury Program Directory
<http://www.dep.state.fl.us/waste/categories/mercury/default.htm>

“Reducing Mercury Use in Health Care”, EPA Manual
<http://www.epa.gov/glnpo/bnsdocs/merchealth/>

Sustainable Hospitals
http://www.sustainablehospitals.org/cgi-bin/DB_Index.cgi

Footnotes

1. Allison L. C. de Cerreño, Marta Panero, and Susan Boehme. *Pollution Prevention and Management Strategies for Mercury in the New York/New Jersey Harbor*, (NY: New York Academy of Sciences, 2002), p 17.

2. Laurie J. Tenace. *Best Management Practices for Reducing and Managing Mercury in Florida Medical Facilities: Field Testing, January - July 1999*, Report #S99-8, December 1999 (Florida Department of Environmental Protection), p 5.

3. *Exposure to Mercury Vapor During the Use of Mercury Carburetor Synchronizers*. Center for Disease Control and Prevention, June 1999. DHHS (NIOSH) Publication No. 99-111 document located at <http://www.cdc.gov/niosh/hid6.html>.

4. *Mercury: A Fact Sheet for Health Professionals*. Document located at Michigan State University, Office of Radiation Chemical and Biological Safety website <http://www.orcbs.msu.edu/AWARE/pamphlets/hazwaste/mercuryfacts.html>.

5. *Best Management Practices for Handling Reducing and Recycling Amalgam and Mercury Wastes*, Handout by the Massachusetts Dental Society, Massachusetts Water Resources Authority, Massachusetts Department of Environmental Protection and the Executive Office of Environmental Affairs.

NOTES

NOTES

The **P2**Program's mission is to minimize the amount of liquid, solid and gaseous pollution as well as energy & water consumption within Pinellas County.



For any additional information, contact the Air Quality Division's Pollution Prevention Program at **(727) 464-4422**.

Pinellas County Department of Environmental Management

Air Quality Division
300 S. Garden Ave.
Clearwater, FL 33756



www.pinellascounty.org



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