The UNIVERSITY of VERMONT

Vermont Legislative Research Shop

Mercury

Mercury, an element that comes from both human-made and natural sources, acts as a nerve toxin that may impair the way humans see, hear, walk, and talk (EPA, 1997). "The US EPA has already finalized emission limits for municipal waste combusters and medical waste incinerators. As a result by the year 2000 emissions from these categories will decline at least 90% from 1995 levels"(EPA, 1999).

Mercury can be found in four different forms:

- Mercury metal, which is a silver-gray liquid, is harmful to humans when it is exposed into the air and consequently breathed into the lungs.
- Methylmercury "may be taken into the body by eating certain saltwater and freshwater fish, especially larger fish at the top of the food chain, such as shark, swordfish, large mouth bass, and chain pickerel."
- Inorganic mercury compounds can be found in batteries, over the counter drugs, ointments, nasal sprays, and some herbal medicines. These compounds may be harmful if breathed or swallowed.
- Phenylmercury can be found in latex paints (made before 1991), exterior and oil based paints, caulks, eye area cosmetics, and toiletries. Phenylmercury can be breathed in vapor form, passed through the skin, or swallowed

  (NJ Department of Health, 1998).

Where is Mercury Found?

Mercury can be made from coal burning power plants and incinerators, as well as, from volcanoes and forest fires. Some common items that contain mercury are:

- **Fluorescent, Metal Halide, high-pressure sodium, mercury vapor, and neon lamps (t**he problem is not in the use of these mercury lamps but in the disposal).
- **Mercury switches and relays** that can be found in chest freezers, and sump pumps.
- **Thermostat probes** found in gas fired appliances with pilot lights, including ranges, ovens, cloths dryers, water heaters, furnaces, and space heaters. These probes may also be known as flame sensors or gas safety valves.
- **Thermometers:** Mercury may be found in both typical fever thermometers and larger laboratory thermometers. Also many thermometers used to measure air and water temperature contain mercury. These thermometers which are generally used outside pose a problem when they break because it is difficult to contain the mercury. Alternatives such as spirit-filled and digital thermometers exist. They have been found to be as accurate and last longer because they do not break.

- **Thermostats:** Mercury tilt switches, which require little or no maintenance, as well as no power source, are a convenient way to provide accurate and reliable temperature control. Electronic thermostats, as opposed to mercury thermostats, can be programmed for certain thermostat control therefore resulting in environmental and monetary benefits through saving fuel.
- **Gauges:** Barometers, Manometers, and vacuum gauges that are found in machinery may contain mercury. Many mercury-free alternatives exist.
- **Laboratory solutions**
- **Dental amalgam:** A dental amalgam is restorative material containing about fifty percent mercury along with other silver alloys. Individuals are exposed to mercury in dental amalgams through inhalation of air containing elemental mercury during the filling procedure and, ingestion of amalgam particles through saliva or during restorative procedures (Subcommittee on Risk Assessment of the Committee to Coordinate Environmental Health and Related Programs, 1999).

Why is Mercury Harmful?

Environmental Impacts: Mercury has been known to have harmful effects on fish, birds, and mammals. These effects include impaired growth and development, abnormal behavior, difficulties in reproduction, and even death (EPA, 1999). Mercury enters the environment through a number of fuel combustion, incineration, and industrial processes, as well as through some natural sources. Atmospheric concentrations are, for the most part, very low. Mercury is deposited by way of wet and dry processes to forest ecosystems. It then accumulates in highly toxic forms in the food chain of aquatic ecosystems. This is detrimental to aquatic organisms, which in some cases leads to problems in human health. Mercury exposure from food occurs most often through consumption of mercury contaminated seafood or plants, such as rice. (ExtoxNet, 1999).

Health Impacts: "Mercury is almost completely absorbed into the blood and distributed to all tissues including the brain; it also readily passes through the placenta to the fetus and fetal brain" (EPA, 1999). The first symptoms of mercury poisoning are evident by numbness and tingling of lips, toes, and fingers; this is called paresthesia. "Continued exposure results in stumbling, slurred speech, constricted visual fields, and impaired hearing. In extreme cases tremors and jerks can occur, followed by coma and death," (State of Louisiana Department of Environmental Quality, 1997). "Signs and symptoms associated with mercury intoxication include tremor, ataxia, personality change, loss of memory, insomnia, fatigue, depression, headaches, irritability, slow nerve conduction, weight loss, appetite loss, psychological distress, and gingivitis. Most of these signs of symptoms have been associated with persons with long term occupational exposure to air concentrations of mercury greater than 50 μ g/m^3 whose urinary mercury concentrations are greater than 100 ug/L," (Subcommittee on Risk Assessment of the Committee to Coordinate Environmental Health and Related Programs, 1999).

How is Mercury disposed?

The most effective way to dispose of mercury is through reclamation. Many devices that contain very small amounts of mercury can be disposed of through a reclaiming process. For example button batteries can be recycled at jewelry stores and retail outlets and thermometers can be disposed of through state exchange programs. "Larger quantities of mercury will need to be disposed of by a licensed hazardous waste hauler" (Michigan State University, 1998). For example, mercury-containing lamps must not be incinerated, but must be transported to a hazardous waste landfill or sent to a lamp recycling factory (EPA, 1997). The most important aspect of mercury disposal is that it is not mixed with any other chemical. Elemental mercury must be placed in a sealed container for collection by the EHSS (Environmental Health & Safety Services Laboratory Safety Division) (Virginia Tech University, 1997).

Mercury spills can also be very hazardous to contain. The best way to contain them is to, "collect the mercury in a flask equipped with a pipette and rubber hose connected to a vacuum source. Small droplets of mercury can be amalgamated with zinc dust and the resulting solids swept up. Droplets in crevices can be converted to mercuric sulfide by dusting with sulfur powder"(Colgate University, 1997).

What are other States doing?

Maine: Bill 1924, enacted during the 119th legislative session, contained the following resolutions related to mercury:

- "An act to require informed consent when using mercury in dental procedures…this bill requires informed consent from the patient for a dental procedure involving the use of mercury or mercury amalgam, including information on the intended use potential advantages and disadvantages, and other options for completing the dental procedure."
- As of July 1, 1999, Maine will require manufacturers to disclose to the commissioner all products that contain mercury or have mercury added to them. In this disclosure the manufacturer must state the amount of mercury, and the purpose that the mercury serves.
- As of July 1, 2000 manufacturers must label mercury-added products for consumer knowledge.
- Sellers of lamps that contain mercury must inform the consumer in writing that the lamps contain the hazardous substance.
- Elemental mercury "may only be sold with a material safety data sheet, and may only be sold for the purpose of medical, dental, instructional, research or manufacturing purposes."
- Mercury use will also be banned from all toys, games and apparel. (ME State Legislature, 1999).

Enacted under Bill 2151, new in-stream water quality standards were outlined for mercury, stating that discharge from facilities, as of January 1, 2000, must be under one pound per year. As of January 1, 2002 the discharge must be less than 0.1 pound per year. If any waters are determined to have a concentration of ten parts per billion of mercury, or if a danger to public health exists, the commissioner can issue an emergency order to prohibit the discharge of mercury from any facility (ME State Legislature, 1999).

Minnesota: On March 23, 1999 a bill was introduced into the House and is currently in the Environment and Natural Resources Finance Committee. "This bill establishes goals and strategies for bringing about further reductions of mercury releases in the state" (MN State Legislature, 1999).

Maryland: A bill was enacted on July 1, 1993 stating, "a manufacturer or distributor may not sell or offer for sale or for promotional purposes any package or packaging component or any product in a package or packaging component to which any of the following was intentionally added during manufacture or distribution: … mercury" (MD State Legislature, 1999).

Massachusetts: On January 6, 1999 the Massachusetts House of Representatives referred a bill dealing with the regulation of products containing mercury to the Committee on Natural Resources and Agriculture (MA State Legislature, 1999).

New Mexico: In the first session of the 1999, the Legislature of New Mexico enacted House Bill 39, prohibiting the sale or installation of mercury vapor outdoor lighting fixtures. This bill takes effect on January 1, 2000 (NM State Legislature, 1999).

New Hampshire: A bill was introduced into the Committee of Science, Technology and Energy on March 2, 1999. "This bill would establish a mercury emissions reduction and control program, and require the Department of Environmental Services to conduct a study of the implications of increased mercury levels in the state's ash landfills…" (NH State Legislature, 1999).

Connecticut: In the January 1999 session the Connecticut Legislature enacted a bill, "requiring the labeling of various products which indicates that the item contains mercury and to authorize regulations regarding such labeling" (CT State Legislature, 1999).

References

Colgate University, 1997, <http://offices.colgate.edu/chemmgt/HazWaste/unwanted material.htm>

CT State Legislature, 1999, <http://www.cga.state.ct.us/ps99/tob/h/1999hb%2 D06625% 2D r00%2Dhb.htm>

EPA, 1997 <http://nsdi.epa.gov/glnpo/ p2/mercpam.html>

EPA, 1997 <http://www.epa.gov/docs/GCDOAR/waste.html#merc>

EPA, 1999, <http://www.epa.gov/oar/mercover1.html>

ExtoxNet, a Cooperative effort of the University of California-Davis, Oregon State, Michigan State, Cornell University, and the University of Idaho, 1999, <http://ace.orst.edu/info/extoxnet/>

MA State Legislature, 1999,<http://www.magnet.state.ma.us/legis/history/h03125.htm>

MD State Legislature, 1999 <http://mgasearch.state.md.us/ search97cgi/s97is>

ME State Legislature, 1999, <http://janus.state.me.us/legis/>

MN State Legislature, 1999, <http://www.house.leg.state.mn.us/hrd/bs/81/hf/1508.html>

Michigan State University, 1998, <http://www.orcbs.msu.edu/AWARE/pamphlets/hazwaste/ mercuryfacts.html>

NH State Legislature, 1999, <http://www.state.nh.us /gencourt/bills/99bills/hb0625.html>

NJ Department of Health, 1998, <http://www.state.nj.us/ health/eoh/ survweb/ mercury. htm>

NM State Legislature, 1999, <http://legis.state.nm.us>

Subcommittee on Risk Assessment of the Committee to Coordinate Environmental Health and Related Programs, 1999, <http://web.health. gov/environment/amalgam1/appendixlll. htm>

State of Louisiana Department of Environmental Quality, 1997, <http://www.deq.state.la.us/owr/mercury/mercsumm.htm>

Virginia Tech University, 1997 <http://www.ehss.vt.edu/labsafe/disp.html>

Completed by Paul Kapsch, Matt Landi, and Sarah Schwartz on May 5, 1999.