

Appendix E. Related Government Mercury Programs

The state and federal government have created many other programs to control mercury pollution. Many of these programs were enacted recently and will help to reduce mercury in fish in California. Some of the major programs are summarized here. Also, state health advisories on fish consumption are described in this appendix. Other programs to address mines and mining are described in a separate appendix.

E.1 Global Programs

United Nations Environment Programme Global Mercury Partnership

The overall goal of the United Nations Environment Programme Global Mercury Partnership is to protect human health and the global environment from the release of mercury and its compounds by minimizing and, where feasible, ultimately eliminating global, anthropogenic mercury releases to air, water and land. The Partnership works closely with stakeholders to assist in the timely ratification and effective implementation of the Minamata Convention on Mercury.

The Minamata Convention on Mercury is a global treaty to protect human health and the environment from the adverse effects of mercury. It was ratified at the fifth session of the Intergovernmental Negotiating Committee in Geneva, Switzerland at 7 a.m. on the morning of Saturday, 19 January 2013. As of August 14, 2015, the treaty has 128 signatures from different countries, including the United States.

E.2 National Regulations

Mercury and Air Toxics Standards (MATS)

On February 16, 2012, the United States Environmental Protection Agency (U.S. EPA) issued a regulation that placed emissions standards for hazardous air pollutants from certain fossil-fuel based power plants. (40 C.F.R. §§ 60, 63, 77 Fed.Reg. 9304, amended April 24, 2013, 78 Fed.Reg. 24073.) The rule established, among other regulations, the Mercury and Air Toxics Standards (MATS) to reduce emissions from new and existing coal and oil-fired electric utility steam generating units. This rule is the first to regulate mercury emissions from coal-fired power plants and will ultimately decrease the amount of mercury released by 90% (40 C.F.R. § 63). (<https://www.epa.gov/mats>).

Mercury Emissions Regulations

U.S. EPA has issued several regulations addressing the major contributors of mercury to the air, including, for example, municipal waste combustors; hospital, medical, and infectious waste incinerators; chlor-alkali plants; and hazardous waste combustors

(www.epa.gov/mercury/regs.htm#air or <http://www.epa.gov/ttn/oarpg/t3pfpr.html>). U.S. EPA issued regulations for these source categories under different sections of the Clean Air Act (42 U.S.C. § 7401 et seq.), including sections 111, 112, and 129. As the result of U.S. EPA's regulatory efforts, the United States achieved a 79 percent reduction in domestic mercury air emissions between 1990 and 2011 (U.S. EPA 2015, U.S. EPA 2016). For cement plants, U.S. EPA issued a final rule On August 9, 2010, to limit emissions of mercury and other toxics from Portland cement plants. (40 C.F.R. §§ 60, 63.).

For petroleum refineries, there is no regulation on mercury in the emissions. The United Nations Environment Programme estimates of emissions to air from human activities show that artisanal and small-scale gold mining is the largest single contributor to mercury emissions (37%), followed by coal combustion (24%), while oil and gas industry emissions from refining and the combustion of oil and natural gas constitute less than 1% of total anthropogenic emissions (United Nations Environment Programme 2013). A U.S. EPA report on mercury emissions from production and processing of petroleum and natural gas estimated that the total amount of mercury released exceed 10,000 Kg yearly in the U.S., but there was a high degree of uncertainty due to lack of data (U.S. EPA 2001).

Mercury Export Ban Act of 2008

The United States enacted the Mercury Export Ban Act on October 14, 2008, and the act went into effect on January 1, 2013. (15 U.S.C. § 2611.) This Act directed federal agencies to permanently store stockpiles of elemental mercury, prohibited the sale, distribution or transfer of mercury by all public agencies in the country, banned exports of mercury from the United States, and established a storage system for stockpiles of mercury. According to the United States Geological Survey (USGS), exports of mercury from the United States dropped from 103 metric tons in 2012 to less than 500 kilograms in 2013; imports also declined from 249 metric tons in 2012 to an estimated 15 metric tons in 2015 (USGS 2016). The decline in imports is likely being driven by technological advancements in LED lighting technology, which has substantially offset demand for elemental mercury in florescent and compact florescent light bulbs. Because the United States is ranked as one of the world's top exporters of mercury, implementation of the act was anticipated remove a significant amount of mercury from the global market. (www.epa.gov/mercury/regs.htm#ban).

Mercury-Containing and Rechargeable Battery Management Act of 1996

The Mercury-Containing and Rechargeable Battery Management Act of 1996 (Battery Act) phases out the use of mercury in batteries, and provides for the efficient and cost-effective disposal of used nickel cadmium (Ni-Cd) batteries, used small sealed lead-acid (SSLA) batteries, and certain other regulated batteries. The statute applies to battery and product manufacturers, battery waste handlers, and certain battery and product importers and retailers (www.epa.gov/mercury/regs.htm#act).

The Frank R. Lautenberg Chemical Safety for the 21st Century Act

On June 22, 2016, President Barack Obama signed the Frank R. Lautenberg Chemical Safety for the 21st Century Act into law. This act was designed to amend and modernize the 37-year-old Toxic Substances Control Act (TSCA, 15 U.S.C. § 2601 et seq.). Most notably, the Chemical Safety Act requires the U.S. EPA to determine whether a new chemical achieves a health-based safety standard before the chemical can be sold in commercial markets. All newly developed chemicals containing any mercury will fall under the requirements of this Act. In addition, the Chemical Safety Act included new reporting requirements for private entities that manufacture of mercury, and requires U.S. EPA to produce an inventory of mercury supply, use and trade in the United States.

E.3 State Regulations

California's Mercury Reduction Act

California's Mercury Reduction Act (SB 633) effective January 1, 2003 restricts mercury containing products in several ways (DTSC 2002). This act prohibits any school from purchasing devices and materials containing mercury for use in classrooms and labs, except measuring devices when no adequate alternative exists. The act bans the sale or distribution of fever thermometers containing mercury without a prescription from a doctor, dentist, veterinarian or podiatrist. This act also prohibits the manufacture, sale, or distribution of mercury added novelty items in California, such as jewelry, games, maze toys, or toys that light up or make noise. In automobiles, this act encourages removal and recovery of switches containing mercury, i.e., convenience lights under the hood or in the trunk, from vehicles before disposal or recycling of the vehicle. This act bans the sale of vehicles manufactured on or after January 1, 2005, if they have light switches containing mercury.

California's Safer Consumer Products Regulations

The California legislature and Governor Schwarzenegger implemented the California Green Chemistry Initiative (CGCI) in 2008 by passing "joined" bills, AB 1879 and SB 507. A component of the CGCI authorizes and requires the Department of Toxic Substances Control (DTSC) to adopt regulations to establish a process to identify and prioritize chemicals in consumer products and to establish a process for evaluating chemicals of concern in consumer products and their potential alternatives.

As directed by regulation, the DTSC's started the Safer Consumer Products program on October 1, 2013 and is phasing in regulatory measures and program elements for the last three years. The overall goals of the program are to reduce toxic chemicals in consumer products, create new business opportunities in the emerging safer consumer products economy, and reduce the burden on consumers and businesses struggling to identify chemicals in products bought for families and customers. To date, the Safer Consumer Products program has developed a Candidate Chemical List of over 2,000 chemicals of concern, including mercury and several groups of mercury compounds (DTSC 2016). In addition, the Safer Consumer Products program has developed alternatives analyses for Priority Products containing some

chemicals of concern. Following an anticipated rulemaking, businesses that manufacture such products will be required to report on chemically safer alternatives for their production processes. (<http://www.dtsc.ca.gov/SCP/>).

Local Programs

The DTSC is also tasked with implementing regulations regarding Universal Waste (DTSC 2010) and California's Mercury Reduction Act (DTSC 2002). Universal Waste is lower risk waste than hazardous waste. A wide variety of people generate universal waste vs. hazardous waste which is mainly generated by industrial businesses. These programs require recycling and proper disposal of mercury containing products, such as batteries, compact fluorescent lights (CFLs), by businesses and individual households. There are local programs in many cities to contain mercury in consumer products and prevent the mercury from ending up in run off or sewer systems from improper disposal. Households should check the following web-sites for a location nearest them to take their wastes: [CIWMB database](#), [eRecycle.org](#) or [Earth911.org](#).

Mercury-containing items that should be taken to a Universal Waste drop off are:

Batteries. Universal waste batteries include rechargeable nickel-cadmium batteries, silver button batteries, mercury batteries, small sealed lead acid batteries (burglar alarm and emergency light batteries), most alkaline batteries, carbon-zinc batteries, and any other batteries that exhibit a characteristic of a hazardous waste.

Lamps. Universal waste lamps include fluorescent tubes and bulbs, high intensity discharge lamps, sodium vapor lamps, and any other type of lamps that exhibit a characteristic of a hazardous waste. Also, any electric lamp that contains added mercury, whether or not it exhibits a hazardous waste characteristic, is a universal waste.

Mercury thermostats. These thermostats contain small glass capsules with mercury, a shiny liquid metal, to make electrical contact. (Modern electronic thermostats do not contain mercury.)

Mercury switches. Two different types of mercury switches are universal wastes:

- 1) Motor vehicle switches that contain mercury. Any mercury switch that is removed from a vehicle is a universal waste. When they are to be crushed for scrap, vehicles that contain mercury light switches are also universal waste until the mercury light switches are removed.
- 2) Non-automotive mercury switches and products that contain them. These switches include thermostats and tip switches in portable heaters, washing machine out-of-balance switches, silent wall switches, and other mercury-containing switches and products containing them. All discarded products that contain mercury switches are universal wastes.

Mercury thermometers, including fever thermometers.

Pressure or vacuum gauges that contain mercury, such as U-tube manometers, barometers, and sphygmomanometers (blood pressure meters.)

Dilators and weighted tubing. These medical devices contain mercury.

Rubber flooring that contains mercury. Some older gymnasium floors that were poured in place to form indoor tracks and gymnastic areas contain mercury.

Mercury-Added Novelties. This category includes practical joke items, figurines, jewelry, toys, games, cards, ornaments, yard statues and figures, candles, holiday decorations, and footwear that contain mercury or mercury batteries. Effective January 1, 2003, the California Mercury Reduction Act banned sale of mercury-added novelties in this state, but some people still have them in their homes.

Mercury gas flow regulators. These older gas flow regulators are managed exclusively by natural gas utilities.

Counterweights and dampers, including devices that use mercury's high density to dampen shaking on hunting bows and snow skis or to absorb recoil on shotguns.

Dental amalgam tooth filling materials including waste amalgam, bits and pieces from chair side traps, and spent wastewater filters.

Gauges. Vacuum and pressure gauges that contain mercury, including blood pressure gauges, barometers, and manometers

Mercury Recycling Pilot Project

The State Water Board, DTSC, U.S. EPA, United States Forest Service (USFS), and Bureau of Land Management (BLM) teamed up in 2000 to go door-to-door collecting mercury in Nevada, Sierra, and Placer Counties. Four hundred pounds of mercury were collected at no charge to residents. USFS and BLM assisted with the cost. (Presentation slides: waterboards.ca.gov/water_issues/programs/cwa401/docs/suctiondredge/mercury_recycle.pdf)

California Bay Area Air District Board - Portland Cement Rule 2012

Regulation 9, Rule 13 Nitrogen Oxides, Particulate Matter and Toxic Air Contaminants from Portland Cement Manufacturing includes strict emissions limits for nitrogen oxides, particulate matter and toxic air contaminants, such as mercury, benzene and hydrochloric acid. Under the new rule, all emissions at the facility must be monitored and must not pose a significant threat to the neighboring community, as demonstrated by a health risk assessment. When the rule was established, there were 10 Portland cement facilities in California. One of these facilities is located in the Bay Area - the Lehigh facility in Cupertino. The rule is expected to lead to dramatic reductions in toxic emissions at the Lehigh facility, such as a 93 percent reduction in mercury emissions, a 90 percent reduction in benzene and a 70 percent drop in hydrochloric acid. The rule will also generate a significant reduction in emissions of NOx, which is an ozone precursor.

E.4 State Health Advisories

Fish Contaminant Goals

The California Office of Environmental Health and Hazard Assessment (OEHHA) developed a methylmercury Fish Contaminant Goal (FCG) that recommends 0.22 mg/kg in fish tissues as a

Draft Staff Report: Part 2 of the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California – Tribal and Subsistence Fishing Beneficial Uses and Mercury Provisions

safe concentration for consumption at a rate of one 8 ounce meal a week (32 g/day, Klasing and Brodberg 2008). This is calculated using the same calculation as in the sport fish water quality objective (in the Provisions), using a reference dose (described in Section 3.9) of 0.0001 µg/kg, a body weight of 70 kg, except that OEHHA did not subtract an amount from the reference dose to account for exposure from commercially bought fish.

FCGs were developed using an 8-ounce (227 g) serving size (prior to cooking; approximately six ounces after cooking). FCGs are based solely on public health considerations relating to exposure to each individual contaminant, without regard to economic considerations, technical feasibility, or the counterbalancing benefits of fish consumption.

Advisory Tissue Level

OEHAA also calculated Advisory Tissue Levels (ATLs, Klasing and Brodberg 2008). These guides present similar information as the in the FCG, but in a way that people can more easily understand. The ATLs recommend an amount of fish that is safe for people to eat. These numbers have an additional goal of encouraging consumption of the least contaminated species. OEHHA Methylmercury ATLs are as follows: Fish with methylmercury concentration of 0.150-0.440 ppm are suitable for one 8-ounce serving a week (equivalent to 32 g/day) for Women aged 18-45 years and children aged 1-17 years. Fish tissue concentrations of 0.070 -0.015 ppm and ≤ 0.070 correspond to two and three meals a week, respectively. ATLs are also provided for the remainder of people (women over 45 and men) that are 3 times as high. ATLs were calculated using the same general formulas as those used to calculate FCGs, with some adjustments in order to incorporate the health benefits of fish consumption. Therefore, the acceptable mercury concentrations in each category range from mercury concentrations above the FCG to mercury concentrations below the FCG. ATLs are not meant to indicate an acceptable concentration of mercury in fish.

Public Education Programs

OEHHA and the California Department of Public Health (CDPH) along with the Water Boards and other local agencies have provide information to the public through multi-lingual signs and pamphlets indicating safer (fish with lower level of contaminant including mercury) fish to eat and suggesting limits for the amount to consume of the more contaminated species.

The Fish Mercury Project was led by the San Francisco Estuary Institute (SFEI) and funded by California and Federal Bay-Delta Program (CALFED). This was a \$4.5 million project to examine mercury in fish in the Bay-Delta watershed. The project increased public awareness of fish contamination issues and monitored mercury concentrations around marsh restoration projects in the Delta. Partners in this project included the UC Davis, the California Department of Fish and Wildlife (CDFW), Moss Landing Marine Lab, the CDPH, and OEHHA.

Similarly, the San Francisco Bay Fish Project was a two year project to reduce human exposure to mercury and polychlorinated biphenyls from eating contaminated fish in San Francisco Bay. It was coordinated by CDPH in partnership with the Aquatic Science Center, OEHHA, and the

San Francisco Bay Regional Water Quality Control Board. Primary funding for the project was provided by the Bay Area Clean Water Agencies, the Western States Petroleum Association, the Bay Area Stormwater Management Agencies Association, and U.S. EPA.

The Central Valley Regional Water Quality Control Board is currently working on a public exposure reduction program for anglers in the Sacramento-San Joaquin Delta. This is being done as part of the Sacramento-San Joaquin Delta Estuary Total Maximum Daily Load for Methylmercury.

References

DTSC (California Department of Toxic Substances Control). 2010. Managing Universal Waste in California. Fact Sheet 2008. California Department of Toxic Substances Control.
<https://www.dtsc.ca.gov/HazardousWaste/UniversalWaste/upload/UniversalWfactsheetfinal.pdf>

DTSC (California Department of Toxic Substances Control). 2002. SB 633: California's Mercury Reduction Act of 2001. Fact Sheet. May 2002. California Department of Toxic Substances Control. http://www.dtsc.ca.gov/HazardousWaste/Mercury/upload/EA_FS_SB633-2.pdf

DTSC (California Department of Toxic Substances Control). 2016. Informational List of Candidate Chemicals and Chemical Groups. California Department of Toxic Substances Control. <https://calsafer.dtsc.ca.gov/chemical/search.aspx> (accessed Dec 2016).

Klasing S, Brodberg R. 2008. Development of Fish Contaminant Goals and Advisory Tissue Levels for Common Contaminants in California Sport Fish: Chlordane, DDTs, Dieldrin, Methylmercury, PCBs, Selenium, and Toxaphene. June 2008. Office of Environmental Health Hazard Assessment. Sacramento, CA.

U.S. EPA (U.S. Environmental Protection Agency). 2001. Mercury in Petroleum and Natural Gas: Estimations of Emissions from Production, Processing, and combustion. Prepared for U.S. EPA Office of Air Quality Planning and Standards. Prepared by National Risk Management Research Laboratory, Research Triangle Park, NC 27711. EPA/600/R-01/066. September 2001.

United Nations Environment Programme. 2013. Global Mercury Assessment 2013: Sources, Emissions, Releases and Environmental Transport. UNEP Chemicals Branch, Geneva, Switzerland.

U.S. EPA (U.S. Environmental Protection Agency). 2015. 2011 National Emissions Inventory, Version 2, Technical Support Document. August 2015
www.epa.gov/sites/production/files/2015-10/documents/nei2011v2_tsd_14aug2015.pdf

U.S. EPA (U.S. Environmental Protection Agency). 2016. EPA's Report on the Environment (ROE). Washington, DC. <http://cfpub.epa.gov/roe/index.cfm> (accessed June 2016).