

Letter Health Consultation

CHASSELL MERCURY RELEASE IN PORTAGE LAKE

CHASSELL, HOUGHTON COUNTY, MICHIGAN

Prepared by
Michigan Department of Community Health

AUGUST 20, 2012

Prepared under a Cooperative Agreement with the
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Agency for Toxic Substances and Disease Registry
Division of Community Health Investigations
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

A health consultation is a verbal or written response from ATSDR or ATSDR's Cooperative Agreement Partners to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR or ATSDR's Cooperative Agreement Partner which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

You May Contact ATSDR Toll Free at
1-800-CDC-INFO

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Visit our Home Page at: <http://www.atsdr.cdc.gov>

LETTER HEALTH CONSULTATION

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Under Cooperative Agreement with
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Agency for Toxic Substances and Disease Registry (ATSDR)



STATE OF MICHIGAN
DEPARTMENT OF COMMUNITY HEALTH
LANSING

RICK SNYDER
GOVERNOR

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DIRECTOR

August 20, 2012

James Mitchell
Health Physicist/On-Scene Coordinator
U.S. EPA Region 5 Emergency Response Branch
77 W. Jackson Blvd.
Chicago, IL 60604

Dear Mr. Mitchell:

In response to your request to the federal Agency for Toxic Substances and Disease Registry (ATSDR) to provide a public health evaluation of an elemental mercury release in Portage Lake in Chassell (Houghton County), Michigan, the Michigan Department of Community Health (MDCH) Division of Environmental Health reviewed the environmental data and concluded that **the mercury concentrations in the sediment samples are not expected to harm people's health.**

On July 2, 2012, people swimming in Portage Lake, which connects to Lake Superior in Chassell, Michigan, found two metal flasks about 30 to 40 feet off-shore from the property. One of the flasks reportedly had no seal, resulting in the elemental mercury that was in it being spilled in the water and sinking to the sediment. The U.S. Environmental Protection Agency (EPA) and the Michigan Department of Environmental Quality (MDEQ) were called to the scene to investigate. They requested assistance from the Western Upper Peninsula Health Department (WUPHD), which has a mercury vapor analyzer (Lumex). The Lumex survey confirmed the presence of elemental mercury.

On July 3, EPA conducted a cleanup of visible contamination on the dock and on the lake bottom. The U.S. Coast Guard also provided assistance during the response. When the initial cleanup efforts were completed, EPA collected three sediment samples to determine the levels of residual mercury contamination. The results showed 4.8 micrograms per kilogram (ug/kg), or parts per billion (ppb), in the background sample, 45 ppb in the flask location sample, and 5.7 ppb in the sample taken near the end of the dock. On July 5, EPA collected an additional sediment sample at the flask location, which contained a mercury level of 3.8 ppb¹.

Although the mercury concentrations in these initial sediment samples were below screening levels for human health or ecological concerns (discussion below), visible mercury was still reported to be present on the lake sediment. To verify the extent of the mercury contamination,

¹ Results from July 3rd and 5th samples are in Weston's July 10, 2012 Data Validation Report for Chassell Mercury Spill Site, Chassell, Michigan, Laboratory Project # 1207175.

EPA developed a Field Sampling Plan (FSP)² to conduct a more detailed characterization of the mercury contamination around the area of the original flask location and the dock.

Based on the FSP, EPA took 109 sediment samples in a grid pattern from the area in which the spill occurred. Most of the samples were taken within the top six inches of sediment, though some samples were from cores taken as deep as 30 inches. Nearly all of the samples contained less than 10 ppb mercury. Three samples had 50, 51, and 120 ppb mercury. These samples were located near the middle of the sampling grid, all taken from the 0-6" depth³. The highest sediment concentration (120 ppb) is similar to that reported for Lake Superior sediments (80-110 ppb)⁴.

There are no specific human health criteria for evaluating exposure to contaminants in submerged sediments. However, the Michigan Residential Direct Contact Criterion (DCC), which considers skin contact and accidental ingestion, for mercury in soil is 160,000 ppb⁵. We considered the DCC as a screening value that is also protective of exposure to mercury in sediments. Since none of the sediment samples exceeded even the DCC criteria, ATSDR and MDCH do not consider this potential exposure to be a public health hazard. In addition, elemental mercury is not readily absorbed through the skin, so direct contact with elemental mercury embedded within the sediment does not pose a health hazard to individuals who may be swimming or wading in the contaminated area.

The primary concern for exposure to elemental mercury is through inhalation of mercury vapors. Exposure to mercury can affect the central nervous system, especially in children and fetuses, and the kidney. Since the elemental mercury found in the sediment in shallow water would have a very limited ability to volatilize through the water into the ambient air, it does not pose an inhalation exposure hazard. Any brief inhalation exposure to the swimmers when the mercury was on the dock would not cause harm.

The only potential future human health concern would be the ecological impact resulting from the bioconversion of elemental mercury into organic forms of mercury that could accumulate in fish through the food chain. This could result in human exposure through fish consumption. However, given the relatively small area of impact and the amount of mercury in this spill, this pathway may not have a significant impact. In addition, the levels detected were all below the EPA- Region 5 Ecological Screening Level for mercury in sediment (174 ppb)⁶.

The EPA is cleaning up the contamination from this spill, and that from another flask that was found in the area. While no public health hazard is expected, MDCH tries to use these events as "teachable moments" for people who have mercury-bearing items in their possession. Therefore, we recommend the following:

² Weston Document Control Number 1894-4H-AWWL, dated July 10, 2012.

³ Results taken from RTI Laboratories' Analytical Report for Work Order # 1207453 (date not given). Analyses conducted July 17-19, 2012.

⁴ Kerfoot, W.C. et al., Local, Regional, and Global Implications of Elemental Mercury in Metal (Copper, Silver, Gold, and Zinc) Ores: Insights from Lake Superior Sediments. *J. Great Lakes Res.* 30S1: 162-184, 2004.

⁵ See http://www.michigan.gov/documents/deq/deq-rrd-OpMemo_1-Attachment1Table2SoilResidential_283553_7.pdf.

⁶ See <http://epa.gov/region05/waste/cars/pdfs/ecological-screening-levels-200308.pdf>.

- 1) People who see beads of liquid mercury at the shoreline or in the sediments should not try to collect it themselves because breathing the vapors can be harmful to their health. Observations of liquid mercury should be reported to the WUPHD.
- 2) People should be informed that if similar flasks are found either in or out of the water, they should contact the WUPHD.
- 3) MDCH encourages people with mercury-containing items (such as thermometers, thermostats, and barometers) to recycle these items so that the risk of an indoor mercury release, which can pose a more serious threat, is minimized. People may call MDCH at 1-800-648-6942 or access the mercury website at www.michigan.gov/mercury for more information.

If we can be of further assistance, please do not hesitate to contact us.

Sincerely,



Christina Bush, Toxicologist
Toxicologist
MDCH



Mark Johnson,
Senior Environmental Health Scientist
ATSDR

CC: Western Upper Peninsula Health Department
Steve Harrington, MDEQ