

Health Consultation

BENSENVILLE, ILLINOIS RESIDENTIAL MERCURY SPILL

1100 BLOCK OF ARGYLE STREET

BENSENVILLE, DUPAGE COUNTY, ILLINOIS

JANUARY 9, 2009

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

Public Health Service

Agency for Toxic Substances and Disease Registry

Division of Health Assessment and Consultation

Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR 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 which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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HEALTH CONSULTATION

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Prepared By:

Illinois Department of Public Health
Under cooperative agreement with the
Agency for Toxic Substances and Disease Registry

PURPOSE

In October 2007, the Bensenville Fire Department requested that the Illinois Department of Public Health (IDPH) assist in consulting and sampling a mercury spill in a Bensenville home. In response to this request, IDPH staff assisted the residents, local officials and the U.S. Environmental Protection Agency (USEPA). This health consultation summarizes the public health response to this incident.

BACKGROUND AND STATEMENT OF ISSUES

On October 5, 2007, the Bensenville Fire Department notified IDPH of a residential mercury spill. The home, located in the 1100 block of Argyle Street in Bensenville, was undergoing remodeling when the spill was reported.

On September 21, 2007, while demolishing a wall, the resident observed a silver, metallic liquid running down his hammer. The source was thought to be a container of mercury that had been sealed in the wall by a previous occupant of the home. The person attempted to clean up the mercury with a shop vacuum, and disposed of the mercury in trash receptacles. On October 4, 2007 another family member noticed small mercury beads on the floor and contacted the Bensenville Fire Department.

Upon entering the home the hazardous materials (HAZMAT) team observed small beads of mercury on the floor. The Bensenville Fire Department temporarily condemned the home and the resident moved in with family members.

On October 10, 2007, USEPA mobilized a cleanup contractor to sample and remediate the home. The contractor set up a contamination reduction zone, which included heaters, negative air units and mercury vacuums. Using a Lumex mercury vapor analyzer (MVA) the contractor measured the mercury concentrations inside the home. The basement area had mercury concentration of 55 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) and the first floor had a concentration of $44\mu\text{g}/\text{m}^3$. The MVA has an upper reporting limit of $50\mu\text{g}/\text{m}^3$ and levels greater than that may be inaccurate.

In 2000, the Agency for Toxic Substances and Disease Registry (ATSDR) and IDPH established a residential mercury cleanup clearance vapor level of $1\mu\text{g}/\text{m}^3$ and a residential relocation action mercury vapor level of $10\mu\text{g}/\text{m}^3$. These values were used as the basis for data interpretation for this response investigation.

Contractors were at the site remediating the mercury contamination from October 10, 2007 to October 30, 2007. A mercury extraction solution was applied to the floors in the basement and the first floor and vacuumed using a specialized mercury vacuum. Heaters and fans were used to evaporate the mercury and to ventilate the home. The contractor also installed new filters in the furnace and turned the system on to allow it to vent any dust and particulates in the ductwork. Contaminated items in the home were bagged and stored in the garage.

Bagged items from the garage were removed and disposed of if they had a mercury vapor level exceeding $10 \mu\text{g}/\text{m}^3$, the guidance value set for personal items. The garage was then decontaminated using a mercury extraction solution followed by vacuuming. Cracks in the concrete also were caulked with a sealant. Upon remediation the mercury concentration in the garage was $0.317\text{-}0.384 \mu\text{g}/\text{m}^3$ (breathing zone) and $0.223\text{-}0.702 \mu\text{g}/\text{m}^3$ (floor surface), which is less than the cleanup clearance level.

On October 29, 2007, ten samples were taken throughout the home and sent to an analytical laboratory for testing for mercury contamination. On October 30, 2007, all ten samples were reported to be less than the cleanup clearance of $1 \mu\text{g}/\text{m}^3$.

DISSCUSSION

Mercury vapor levels in the home on Argyle Street were, prior to remediation, greater than the mercury cleanup clearance vapor level as well as the relocation mercury vapor action level originally established by ATSDR and IDPH in 2000. In addition, clean-up crews observed free mercury droplets in areas where remodeling was taking place. After extensive remediation the mercury vapor levels were less than clearance levels set by ATSDR and IDPH.

Chemicals of Interest

IDPH compared the results of each environmental sample with the appropriate screening comparison value used to select chemicals for further evaluation for carcinogenic and non-carcinogenic health effects. Chemicals found at levels greater than comparison values or those for which no comparison values exist were selected for further evaluation. The only chemical of interest for this response investigation was metallic mercury, also known as elemental mercury.

Metallic Mercury

Mercury occurs naturally in the environment and exists in several forms. These forms can be organized under three headings: metallic mercury, inorganic mercury, and organic mercury. Metallic mercury metal is the liquid metal used in thermometers, some electrical switches and medical devices. Metallic mercury is a shiny, silver-white metal that is a liquid at room temperature. At room temperature, some metallic mercury will evaporate to form colorless and odorless mercury vapor. The higher the temperature, the more vapors will be released from liquid metallic mercury.

Exposure Evaluation

Persons are exposed to metallic mercury primarily through inhalation of mercury vapor. Ingestion of and direct contact with metallic mercury are not significant routes of exposure. When metallic mercury vapors are inhaled, they readily enter the bloodstream and are carried throughout the body. Permanent damage to the brain can occur from exposure to sufficiently high levels of metallic mercury. Metallic mercury vapors may affect many different areas of the brain and their associated functions, resulting in a variety of symptoms. These include

personality changes (irritability, shyness, nervousness), tremors, changes in vision (constriction or narrowing of the visual field), deafness, muscle in-coordination, loss of sensation, and difficulties with memory.

Short-term exposure (hours) to high levels of metallic mercury vapor in the air can damage the lining of the mouth and irritate the lungs and airways, causing tightness of the chest, a burning sensation in the lungs, and coughing. Other effects from exposure to mercury vapor include nausea, vomiting, diarrhea, increases in blood pressure or heart rate, skin rashes, and eye irritation.

During initial sampling, prior to remediation levels at the home exceeded $50 \mu\text{g}/\text{m}^3$. This level was greater than the residential mercury cleanup clearance vapor level of $1 \mu\text{g}/\text{m}^3$ and a mercury vapor relocation action level of $10 \mu\text{g}/\text{m}^3$. Consequently, workers and residents were exposed to mercury at levels higher than guidance values set forth by ATSDR and IDPH.

Blood sampling results from one person involved in the remodeling of the home indicated exposure to elevated levels of mercury vapor. IDPH staff spoke with the affected resident and other persons potentially affected by the spill. IDPH counseled the person with the elevated blood mercury level to be re-tested in a month after his initial elevated result. After cleanup, the home had no visible mercury present and mercury vapor levels were less than $1 \mu\text{g}/\text{m}^3$ thus eliminating future exposure to elevated levels of mercury vapor. After clearance by IDPH, the resident moved back into the home.

CONCLUSIONS

Based on the sampling information collected before remediation, IDPH concludes that a public health hazard existed from mercury contamination in the home on Argyle Street in Bensenville, Illinois. After the cleanup and removal of contaminated personal items, exposure to mercury has been reduced to acceptable levels and the public health hazard no longer exists.

RECOMMENDATIONS

IDPH recommended that the individual with the elevated blood mercury level be retested within a month after the initial test. In addition, IDPH offered to resample the home to determine that mercury vapor levels remain less than residential clearance levels.

Preparers of Report

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REFERENCES

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2. "Residential Mercury Spill from Gas Regulators in Illinois (a/k/a Nicor) Health Consultation" *Illinois Department of Public Health*. March 2, 2001.
3. "Toxicological Profile for Mercury" *Agency for Toxic Substances and Disease Registry*. Updated March 1999.
4. "United States Environmental Protection Agency Pollution Report: Bensenville, Illinois Mercury Spill" *USEPA Pollution Report*. October 16, 2007.

Certification

This Bensenville, Illinois Residential Mercury Spill health consultation was prepared by the Illinois Department of Public Health under a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR). It was completed in accordance with approved methodologies and procedures existing at the time the health consultation was initiated. Editorial review was completed by the Cooperative Agreement partner.



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The Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this health consultation and concurs with its findings.



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