



Mercury-Containing Devices On Gas Service Lines

What are the dangers?

What should be done?

October, 2002

The issue

Mercury-containing gas regulators, valves, or other devices were installed on some residential natural or manufactured gas lines in the United States from about 1920 to 1960. Mercury-containing regulators were used to regulate natural gas pressure in houses to a certain range (pressure regulators), and other types of mercury-containing devices (such as 'slam-shut valves') may have restricted the flow of gas following a low or high pressure incident. While pressure regulators were typically installed on natural gas company lines, other devices may have been installed by the homeowner or by the gas company doing work for the homeowner. . When any of these mercury-containing devices are removed, mercury may be spilled, exposing residents to dangerous levels of mercury vapors.



Photo #1

Typical Pressure Regulator

Mercury-containing pressure regulators typically have horizontal disc-shaped bodies (see photo #1), as opposed to non-mercury regulators that are mounted vertically. Mercury-containing pressure regulators typically contain between 1 and 2 teaspoons of mercury. Most mercury-containing regulators that have been found in the upper Midwest have been pressure regulators. A device found on a low-pressure system in St. Paul (photo #2) may have contained 1/4 cup of mercury. Calculations performed by the Minnesota Pollution Control Agency (MPCA) suggest that a spill of 1 - 2 teaspoons mercury, from any device, may result in hazardous concentrations of mercury in air in a basement for about 80 years. Contamination from larger spills may result in much greater health hazards.



Photo #2

Mercury-containing device found on a low-pressure system

The prevalence of mercury-containing devices on natural gas lines in Minnesota is not known but they are thought to be uncommon. Information from other areas of the country suggests that mercury spills in houses that may have had mercury regulators or devices are relatively rare. In the Chicago area, spills requiring remediation occurred in less than 1% of the houses believed to have been supplied through mercury-containing regulators. However, the resulting contamination and potential exposure of residents has serious health implications.

In June 2001, a mercury-containing device (low-pressure system - 6" WC – 8" WC), shown in photo #2, was found in a house in St. Paul and removed. An unknown amount of mercury was spilled during removal. Mercury slowly vaporizes at room temperature; however, vacuuming even with a mercury vacuum can exacerbate the problem, increasing levels of mercury vapor. A mercury vacuum was used during preliminary clean-up in this situation and mercury concentrations in air were measured at up to 200 times the MDH level of concern for short-term (acute) exposures. An expensive cleanup was necessary.

Health concerns

Mercury is a nervous system poison, which also affects reproduction and development. Developing fetuses and young children are especially at risk from mercury exposure. Mercury vapor is easily absorbed in the lungs and is toxic at low concentrations in air. MDH is concerned about the potential health effects from both long-term (chronic) exposures to mercury vapors and from short-term exposures.

The first concern is mercury exposures from vapors inside buildings. However, improper disposal of mercury and mercury spills in the environment are also of health concern. Elemental mercury that is released into the environment will slowly volatilize into the atmosphere. Mercury vapor will eventually be converted to reactive gaseous mercury and deposited globally. This mercury reaches aquatic systems where it is converted into methylmercury by bacteria. Methylmercury is concentrated in aquatic food chains. Predatory fish, at the top of the aquatic food chain, may accumulate large concentrations of methylmercury. Consumption of large predatory fish (e.g. walleye, northern pike), especially by pregnant women and children, can lead to adverse health effects from methylmercury toxicity.

MDH Recommendations

MDH has developed the following recommendations related to mercury-containing gas devices in houses:

1. Anyone who believes that their gas line has a mercury-containing device should notify their gas company.
2. Natural gas distributors in Minnesota should be aware of these devices and train appropriate employees on their identification. If devices are discovered, they should be removed from service.
 - a. Mercury-containing gas devices should be removed only by specially trained personnel.
 - b. Extreme care should be taken to not spill any mercury during removal.
 - c. All mercury and mercury-contaminated materials must be treated as hazardous waste and disposed of properly.
3. Ambient mercury vapor monitoring should be performed following removal of mercury-containing gas devices when a spill occurs. Vapor concentration data should be recorded.
 - a. Residents and the Minnesota State Duty Officer (below) should be notified immediately if mercury is spilled during removal
 - b. Residents should not be exposed to mercury vapor concentrations exceeding 1800 ng/m³ anywhere in the house, even for a short period of time.
 - c. Mercury vapor monitoring should be performed with instrumentation or methods that can detect mercury vapor concentrations below 300 ng/m³. MDH considers mercury vapor concentrations below this to be safe.
 - d. Residents should be notified if ambient mercury concentrations following a spill clean-up exceed 300 ng/m³.
4. If a spill occurs, addresses, ambient mercury vapor data and other information related to the removal of mercury-containing gas devices should be recorded into a permanent gas utility company record.

Contacts for more information

Portable instruments are available from a number of companies (including Ohio Lumex and Nippon Instruments) to accurately measure mercury vapor concentrations below levels of health concern. Information about other sources of mercury (such as thermometers, thermostats, fluorescent light bulbs, and some electrical switches), cleanup and disposal issues is available from the Minnesota Pollution Control Agency (<http://www.pca.state.mn.us/air/mercury-faq.html>)

Report spills to the Minnesota Duty Officer at: (800) 422-0798 or from the Twin Cities metro area at (651) 649-5451

For cleanup advice, call the MPCA through the Minnesota Duty Officer

For acute exposures or health concerns contact a physician or the Poison Hotline: 1-800-222-1222

For information related to human health and potential exposure to mercury contact MDH at: 651-215-0916 or toll-free at (800) 657-3908, and press '4'

This fact sheet was developed with support from the Agency for Toxic Substances and Disease Registry (ATSDR), U.S. Department of Health and Human Services.