

MERCURY USE: AGRICULTURE

from John Gilkeson, MPCA

Mercury was traditionally used in agricultural chemicals as a fungicide, mildewcide, or pesticide. All food uses of mercury-containing pesticides were cancelled in 1969, and all US pesticide registrations were canceled in as of early 1995. The last four uses to be cancelled were turf fungicide, mildewcide for fresh cut wood, latex paint fungicide/preservative, and outdoor fabric treatment. However, many mercury-containing chemicals may still be present on farms or golf courses in the form of old stockpiles. These materials should be targeted by waste pesticide collection programs or clean sweep programs to prevent further emissions to the environment.

John Gilkeson of the Minnesota Pollution Control Agency began his extensive inventory of mercury-containing products through an examination of mercury used in pesticides. He has developed a list of over 150 trade and chemical names of pesticides used between the 1950's and present that contain mercury.

John reports that some mercury-containing pesticides are still being manufactured and used in developed countries. For example, Canada still allows the use of mercuric pesticides for turf mold. It is also possible that mercury-containing pesticides are manufactured in this country for export abroad.

Keeping mercury out of the environment

When mercury-containing pesticides or fungicides are used, some of the mercury may, over time, be volatilized to the atmosphere. This mercury may then be deposited into lakes and streams, methylated, and ingested by fish, eventually reaching wildlife and humans. It is therefore very important to keep these materials out of the environment.

ACTION IDEAS TO CONSIDER

- ✓ Actively participate and increase interest in your local farm-a-syst or clean sweep program.
- ✓ Get the word out about mercury-containing pesticides to your local golf courses.

BIBLIOGRAPHY

The information included in this pamphlet is essentially a compilation of the best mercury pollution prevention work to date. Information was gathered from the documents below; some material may have been quoted directly from these sources:

“Mercury Products Study,” John Gilkeson, Minnesota Pollution Control Agency, May 1996

“Trade and Chemical Names of Mercury Containing Pesticides,” by John Gilkeson, Minnesota Pollution Control Agency, 1996

ABOUT THIS HANDOUT

This is one chapter of the “Wisconsin Mercury SourceBook.” The Sourcebook was written as a guide for communities to help identify and reduce the purposeful use of mercury. The SourceBook contains background information on mercury contamination and provides a seven-step outline for drafting a mercury reduction plan.

This handout is one of the nineteen sectors that were highlighted in the SourceBook as a potential contributor of mercury in any given community.

What you will find in this handout:

- ★ Information on mercury-containing products and that are unique to the agriculture industry
- ★ Action ideas that describe pollution prevention, recycling, and management practices for a mercury reduction plan for a business in this sector. This provides a good overview of the types of mercury-containing products and alternatives that may exist in your sector.
- ★ Current mercury projects in the agriculture industry

For more information, please contact:

WHY SHOULD I BE CONCERNED ABOUT MERCURY?

Some of you may remember playing with mercury when you were a child. Its silvery white shimmer was entrancing, and the ability of its glistening mass to split and come back together again was magical. But scientists are now beginning to realize that there is another side to mercury's wily nature. In fact, it is some of mercury's most elemental qualities that make it a difficult substance to handle.

Mercury is a common element that is found naturally in a free state or mixed in ores. It also may be present in rocks or released during volcanic activity. However, most of the mercury that enters the environment in Wisconsin comes from human uses.

Because mercury is very dense, expands and contracts evenly with temperature changes, and has high electrical conductivity, it has been used in thousands of industrial, agricultural, medical, and household applications.

It is estimated that half of the anthropogenic mercury releases in Wisconsin are the result of the purposeful use of mercury. The other half of mercury emissions originate from energy production.

Major uses of mercury include dental amalgams, tilt switches, thermometers, lamps, pigments, batteries, reagents, and barometers. When these products are thrown in the trash or flushed down a drain, the mercury doesn't go away.

The good news is that the majority of products that use mercury purposefully have acceptable alternatives. For example, electric vacuum gages, expansion or aneroid monitors are good alternatives to mercury blood pressure monitors. Mechanical switches, magnetic dry reed switches, and optic sensors can replace mercury tilt switches.

Replacing mercury-laden products with less toxic alternatives is

referred to as *source reduction*. Source reduction allows us to eliminate the use of mercury in certain waste streams. This is especially beneficial considering the volatile nature of mercury, because mercury can so easily transfer from air to soil to water.

Practicing source reduction in combination with recycling the mercury already in the waste stream can have a significant impact on reducing mercury levels in the environment.

HEALTH EFFECTS OF ELEMENTAL MERCURY

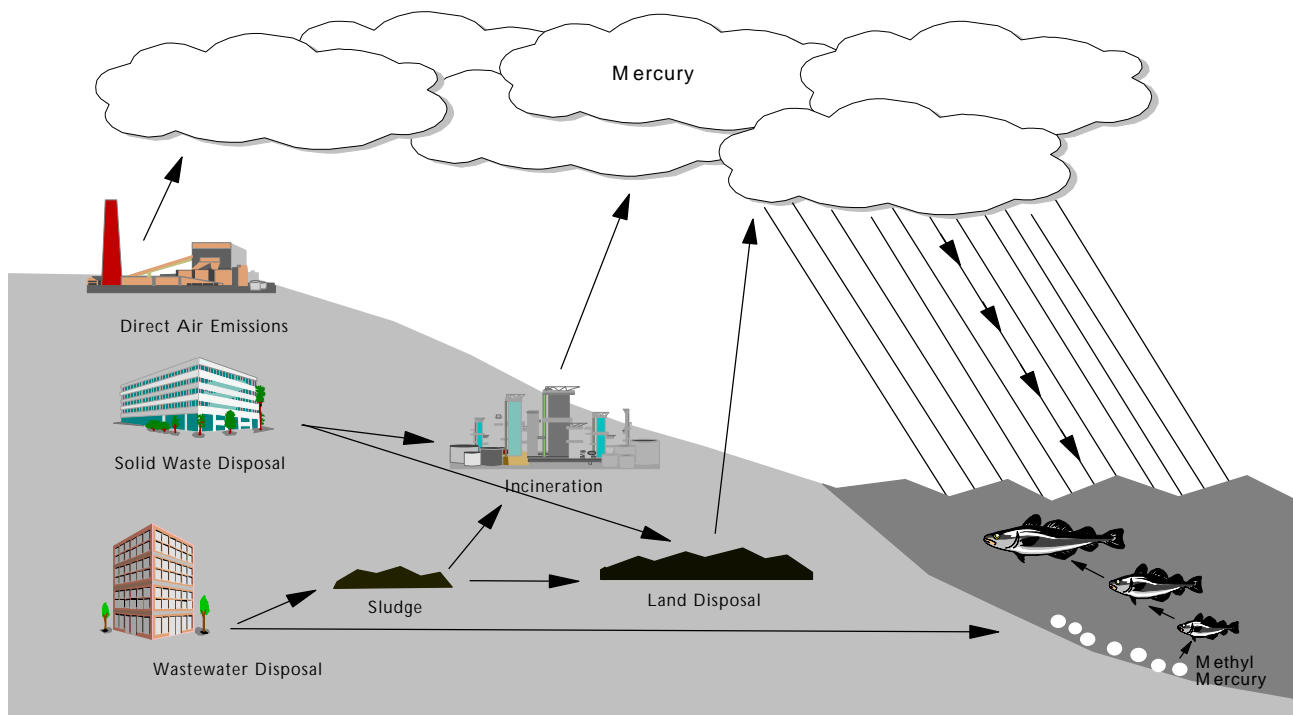
The toxicity of mercury has long been known to humans. Hat makers during the 19th century developed symptoms of shaking and slurring of speech from exposure to large amounts of inorganic mercury, which was used to give a metallic sheen to felt hats. This gave rise to the term "mad as a hatter."

The hat makers were suffering from neurological damage from the inhalation of mercury fumes. Exposure to elemental mercury vapors can cause acute respiratory problems, which are followed by neurologic disturbances and general systemic effects. Acute exposure to inorganic mercury by ingestion may also cause gastrointestinal disturbances and may effect the kidneys.

SO WHAT'S THE BIG DEAL?

Mercury is a bioaccumulative, persistent, toxic substance that threatens the health of humans and wildlife throughout North America. The USEPA, Environment Canada, the International Joint Commission, the Commission for Environmental Cooperation and many state and provincial governments have identified mercury as one of the most critical pollutants for significant elimination and/or reduction.

Mercury Transport and Bioaccumulation



Mercury can enter the environment from a number of paths. For example, if a mercury-containing item is thrown into the garbage, the mercury may be released into the atmosphere from landfill vapors or leachate, or the mercury may vaporize if the trash is incinerated. If mercury is flushed through a wastewater system, the mercury will likely adhere to the wastewater sludge, where it has the potential to volatilize and be deposited elsewhere. Mercury can enter the atmosphere through these various means because it evaporates easily. It then travels through the atmosphere in a vaporized state.

Once mercury is deposited into lakes and streams, bacteria convert some of the mercury into an organic form called *methylmercury*. This is the form of mercury that humans and other animals ingest when they eat some types of fish. Methylmercury is particularly dangerous because it *bioaccumulates* in the environment. Bioaccumulation occurs when the methylmercury in fish tissue concentrates as larger fish eat smaller fish. A 22-inch Northern Pike weighing two pounds can have a mercury concentration as much as 225,000 times as high as the surrounding water.

These concentrations are significant when one considers the potential toxic effects of methylmercury. Methylmercury interferes with the nervous system of the human body and can result in a decreased ability to walk, talk, see, and hear. In extreme examples, high levels of methylmercury consumption has resulted in coma or death.

Many animals that eat fish also accumulate methylmercury. Mink, otters, and loons in Wisconsin have been found to have high levels of mercury in their tissue. Mercury can interfere with an animal's ability to reproduce, and lead to weight loss, or early death.

Fish Consumption Advisories

There are currently 260 lakes and more than 350 miles of rivers in Wisconsin that have fish consumption advisories because of mercury.

Approximately 1 out every 3 sites that is tested is listed on the advisory; no sites have ever been removed. Forty-eight states now issue fish consumption advisories to protect human health. Most of these warnings are related to mercury contamination.

Current Mercury Work – Agriculture

Collection Programs

Project: *Clean Sweeps of Waste Pesticides*

Description: Minnesota, Wisconsin, and Michigan all run pesticide collection programs

Agencies working on this project:

MN Department of Agriculture

WI DATCAP

Specific Outreach/Research

Project: *Green Thumb Project*

Description: Highlights ways in which non-point source run-off from the use of toxic-containing products can affect wastewater treatment plants. Examines use of unused stock of mercury-containing pesticides

Agencies working on this project:

WLSSD