

REDUCING MERCURY USE IN INDUSTRIAL FACILITIES

The purpose of this fact sheet is to create awareness about the hazards of mercury and outline things you can do to reduce or even eliminate mercury from your processes and operations. Decreasing mercury use has many advantages that can be good for your facility and the environment. These include:

- Protection of human health by reducing occupational exposures and releases of mercury to the air, water and land;
- Minimization of mercury spills, costs for recovery and cleanup, and environmental liability;
- Avoidance of costs associated with the use of mercury, such as disposal and recycling, spill response, protective equipment, recordkeeping and training;
- Avoidance of future regulation;
- Enhanced public image.

Taking steps to reduce mercury use will help demonstrate your facility's commitment to protecting the environment. You will show your customers, peers and the community that you can be an industry leader.

What is the Problem with Mercury?

Mercury has long been known to pose serious health and environmental risks when released to the environment through human uses. In an industrial setting, the most common routes of exposure include inhalation of mercury after a spill or accidental skin contact with mercury.

When mercury is spilled, or a device containing mercury leaks, it can spread easily and vaporize at room temperature. Small droplets of mercury can lodge in porous/cracked surfaces, mix with dust and get into and under equipment. This increases the potential for evaporation and continuous contact over time. If not cleaned up properly, prolonged exposure to the mercury vapors can lead to serious health problems, ranging from nervous system disorders (hand tremors, memory loss and irritability) to kidney damage, to nausea and diarrhea.

When mercury containing items are broken over a sink, or improperly cleaned up after a spill, the mercury can get into drains and sewer lines. Once in the water, mercury becomes a contaminant that must be removed by a wastewater treatment plant. The mercury can end up in the wastewater sludge, where it has the potential to evaporate, travel through the atmosphere and be deposited elsewhere.

Mercury released into the air will eventually settle into water or onto land. When mercury is deposited in lakes or rivers, it can be converted into methylmercury. This is an organic form of mercury that builds up in the tissue of fish, and wildlife and humans

who eat the fish. Health effects associated with long-term mercury exposure include damage to the brain, nervous system, kidneys and a developing fetus.

Due to the presence of mercury in fish and the potential consequences for people who eat the fish, public health officials have issued fish consumption advisories, cautioning pregnant women, women of childbearing age, nursing mothers and young children to limit their intake of certain fish that are higher in mercury.

Where Can Mercury Be Found?

Due to its unique properties – including temperature sensitivity, conductivity, ready amalgamation with other metals and catalytic properties – mercury has been used in a wide range of products and equipment over the years. It may be found in different areas of your facility. Some may be obvious, while others may be in places you don't expect. These areas include:

- A component in equipment and controls, such as pressure gauges, industrial thermostats, wattage meters, flow meters, ring balances, level and flotation sensors and high intensity discharge lamps;
- An ingredient in laboratory chemicals, such as mercury nitrate;
- A contaminant in feedstock chemicals or raw materials, such as caustic soda;
- A constituent in manufactured products, such as electrical apparatus or instrument manufacturing.
- A by-product of a production process, such as smelting or lime manufacturing.

Within an industrial facility, you may find mercury-containing devices installed in electrical units, boiler rooms, distribution boxes, sumps, machinery, and measurement and control instruments. Some facilities may also have elemental mercury on site for refilling mercury-containing equipment.

Facilities that do extensive lab testing may have old mercury compounds sitting on shelves in laboratories or chemical supply rooms. Obsolete or broken equipment containing mercury may be stored in basements and storage areas. Mercury hot spots in piping and traps may exist where laboratory or equipment maintenance activities took place.

Although the mercury concentration in industrial chemicals may be low, the total mass of mercury in your wastewater stream can be significant due to the large quantities of feedstock materials used on a daily basis.

What Can Facilities Do?

For most mercury-containing equipment and materials, the preferred management practice is to reduce or eliminate the source of mercury at your facility. This will reduce the opportunity for a release. The good news is that most of products and equipment that use mercury intentionally have feasible alternatives.

However, it may not be possible to replace all mercury-containing items at once, and, in some instances, there may not be an acceptable substitute. In such cases, the best approach is to set priorities for limiting mercury use and have effective procedures in place to prevent mercury releases from materials and equipment.

Below is a list of action steps to help you launch a mercury reduction initiative at your facility. Your program should include goals, action steps and timelines. It is also important to evaluate the progress of your program to ensure ongoing reductions in mercury use.

Planning and Assessment:

- Secure management buy-in and support for a mercury reduction initiative.
- Designate a multi-functional team to coordinate mercury reduction efforts.
- Develop goals for reducing mercury use that can become part of your facility's overall environmental improvement goals.
- Require certificates of analysis from suppliers on all feedstock chemicals known to have potential mercury contamination. The certificate of analysis should list mercury content in parts per billion, not as a percentage.
- Create a baseline inventory that identifies the locations and quantities of mercury. Examine equipment, products, raw materials and storage areas. Update the inventory as products are phased-out or purchased.
- Establish a system to track and evaluate mercury reduction efforts and update your program, as needed.
- Keep staff, suppliers and customers informed about your mercury reduction initiative.
- Publicize your mercury reduction successes.

Spill Prevention/Response:

- Inspect all equipment and devices that use or contain mercury.
- Label equipment and devices containing mercury. If you are uncertain if a device contains mercury, contact the manufacturer for verification.
- Train staff in preventing and cleaning up mercury spills. Keep mercury spill kits in convenient, accessible locations.
- Clean out laboratories, basements and storage areas of obsolete equipment and materials containing mercury. All items should be properly recycled or disposed.
- Establish procedures to check and remove historical mercury from pipes, sumps and traps in your sewer lines.

Mercury Reduction:

- Reduce the use of mercury-containing compounds in your laboratories with mercury-free alternatives.
- Use a low-mercury alternative if mercury contamination is discovered for material feedstock.
- Evaluate non-mercury alternatives for mercury-containing equipment and materials. Start with devices that pose an immediate risk to the environment, if damaged.
- Ask suppliers to assist you in identifying mercury-free alternatives.
- Use mercury-free alternatives when renovating buildings or replacing old equipment.
- Recycle or dispose of mercury-containing products in an environmentally sound manner. Check RCRA and universal waste rules for appropriate management options.
- Include mercury-free preferences in product specifications when ordering equipment and materials. If no alternative is available, choose the product containing the least amount of mercury for that particular device or material.

Where to go for more information?

You will not have to reinvent the wheel to implement a mercury reduction program. Steel mills, oil refineries, pulp and paper mills, shipyards and medical facilities have developed successful initiatives that can help you get a program off the ground. While each facility is unique with its own set of challenges and opportunities, you should be able to tailor a program that meets your specific circumstances.

To help build support for a mercury reduction effort, you will find a list of resources outlined below that includes information on mercury sources, alternatives for mercury use, collection and recycling options and planning activities.

We suggest that you start with a few departments or buildings first. This will help you build momentum and gain experience in identifying and implementing mercury reduction measures at your facility.

- Mercury Managing, Recycling, Disposing: A Business Guide to Conducting a Mercury Audit
www.dep.state.pa.us/dep/deputate/pollprev/p3erie/Mercbroch.pdf
- Conducting an Internal Mercury Audit for Manufacturing Facilities
www.p2pays.org/ref/22/21178.pdf
- A Guide to Mercury Reduction in Industrial and Commercial Settings
www.delta-institute.org/publications/Steel-Hg-Report-0627011.pdf
- Prescription for Mercury and PCB Reduction: Guidance for Oil Refineries,
www.ci.superior.wi.us/documents/Environmental%20Services/Mercury/Prescription%20for%20Mercury%20and%20PCB%20Elimination.pdf
- Mercury Assessment: Portsmouth Naval Shipyard
<http://www.newmoa.org/publications/mercstudies/PortsmouthStudy1.pdf>
- Wisconsin Mercury Sourcebook
www.epa.gov/glnpo/bnsdocs/hgsbook/
- Mercury Spills and Recycling/Disposal
<http://www.idph.state.il.us/envhealth/factsheets/mercuryspills.htm>
<http://www.epa.state.il.us/mercury/mercury-recycling.html>