MERC CONCERN

# MERCURY IN SCHOOLS

# MERCURY ELIMINATION GUIDELINES

## Where to Find It and How to Remove It

**According to Public Act 376 of 2000 (Enrolled Senate Bill #1262), Michigan's public and private, K-12 schools, have until December 31, 2004, to phase out mercury use in the classroom and in the health (nurse's) office. Schools shall "not purchase, store or use free flowing elemental mercury… or use an instrument that contains mercury." This law applies to liquid (free flowing) elemental mercury, as well as, mercury-containing instruments such as thermometers, barometers, manometers, and sphygmomanometers (blood pressure gauges).**

NOTE*: It is the Michigan Department of Environmental Quality's (DEQ's) interpretation that other mercury-containing compounds and devices found in buildings such as thermostats, light switches, relays or fluorescent lights, are not impacted by this legislation. However, it is recommended that as these products reach the end of their useful (functioning) lives, they be replaced with mercury-free alternatives or if none are available, as is the case with fluorescent lights, the lowest mercury content product available.*

### ABOUT THIS DOCUMENT

This document was developed to provide guidance to Michigan Schools in safely eliminating mercury and instruments that contain mercury. It is written for those individual(s) responsible for carrying out this task. Individual programs may vary to better accommodate their specific needs.

## Mercury Overview

Mercury is a silvery colored heavy metal that is liquid at room temperature. When heated or exposed to the atmosphere it emits dangerous vapors. In the past, mercury was used in thousands of household and commercial products and industrial processes. Even a small amount of mercury released to the environment can be converted by organisms to methylmercury (highly toxic) which can be magnified up the aquatic food chain hundreds of thousands of times and subsequently endanger humans and wildlife that consume fish. Michigan is one of 41 states that have issued fish consumption advisories due to mercury contamination.

DEQ MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

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## NINE STEPS TO BECOMING A MERCURY-FREE SCHOOL

**1** **OBTAIN ADMINISTRATIVE SUPPORT**. In order for your mercury reduction program to be effective, it is imperative that upper management is involved prior to initiation. Typically the School System Superintendent, Principal, or other top-level administrator issues a formal directive or memorandum. This directive announces a project coordinator or point person. The larger the number of schools working together cooperatively, the higher the cost savings in handling, transportation, and recycling costs. However, larger projects require precise coordination and demand strict adherence to proper safety procedures (see: Step 9).

**2** **ADOPT MERCURY-FREE PURCHASING POLICIES.** The next step is to enact policies that prohibit the purchase of free-flowing elemental mercury and mercury instruments. Make this policy known to vendors. Prominently display formal pledges, policies, or mission statements that commit to mercury elimination and inform school employees of this commitment. Have purchasing personnel search through product catalogs that people commonly order from and remove the mercury-containing products from those pages. It makes little sense to rid a school of mercury only to have new mercury instruments reappear in the classrooms at some future date due to inadequate communication.

**3** **CONDUCT A MERCURY AUDIT.** Designate from each school one individual or team of persons that has the responsibility to compile a comprehensive mercury audit. Targeted rooms for the audit include Science, Chemistry, Biology, and Physics, as well as school health offices as primary focal points. For each location compile information on quantities and types of mercury-containing instruments. The size of the school(s) and the responsibilities of different teachers may affect the methods used in obtaining this information. Use one or more of the following methods to compile an accurate assessment: ►Door to door audits, ►written surveys, ►e-mail queries, and ►evaluations of purchasing inventories. Once an inventory is performed, results are consolidated and compiled. This information comprises the 'big picture' as to where mercury is found in your facility.

In some instances other metals such as lead, copper, silver, or other substances may have been added to the mercury during classroom demonstrations or by students "playing" with mercury. If any of the liquid elemental mercury has been contaminated, it would constitute a regulated hazardous waste. In addition, where "unique" instruments are identified for collection, determine if they contained other hazardous waste constituents besides mercury. Keep testing results, or documentation of the school's knowledge that the elemental mercury was not contaminated and instruments only contained elemental mercury, for at least three years. Discuss waste characterization questions with a hazardous waste inspector from your DEQ's Waste Management Division (WMD) District Office.

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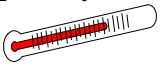
## 4 DEVELOP COST ANALYSIS AND IMPLEMENTATION PLAN.

The Cost Analysis determines program costs for handling, packaging, transportation, and recycling, as well as capital costs required replacing mercury devices with mercury-free alternatives. Hopefully, the 'mercury exodus' can proceed as one event, however, in some instances it may be necessary to establish a phased-out approach. For example, if funding for the entire project is not immediately available, the mercury reduction effort will need to be implemented in stages. In this case, an implementation plan is developed that prioritizes replacement of the mercury-containing products and contains a timetable for project completion. The completed program cost analysis and implementation plan is then presented to appropriate authorities to obtain approval and funding to proceed. Tips for prioritizing mercury elimination:

1) Go for the easiest targets or "low hanging fruit" first. Eliminate liquid elemental mercury, then replace instruments that contain the largest quantities of mercury.
2) Mercury instruments prone to breakage or handling by students should also be ranked high on the priority list. Examples include sphygmomanometers and thermometers used in the classroom.



3) Also, prioritize equipment in poorly ventilated common areas that cannot be isolated in the event of a spill and in areas where younger children (5-12) might frequent. Take note, young and unborn children are the most susceptible to the toxic affects of mercury vapors, the most dangerous routes of mercury exposure.

## 5 COORDINATION AND COMMUNICATION.

Whether you have decided to conduct a 'clean sweep' event or a staged phase-out program, the project coordinator works closely with Science, Chemistry, Biology, and Physics teachers and the health office throughout the project. These teachers, custodians, and other key maintenance personnel are advised of the program and trained, at a minimum, with a few key principles on how to respond to a mercury spill. They are educated on the difference between a small and large (2 tablespoons or more) mercury spill and what the legal reporting requirements are for a large spill and who to contact in the event of a spill. Mercury spill kits are made readily available to those involved. Spill kits are inexpensive and available from many scientific supply catalogs or can be assembled using some simple household and garden supplies (see: www.deq.state.mi.us/ead/pub/p2/mercspills.pdf for more information and a list of suppliers). Everyone is also made aware of the reasons behind the need for removal and the five most important measures in the event of a mercury spill:

1) Immediately restrict traffic in the spill zone area.
2) Never vacuum up a mercury spill.
3) Contain the spill as best as possible.
4) Never throw mercury or mercury-laden articles in the trash or pour mercury down the drain.
5) Get qualified assistance.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6 **CONSOLIDATE THE MERCURY.** Once you've inventoried all the mercury and mercury-containing instruments, carefully move them to a convenient, locked, secure, location within each building or complex. It is advised that this procedure be performed by a small group of trained individuals, after hours, when fewer people are on the premises. Have mercury spill kit(s) available for those performing this procedure and have people trained on responding to spills. Students should not be involved in this process.

As a Michigan school, you may have the option to manage collected mercury instruments as, "Universal Wastes." Elemental mercury must be the only hazardous waste constituent in the instrument. This is an alternative approach in lieu of handling them under the more complex hazardous waste requirements. Recycling universal waste is advantageous since accumulated totals are not counted when determining a schools hazardous waste generator status. The generator status determines the applicable hazardous waste regulations the school is subject to. Do not remove mercury from the devices since there are additional universal and hazardous waste requirements that would apply. Most schools will fall into the "Small Quantity Handler" category, where by definition they accumulate less than 5,000 kilograms (11,000 pounds) total of all universal wastes at any time. (Don't confuse the "universal waste handler" category with "hazardous waste generator status requirements"). If your facility exceeds this amount or for more information on universal waste requirements visit: www.deq.state.mi.us/ead/pub/tas/univwast.pdf.

Store elemental mercury and mercury instruments sorted by the type of device, in unbreakable container(s). Containers must be kept closed, in good condition, and be compatible with the type of waste put into them. Clearly label each device or container as "Universal Waste-Mercury Thermometers" or "Universal Waste-Mercury Barometer(s)" etc. You may substitute the wording "Waste" or "Used" in place of "Universal Waste" when labeling universal waste. A tracking system is required to document the length of time universal waste is accumulated. Date each container with the first date universal waste was placed into it or use other tracking systems, such as a log sheet identifying the dates universal waste was put in the container. A universal waste handler may only accumulate universal waste for a maximum period of one year after it was first collected. (This is a longer time period than what is allowed for small or large quantity hazardous waste generators.)

Immediately contain any universal waste exhibiting evidence of breakage, leakage, or damage that could cause the release of mercury or other hazardous constituents. Store it in sound packaging compatible with the waste and any spill residues cleaned up. Keep the package closed to contain vapors. Next, determine if any of the materials or residue would be a hazardous waste. Depending on the amount of release, you may have spill reporting requirements.

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6 **CONSOLIDATE THE MERCURY (continued).** The following materials must be managed under all applicable hazardous waste regulations:

►Any collected item the school decides to manage as a hazardous waste instead of universal waste; ►Any device that contains other hazardous waste constituents besides elemental mercury; ►Any elemental mercury that was contaminated; and ►Any universal waste that was broken or damaged so that it could cause the release of mercury to the environment, and any contaminated residuals associated with leakage, breakage, or damage.

Since there are different labeling, accumulation, and shipping requirements for hazardous waste, call the Environmental Assistance Center at 800-662-9278 or contact your DEQ's WMD District Office staff to discuss questions about these requirements.

'Free flowing' liquid elemental mercury that is 99% pure may be treated as a "commodity" and therefore is not subject to waste regulations. However, mercury may still be regarded as an U.S. Department of Transportation (DOT) hazardous material during transport (see: Step 8).

7 **IDENTIFY A RECYCLER.** Carefully select where you will send your mercury for recycling. Consult the DEQ's Mercury Pollution Prevention (P2) Web Page for a list of Mercury Recyclers or drop-off sites at: www.deq.state.mi.us/ead/p2sect/mercury. Many of these facilities will accept mercury from schools. Always contact the recycler first before sending any mercury and carefully follow the instructions they provide. If the material is being shipped out of Michigan, check with the receiving state's environmental agency to see if they accept mercury devices as universal waste or if they have other requirements, as this may affect your decision which recycling company to use.

In some instances, suppliers of science and laboratory equipment will accept mercury instruments in exchange for purchasing mercury-free equipment. These suppliers may also offer technical assistance and other mercury elimination services. The programs vary in scope, services, and price. The best advice is to read all the literature carefully, evaluate options, and decide whether or not they fit your specific needs.

Recovered mercury and mercury-containing instruments are consolidated and eventually sent to retort facilities that generally use a triple distillation process to recycle the mercury. At present, this is the preferred approach since a safe disposal (retirement) or encapsulation process has not been fully developed and endorsed by the appropriate environmental regulatory authorities. The mercury collected may be used for essential purposes such as in low mercury fluorescent lighting. It may also serve to reduce global demands and prevent mining of new mercury sources.

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**8** **DETERMINE HANDLING AND TRANSPORT METHOD.** The total amount and type of mercury and mercury instruments you identified in Step 3, will be useful in helping you decide whether to hire an outside contractor or to handle the transportation and drop-off of the material yourself, and whether or not you can manage it as universal waste or must handle it as hazardous waste. Regardless of what transportation method you choose, use unbreakable packaging, including secondary or even tertiary containment to prevent a leak or spill. Sealed plastic containers inside larger plastic containers, wrapped in strong plastic bags are good precautionary measures. Universal waste must be taken to another universal waste handler (Clean Sweep Program, an identified central location or school in the district, another school district, or business who has agreed to accept the universal waste) or to a destination facility that treats, disposes, or recycles that material. Before taking universal waste to another universal waste handler or destination facility, make arrangements with them first to ensure they will accept your collected items.

**Get A Receipt** -- A hazardous waste manifest is not necessary in order to ship universal waste within Michigan. If the material is being taken out of Michigan, check with the receiving state's environmental agency as to their requirements since some states have different universal waste requirements. Universal waste regulations do not require a Small Quantity Handler to keep records of their shipments, although in some instances you are required to have shipping papers under the Federal Hazardous Materials Regulations. Regardless of the recycler or the transportation method you choose, having a tracking receipt will document when, where, and how much mercury is sent off for recycling. If no receipt or shipping papers were required, it is advised that you create one and have the hauler and recycler sign and date your list. This record(s) may be useful in the future for documenting compliance with Public Act 376 and reducing potential liabilities. Keep the shipping records for at least 3 years. NOTE: If your shipment is refused after it is received, additional regulation may be applicable.

**Transport Options:**

MAILING OR SHIPPING

The U.S. DOT regulates transportation of hazardous materials. When shipped by air or vessel, elemental mercury would be regulated as a hazardous material. Packages containing one pound or more of mercury in one package would also be regulated as a hazardous material when shipped by highway. Mercury instruments in packages of less than one pound are only regulated in transportation by air. The shipping requirements include proper labeling, marking, and shipping papers. It is highly advised not to mail mercury via the U.S. Postal Service unless you fully understand all legal requirements. To obtain complete details call: 202-268-5168. Specify that the question is regarding the proper shipment of mercury and specify the UN number (UN2809). The United Parcel Service and Fed Ex, and other shippers employ stringent requirements about shipping mercury and mercury instruments and in some cases, prohibit it all together. Contact them directly for details.

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## 8 DETERMINE HANDLING AND TRANSPORT METHOD (continued).

**Transport Options (continued):**

REGISTERED HAZARDOUS WASTE TRANSPORT

A school that uses a permitted and registered hazardous waste transporter for other hazardous waste shipments may also choose to have them transport their universal waste. This is not required by law, however, is certainly a viable alternative. Another option is to hire another 'contracted carrier' like a trucking company, for example. Considerable cost savings can be realized if a group of schools combine programs and solicit bids for this service. Experience has shown that costs vary widely. Check their prices, credentials, reputation, and references.

When using contracted carriers to transport mercury instruments, or manufactured articles containing mercury by highway, the school will need to meet applicable transportation regulations when the material is a hazardous waste, or reportable quantity (RQ) of a hazardous substance as defined in 49 CFR 171.8. One pound or more of mercury in one package would constitute a RQ of a hazardous substance and any material subject to hazardous waste manifest requirements constitutes a hazardous waste. Packages containing less than one pound of mercury are not regulated as a hazardous substance when shipped by highway (This figure is derived by determining the total weight of the mercury in the instruments). Should you have questions regarding the transportation requirements of hazardous materials, contact the Michigan State Police, Motor Carrier Division at 517-336-6580. If your school is handling the materials as hazardous waste, then contact the Environmental Assistance Center at 800-662-9278 or the DEQ's WMD District Office to discuss questions about hazardous waste requirements.

EMPLOYEES OR VOLUNTEERS

School employees or volunteers may transport universal waste and are exempt from the federal hazardous material transportation requirements. However, be very careful when using employees or volunteers to load and deliver the mercury to drop-off locations. Although it may be possible to transport the mercury yourself and even appear much less expensive, carefully consider the following risks. What if en-route, the vehicle is involved in an accident? What if there is a spill either inside the vehicle or on to the pavement? What are the possible risks and liabilities if people are exposed to mercury vapors, etc? What if a spill results in having to scrap a vehicle or replace carpeting, seats, etc? What if the spill results in an environmental contamination incident and subsequent cleanup ensues? What costs will insurance cover and more importantly, not cover? How might the media portray such an event? As you can see, there are many factors to consider in addition to just the initial cost of transport. The lowest price may not necessarily be the best price.

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**9 ADOPT BEST MANAGEMENT PRACTICES.** Congratulations! Now your school is "virtually" mercury-free but, even in exemplary programs, some mercury may still remain in thermostats, switches, relays, fluorescent lights. In addition, mercury may show up in previously unknown sources or be brought into the school. For these reasons, it is important to adopt a mercury spill management plan that clearly outlines the necessary steps to properly respond to a mercury spill, should one occur. Key elements of this plan include information on proper procedures, regulations, emergency numbers, 'reportable' quantities, and exposure thresholds. Highlight practices such as never using a vacuum to pick up a mercury spill and never mop up a mercury spill and pour the residuals down the drain. Make mercury spill kit(s) accessible and train individuals in their use. Post emergency numbers and spill reporting requirements. In the event of a mercury accident, trained personnel should be accessible at all times and ready to respond in a moment's notice.

## FOR MORE INFORMATION

**Visit the DEQ's Website at:**
www.deq.state.mi.us/ead/p2sect/mercury/schools.htm

**or Call:**

Environmental Assistance Center, 800-662-9278 (on Disposal and P2 Alternatives)
Environmental Education Coordinator, 517-335-6928 (for Additional Educational Resources)


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