Best Management Practices Recommendations for Mercury Waste Management in Schools

Prepared by City of Clinton, NC Public Works and Utilities, for the control of mercury discharged to the sanitary collection system by Schools.

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INTRODUCTION

The recommended best management practices (BMPs) for school facilities in this pamphlet are designed to prevent pollution and assist schools in the proper management of mercury and mercury waste in their day-to-day activities. This pamphlet contains a set of recommended practices and guidelines designed to reduce the amount of mercury discharged to the City of Clinton sanitary sewer system and wastewater treatment plant, a publicly owned treatment works (POTW). Proper implementation of these practices is intended to protect North Carolina's natural environment from the discharge of hazardous mercury-containing compounds while also protecting the health and safety of students and staff.

When mercury is spilled, it comes into contact with air and evaporates into an invisible, odorless, toxic vapor. Acute and chronic exposures to mercury can negatively impact cognition, personality, sensory, and motor functions. Of particular concern is the potential health risk to children, who are more sensitive to mercury than adults and spend an average of 30 hours per week in the classroom.

This pamphlet identifies the practices that schools should follow, with a summary for each at the end of each topic listed as "BMP Summary Recommendations." In addition, guidance is given on practices that offer environmentally preferable practices for schools that may also help save money through waste minimization. These will be summarized in each section under the heading, "Consider the following."

BMP #1: INVENTORY AND DISPOSAL PRACTICES

All schools should complete a mercury products inventory. An example assessment inventory is included at the back of this pamphlet. Mercury is typically found in science and chemistry classrooms, and nurses' offices. Items such as thermometers, barometers, sling psychrometers, chemical compounds, blood pressure cuffs, medications, electrical switches, light bulbs, and thermostats can all contain mercury. Some rooms and offices may still have supplies of elemental mercury tucked away in a storeroom. This supply, especially if it is forgotten or poorly managed, exists as a potential risk to children and employees and can be very expensive to clean up.

Do not pour mercury down the drain. It is highly toxic to organisms at the wastewater treatment plant. Mercury is also heavy and can become stuck in sink traps, creating a health risk. Properly dispose of or recycle elementary mercury, mercury compounds, and mercury containing instruments and products. It is always more cost effective to dispose of mercury properly than it is to clean it up. Make sure all mercury thermometers and other mercury devices are stored in non-breakable containers and are secured in an air-tight locked container until they are properly disposed of or recycled.

Recycle all unused free mercury. Many hazardous waste haulers will accept elemental mercury for recycling. Earth911 provides options for recycling mercury: Call 1(800)CLEANUP or go to https://search.earth911.com .

BMP #1 Summary Disposal Recommendations
Never discard elemental mercury in any sink or drain, sharp container, biohazard waste bag (red bag) or trash.
Always recycle or dispose all mercury-containing materials through a licensed mercury waste recycler or handler.

Consider the Following:
Use non-mercury alternatives to reduce the risk of an elemental mercury spill.
Designate all sinks as "Sanitary Use Only – No Chemical Disposal" to eliminate any chance of accidental discharge in the sink.

BMP #2: MERCURY ELIMINATION & RECYCLING

All schools should have an action plan in place to eliminate mercury-containing items found as a result of the inventory. Instruments and products such as thermometers or blood pressure cuffs can easily be replaced with non-mercury alternatives. Alcohol and electronic thermometers are readily available and sufficiently accurate. Aneroid blood pressure devices are just as effective as the mercury versions. Electronic thermostats and non-mercury switches are also widely available. For immobile items such as thermostats or switches, place labels indicating they contain mercury so when they need to be replaced, they can be properly handled and disposed of. For items with no alternatives, such as fluorescent light bulbs, properly handle, store, and recycle to prevent spills. Many product manufacturers will recycle a mercury-containing item for free, especially if you purchase the mercury-free alternative from them.

Science classes can go to microscale chemistry to reduce the amount of mercury available onsite. Eliminate elemental mercury for demonstrations. Non-mercury experiments can effectively demonstrate scientific concepts such as density, pressure, and spectral signatures. Use video and computer presentations to show students mercury properties in order to eliminate hands on access to mercury.

Implement and enforce a no-mercury policy to prevent the purchase of mercury-containing items if alternatives exist, and to prevent mercury from entering the school.

BMP #2 Summary Elimination Recommendations
Use non-mercury alternatives when available.
Label immobile items containing mercury.
Implement and enforce a no-mercury policy.
Dispose of bulbs, and other mercury containing items through a licensed mercury waste recycler or handler.

Consider the Following:
Have your school take a Mercury-Free Zone Pledge.
Include a Mercury-Free Purchasing Policy.
Consider Microscale Chemistry.

BMP #3: PREPARING FOR AND RESPONDING TO ENVIRONMENTAL RELEASES

It is important to be prepared for a mercury spill. Spilled mercury can evaporate at room temperature and be inhaled; it can also spread long distances and settle in cracks and porous materials like cloth, carpet, or wood, slowly emitting vapors over a long period of time. Keep students and staff away from contaminated areas. Even small amounts of mercury can pose a risk to human health and the environment. Exposure to mercury by inhalation is of particular concern in managing a spill.

Designate a professional spill cleanup firm to respond or designate a competent, OSHA trained staff person to be immediately notified in case of a spill. This person should be properly trained in the appropriate use of a mercury spill kit, cleanup procedures, required personal protective clothing, decontamination, and disposal. Mercury spill kits are available from companies that specialize in Occupational Safety and Health Administration compliance supplies. Before purchasing a kit, make sure it includes complete instructions on how to perform a spill clean-up. Train staff members in proper spill cleaning procedures.

Establish emergency plans for small spills (less than 2 tablespoons) and for large spills (more than 2 tablespoons or one pound). Get professional spill response help for large spills or if mercury contaminates carpeting or porous flooring. Do not handle mercury in carpeted areas because it is very difficult to collect all of the contaminants if there is a spill. In the event of a mercury spill, put on nitrile gloves (do not use latex gloves as mercury can penetrate latex) along with other appropriate proper protective equipment and clean it up immediately. Never use a vacuum cleaner, mop or broom to clean up a spill. A vacuum cleaner has the potential to spread mercury dust and/or vapor throughout the area in the vacuum exhaust. Heat from the motor will also increase the amount of mercury vapor in the air. Mops and brooms will spread the mercury, making proper cleanup more difficult and costly.

Prevent spills by storing items in secure locations until the items can be properly disposed of or recycled. Make sure mercury-containing products are well protected against breakage. Place guards over gymnasium lights.

Double bag any item containing liquid mercury and then place bag in a covered non-breakable container.

BMP #3 Summary Release Recommendations
Be prepared for a spill.
Only have OSHA trained staff or a qualified cleanup company handle any spill regardless of size.
Prevent spills through proper storing or eliminating use of mercury and mercury containing materials.

Consider the Following:
Require all personnel who may come into contact with mercury-containing materials to review the Occupational Safety and Health Administration's proper mercury safe handling and disposal procedures at the OSHA Web site: http://www.osha.gov/SLTC/mercury/standards.html

BMP #4: KEEPING AND MAINTAINING RECORDS

Schools should maintain a written or electronic log of all completed inventory lists indicating where all mercury is located or stored in the school. In addition, retain receipts, shipping manifests and other certified documentation from the recycler or hazardous waste hauler of all mercury waste recycling and disposal shipments. These documents must be kept on file for at least three years and must be made available to authorized City of Clinton inspectors upon request.

BMP #4 Summary Records Recommendations
Retain the following records for three years: Completed mercury inventory list, All waste recycle/disposal receipts and shipping manifests, BMP training documentation for all employees.

BMP #5: TRAINING

Proper knowledge and handling of mercury and all items containing mercury is vital to preventing accidental exposure and release of hazardous materials into the environment. A proper training program should include all of the Best Management Practices included in this pamphlet. Additional training is available via the EPA at https://www.epa.gov/mercury , OSHA at https://www.osha.gov/mercury , the CDC/NIOSH at https://www.cdc.gov/niosh/topics/mercury/default.html . Anyone who handles or has the potential to come into contact with mercury-containing materials should be trained in these BMPs for proper mercury waste handling requirements.

Help raise awareness about mercury safety by teaching students in the classroom. Teachers can implement lesson plans in which the students will gain an understanding of the pervasiveness of mercury in their schools, communities, homes and environment and how and why this is an environmental and health concern.

BMP #5 Summary Training Recommendations
Use these Best Management Practices to teach proper handling techniques to all sta who may come into contact with mercury-containing materials.

Consider the Following:
Consider educating students about mercury through various lesson plans.
Include Mercury education at teacher workshops.
Create and distribute outreach mailings to parents.

Mercury Assessment Checklist for Schools: Science Rooms, Nurse's Office, Facilities, Other

Item	On site, No	On site, Yes	In Use?	How Many/ How Much?	Location
Liquid mercury					
Mercury thermometers					
Mercury barometers					
Mercury vacuum gauges					
Mercury spectral tubes					
Mercury molecular motion device					
Mercury sling psychrometer					
Mercury compounds					
Mercury oxide					
Mercury (II) chloride					
Mercury (II) sulfate					
Mercury nitrate					
Mercury iodine					
Zenker's solution					
Mercury fever thermometers					
Sphygmomanometers					
Nasal spray that contains					
Contact lens solution					
Fluorescent lamps (bulbs)					
Mercury thermostats					

Item	On site, No	On site, Yes	In Use?	How Many/ How Much?	Location
Various types of lamps (light bulbs: mercury vapor, metal halide, high-pressure vapor sodium, high intensity discharge (HID)					
Mercury gauges					
“Silent” light switches					
Mercury float control switches (e.g., on sump pumps)					
Flow meters with mercury switches					
Other equipment with mercury switches (e.g. fire alarms, safety valves)					
Older fungicides and pesticides (manufactured prior to 1991)					
Latex paint (manufactured prior to 1992)					
Mercury cooking thermometer (kitchen)					
True vermillion paint (contains mercuric sulfide) (art rooms)					
Mercury oxide/mercury zinc batteries (old alkaline type, prior to 1996 and button batteries)					
Other					