



## WASTEWATER PRACTICES: MERCURY DISCHARGE

### Introduction

Mercury may be found in many products in use at Harvard University including lab chemicals, wastewater treatment chemicals and cleaning supplies and equipment. In the Boston metropolitan area, the discharge of mercury to the sewerage system is strictly prohibited by the Massachusetts Water Resources Authority (MWRA). Other agencies maintain similar discharge requirements in other areas.

Once mercury enters a wastewater stream, it is very difficult to remove; conventional treatment technologies are inefficient in removing mercury to the required treatment levels. Mercury is highly toxic to aquatic life and adversely impacts the quality of the wastewater sludge, which is used to make fertilizer pellets for certain agricultural and other beneficial applications. Wastewater permits issued to Harvard by the MWRA require frequent sampling of the wastewater for mercury content.

This factsheet identifies several known or potential sources of mercury in common products and processes. It includes an inquiry letter to chemical vendors which can be used to obtain vendor assistance in identifying products suspected of containing mercury.

### Applicable Regulation

MWRA Regulation 360 CMR 10.00, "Sewer Use"

### Summary of Requirements

The following outlines administrative and operational steps that a facility can undertake to minimize or eliminate mercury discharges. These corrective actions have proven successful in numerous local hospitals and laboratories which have experienced mercury discharge problems.

### Operational Actions

Material Data Safety Sheets (MSDS) may provide a gross indication of mercury content, but do not generally list any ingredients present at levels below 0.1%. For this reason, MSDSs are of limited use in identifying mercury in products; do not rely on MSDSs to identify mercury containing chemicals. Attachment 1 identifies known or suspected sources of mercury.

Whenever possible, either substitute non-mercury products for known mercury products, or prevent mercury-containing substances from discharging to the sewer. For



example, consider purchasing mercury-free thermometers or mercury-free stains for lab use.

Inspect sink traps for mercury; clean out if found.

Check and clean equipment where mercury may have accumulated (i.e. plumbing joints, limestone chip tanks).

Manage mercury-containing products and waste materials as hazardous waste. Contact EH&S for assistance.

### **Administrative Actions**

Conduct a survey of mercury use in the work area. Ensure that procedures are in place to manage mercury containing products (i.e. broken thermometers, manometers, switches, etc.) as hazardous waste. Do not permit drain disposal.

Develop a mercury control policy and awareness training program.

Solicit the assistance of purchasing personnel in securing mercury-free products.

Develop and distribute a database identifying the content of mercury in chemicals and other products.

Obtain information on mercury content from reagent and chemical vendors. A form letter for this purpose is included as Attachment 2.

### **Training**

All personnel whose activities involve the discharge of potentially mercury-containing substances should be trained to recognize that any amount of mercury discharged to the sewer is strictly prohibited.

### **Reporting**

The MWRA and City Sewer Authorities must be notified of any non-complying discharge. Therefore, any amount of mercury detected in a wastewater sample is deemed non-compliance and would require notification to the MWRA and City Sewer Authority. EH&S is available for assistance with notification requirements.

### **Recordkeeping**



Facilities should document all administrative and operational corrective actions to eliminate mercury from the wastewater stream. Documentation, in many cases, is a show of good faith effort in addressing the problem and may help to minimize any penalties and/or fines associated with non-complying discharges.

**University Resources**

Cambridge/Allston Campus EH&S 495-2060

Harvard Longwood Campus EH&S 432-1720

**Attachment 1**

**Known Sources of Mercury**

| <b>Instruments:</b> | <b>Lamps:</b>        |
|---------------------|----------------------|
| Barometers          | Fluorescent          |
| Hydrometers         | High Pressure Sodium |
| Manometers          | Mercury arc          |
| Pyrometers          | Metal halide         |
| Sphygmometers       | Neon                 |
| Thermometers        | UV disinfectant      |
| Thermostats         |                      |

| <b>Switches</b>      | <b>Electrical Equipment:</b>       |
|----------------------|------------------------------------|
| Household switches   | Batteries (alkaline, Hg-Zn, Hg-Cd) |
| Mercury thermometers | Rectifiers                         |
| Industrial switches  |                                    |



|                        |  |
|------------------------|--|
| Tilt (motion) switches |  |
|------------------------|--|

**Chemicals:**

| <b>Laboratory Use:</b>             | <b>Medical Uses:</b>                                  |
|------------------------------------|---|
| Acetic Acid                        | CAT-Scan film   |
| Acetone                            | Dental amalgams                                       |
| Aldehyde                           | Hospital Clinical Laboratory Reagents                 |
| Ammonia<br>(see MWRA test results) | Pharmaceuticals (antiseptics, anesthetics, diuretics) |
| Arsenic                            | Reagent Test Kits                                     |
| Barbital                           | Stains (slide preparation)                            |
| Bleach                             | Thimeresol  |
| Buffers                            |   |
| Chloride                           |   |
| Chlorine                           |   |
| Citric acid                        | <b>Other:</b>   |
| CO in gas                          | Detergents  |
| Cystine                            | Fixers, developers and etching solutions              |
| Fe                                 | General purpose cleaners                              |
| Ferric Chloride                    | Impurities in other chemicals                         |
| Ferrous Chloride                   | Neutralization agents (e.g. sulfuric acid and sodium  |



|                               |                                  |
|-------------------------------|----------------------------------|
|                               | hydroxide                        |
| Glucose                       | Odor control chemicals           |
| HCN                           | Pigments, dyes, stains and links |
| Iron                          |                                  |
| Kjeldahl nitrogen             |                                  |
| Manganese                     |                                  |
| Nitric Acid & Utrex           |                                  |
| Organomercury Catalysts       |                                  |
| Phenyl Mercuric Acetate (PMA) |                                  |
| Sodium Hydroxide              |                                  |
| Standard Mercury solutions    |                                  |
| Thiophene                     |                                  |
| Vanadium                      |                                  |
| Wine coloring                 |                                  |
| Zinc                          |                                  |



**HARVARD**  
Campus Services

ENVIRONMENTAL HEALTH, SAFETY &  
EMERGENCY MANAGEMENT

**Attachment 2**

Vendor XXX

Street

Location

SUBJECT: MERCURY

ISSUE: MERCURY IN SEWER DISCHARGE

REQUEST: MERCURY CONTENT CERTIFICATION

Dear Vendor:

Harvard University is implementing procedures to eliminate mercury from entering the sewer effluent discharge system. One of the critical components of this program is vendor certification of mercury content in all products used by the University that could enter the sewer system. The goal is to identify all products containing greater than 1.0 parts per billion (ppb) of mercury. We are obligated to comply with the discharge regulations enforced by the Massachusetts Water Resources Authority (MWRA). The effluent standards are very restrictive and require that no mercury discharge occur (i.e. must be less than 1.0 ppb). In order to comply with this requirement, we must identify all products with the potential of contributing to such a discharge.

Vendors wishing to continue to provide materials to Harvard University are requested to certify the mercury content of each product. If the certification criteria is not met, then we are asking you to provide a sufficient quantity of reagent or multiple component materials to a state approved lab for proper certification. All related lab fees will be borne by the vendor. For proper documentation, especially when identifying "mercury free" products, analysis must be conducted according to EPA SW 846 Methods 7480 and 7471, cold vapor atomic absorption or equivalent analysis.

It is acknowledged that there may not be mercury-free alternatives currently available. Harvard is actively seeking, and would appreciate assistance and active participation in finding alternative your formulations in its goal to remove all sources of mercury from its waste stream.