Appendices

Appendix M

Prevent Mercury Pollution

Use Best Management Practices for Amalgam Handling and Recycling
Prepared by the Monroe County Department of Health, in cooperation with the University of Rochester’s Department of Dentistry and Eastman Dental Center and the Monroe County Department of Environmental Services, with funding by a grant from the U.S. Environmental Protection Agency.
Introduction

This booklet has been developed to enlist your help in a region-wide effort to manage amalgam waste so as to protect the environment from mercury. The amalgam management practices described in this booklet were developed during the past few years by dentists at the University of Rochester’s Department of Dentistry and Eastman Dental Center in Rochester, New York, and by dentists in Minnesota, in cooperation with the Western Lake Superior Sanitary District. The methods have been shown to be effective in keeping mercury from amalgam out of the environment.

Share this booklet with your staff. When new employees join your staff, make sure that they read this booklet also. You and your staff together can evaluate your current practices and, where appropriate, adopt new practices to protect the environment from the discharge of mercury from dental amalgam.

How mercury from dental amalgam can get into the environment

There are many ways that mercury from dental amalgam can get into the environment:

- Amalgam particles that are rinsed down drains or that escape poorly maintained chair-side traps and vacuum pump filters travel through the sewer system to the wastewater treatment plant. From there mercury from the amalgam may enter the environment in one of three ways: (1) It may be released directly to a waterway; (2) It may be released to the air if the treatment plant sludge is incinerated and then re-deposited to the ground or a waterway; (3) It may be released to soil if treatment plant sludge is land spread.
- If a dental practice is connected to a septic system, amalgam particles become part of the sludge in the septic tank, which is eventually pumped out and transported to a wastewater treatment plant or land spread. Any mercury from the amalgam that becomes soluble will end up in groundwater.
- Placing an item that contains amalgam particles in a red bag allows mercury from the amalgam to be released into the air if the medical waste is incinerated. The volatilized mercury is then re-deposited to the ground or a waterway.
- If items that contain amalgam particles are discarded with the ordinary trash, there is the potential for mercury from the amalgam to leach into groundwater when the trash is placed in a landfill not designed to handle hazardous waste.
- In an older dental clinic, pure bulk mercury from past practices may have settled in sink traps. The mercury is gradually released into wastewater for many years after the use of bulk mercury has been discontinued.
New federal regulations greatly reduce the amount of mercury that is allowed to be discharged from a municipal wastewater system or an incinerator. By implementing the best management practices described in this booklet, you can reduce the level of mercury in the environment and avoid the need for increased regulations in the years to come.

Amalgam storage and handling

Stock your amalgam materials in a good choice of capsule sizes, in order to better select the right amount of material for a particular restoration. This will minimize waste.

Dental scrap amalgam should be collected and stored in two designated, tightly closed, widemouth plastic containers. One container should be labeled CONTACT AMALGAM (amalgam that has been in the patient’s mouth). The other should be labeled NONCONTACT AMALGAM. Neither the New York State Department of Health nor the Occupational Safety and Health Administration (OSHA) requires that contact amalgam be discarded in a medical waste red bag.

Most recyclers prefer that contact amalgam be transported for recycling in a disinfectant. The liquid is visual evidence that the contact amalgam has been disinfected. Noncontact amalgam in a tightly sealed container can be stored and transported dry.

Amalgam capsule handling

Collect and store the entire contents of broken or unusable capsules with your noncontact scrap amalgam. If empty dental amalgam capsules contain no visible amalgam materials, they may be placed in the trash.

If there is a spill of mercury from a capsule, contain it and clean it up immediately. Keep mercury clean-up materials on hand, and train a staff member in proper spill clean-up. Inexpensive mercury clean-up materials are available from science and safety equipment suppliers. (Some suppliers are listed on page 8.)

Amalgam trap and filter handling

When the fine particles of amalgam come in contact with cleaning agents and chemicals in the suction system and sewers, the mercury may be released. Large particles of amalgam can be prevented from entering the sewer system by the use of chair-side traps and vacuum pump filters. Material captured in the traps and filters can be sent to a recycler. Calculations based on data in scientific literature indicate that, when used properly, chair-side traps and vacuum pump filters can capture about 70% of the amalgam that enters the vacuum system.
Never rinse scrap amalgam down the drain.
Never place scrap amalgam in the medical waste red bag.
Never place scrap amalgam in the trash.

Recommended techniques for collecting amalgam from the chair-side traps are as follows:

1. Change or clean chair-side amalgam traps often. The frequency may vary from daily to weekly depending on how often the chair is used for amalgam placement or removal and the effectiveness of the suction.

2. Flush the vacuum system with disinfecting line solution before changing the chair-side trap. The best method is to flush the line at the end of the day, and then change the trap the first thing the next morning.

3. Use universal precautions (gloves, glasses and mask) when handling the chair-side trap. Choose utility gloves intended for cleaning and handling wastes for this procedure.

4. Do not place gloves, plastic bags or paper towels into the recycling container. These add to the volume of the waste created and cause problems in the recycling equipment.

5. Remove all visible amalgam by tapping the contents into the container labeled CONTACT AMALGAM. Close the cover tightly. If the trap is visually clean, it can be put in the trash. These visually clean traps have been determined to be nonhazardous.* (A heavily contaminated trap should always be recycled. It should be placed in the contact amalgam container.)

Vacuum pump filters are usually located upstream of the central vacuum pump. Recommended techniques for recycling the vacuum pump filters are as follows:

1. Replace or dispose of these filters regularly as recommended by the equipment manufacturer.

2. Use universal precautions.

3. Remove the filter and decant, over a tray, as much liquid as possible without losing visible amalgam.

4. Put the lid on the filter and place the filter in the box in which it was originally shipped. When the box is full, the filters should be recycled.

*Shown by the Toxicity Characteristic Leaching Procedure (TCLP) to be acceptable for landfiling.
Plumbing replacement and repairs

After your office adopts its new amalgam management practices, it may be a good time to replace sink traps. Mercury from past practices often settles at low points such as sink traps and sumps. The slow dissolution of the mercury in a sink trap or sump can release mercury into the wastewater for years after past disposal practices have been corrected. Whenever plumbing parts are moved or cleaned, caution should be taken to avoid spilling the contents in case amalgam or mercury are present. Pour and brush out the sludge and handle it as you would handle contact amalgam. The plumbing parts can be put back in place or discarded in the trash.

Renovations

If you have an older dental office, alert renovators to the possibility of mercury contamination in carpets, in floor cracks, behind moldings and other areas where bulk mercury may have been used, or where amalgam capsules may have been spilled. Call your county health department, district office of the New York State Department of Health, or regional office of the New York State Department of Environmental Conservation if you have questions about disposal of renovation debris. (See page 7 for telephone numbers.)

Keep informed on separator technologies

Systems are available to treat wastewater contaminated with amalgam particles that are too fine to be caught in traps or filters. Most systems employ centrifugation or enhance sedimentation of particles. Some can also capture mercury that is in solution. Some of the new equipment can remove more than 99% of the mercury in the wastewater. It is used in some European countries, where removal rates of at least 95% are required. The systems are being evaluated in dental offices in the U.S. Equipment can be purchased or leased. These systems are expensive now, but may become cheaper in the future. Contact 716-292-3935 for further information.

Recycle bulk elemental mercury stock

In 1994 the American Dental Association recommended that dentists eliminate the use of bulk dental mercury by switching to precapsulated amalgam alloy in their practices. Measurement of the ratio of liquid mercury to amalgam powder is much more exact with the precapsulated technique. There is also less possibility of leakage during trituration. The use of precapsulated amalgam alloy eliminates mercury dispensers and containers as sources of mercury vapor, and eliminates the possibility of spilling a large quantity of mercury.

Recycle bulk mercury. If there is a spill of a large amount of bulk mercury before it is eliminated from your office, call your county health department or district office of the New York State Department of Health for instructions about cleaning it up. (See page 7 for telephone numbers.)

Recycle any bulk elemental mercury that may still be on hand in your office.
Select a recycling method

There are four options for recycling the amalgam from your dental office.

1. **Amalgam containers only**: Mail via U.S. Mail to the Monroe County Household Hazardous Waste Facility in Rochester. It has authorization to collect noncontact amalgam and contact amalgam by mail from other counties, as well as from Monroe County. Make arrangements with the Monroe County Household Hazardous Waste Facility at 716-760-7600 to receive detailed instructions for amalgam recycling. Packaging materials will be provided for your office as long as supplies last.

2. **Amalgam containers, vacuum pump filters and bulk mercury**: Deliver directly to the Monroe County Household Hazardous Waste Facility in Rochester. Materials can be dropped off without an appointment in the Industrial Waste Office foyer of Building 15 at 444 East Henrietta Road, in Rochester. The foyer is open between 7:00 a.m. and 4:30 p.m. Monday through Friday. The Facility has authorization to accept deliveries of these materials from other counties, as well as from Monroe County. Call 716-760-7600 for directions to the Facility and other information.

3. **Amalgam containers and vacuum pump filters**: Ask your infectious or hazardous waste hauler if delivery of amalgam containers and vacuum pump filters to a mercury recycler or the Monroe County Household Hazardous Waste Facility can be arranged.

4. **Amalgam containers, vacuum pump filters and bulk mercury**: Work directly with an amalgam recycling company. There are many questions you will need to ask when choosing a recycler:
   - What can I recycle?
     - Contact amalgam
     - Noncontact amalgam
     - Chair-side traps
     - Vacuum pump filters
     - Bulk mercury
   - What are the costs or profits for recycling each of the above?
   - What are the instructions for disinfection of contact amalgam?
   - What are the packaging requirements for contact amalgam, noncontact amalgam chair-side traps, vacuum pump filters and bulk mercury?

(See page 6 for a partial list of recyclers.)
Recycling Companies

Advanced Environmental Recycling Co.
2591 Mitchell Ave.
Allentown, PA 18103
800-554-AERC

Amalgaway Mail Disposal Service
1002 West Troy Ave.
Indianapolis, IN 46225
800-267-1467

Bethlehem Resource Recovery Division
890 Front St.
P.O. Box Y
Hellertown, PA 18055
610-838-7034

Dental Recycling North America, Inc.
P.O. Box 1069
Hackensack, NJ 07601
800-526-3793

DFG Mercury Corp.
909 Pitner Ave.
Evanston, IL 60202
847-869-7800

Dorell Refinery
533 Atlantic Ave.
Freeport, NY 11520
800-645-2794

Everlights
8500 West 191st Street, Suite 1
Mokena, IL 60448
815-469-0631

Garfield Refining
810 East Cayuga
Philadelphia, PA 19124-3892
800-523-0968 ext. 300

Global Recycling Technologies, Inc.
218 Canton St.
Stoughton, MA 02072
781-341-6080

Maquire & Strickland Refining Co.
1290 81st Ave. NE
Minneapolis, MN 55432
612-786-2858

Mercury Refining Company, Inc.
1218 Central Ave.
Albany, NY 12205
800-833-3505

Mercury Waste Solutions, Inc.
21211 Durand Ave.
Union Grove, WI 53182
414-878-2599

RECYCLIGHTS, Inc.
401 West 86th St.
Minneapolis, MN 55420
800-831-2852

Safety Kleen
P.O. Box 97
Avon, NY 14414
716-226-2411

Note: The above list does not imply an endorsement of any company. Each user is responsible for verifying vendor information. The list is not intended to be all-inclusive, but is provided for informational purposes only.
Contacts for Applicable Regulations

NYSDEC, Region 8 (Counties of Genesee, Livingston, Monroe, Ontario)
Division of Water
6274 East Avon-Lima Road
Avon, NY 14414
716-226-2466

NYSDEC, Region 9 (Counties of Allegany, Wyoming)
Division of Water
270 Michigan Avenue
Buffalo, NY 14203-2999
716-851-7070

Allegany County
Public Health Director
Allegany County Health Department
County Office Building
Belmont, NY 14813
716-268-9254

Genesee County
NYSDEC Region 8; also contact the municipality

Livingston County
Environmental Health Director
Livingston County Health Department
2 Livingston County Campus
Mount Morris, NY 14510-1691
716-243-7280

Monroe County
Industrial Waste Control Section
Monroe County Department of Environmental Services
444 East Henrietta Road
Rochester, NY 14620
716-760-7600

Ontario County
Cornell Cooperative Extension, Ontario County
480 North Main St.
Canandaigua, NY 14424
716-394-4110

Wyoming County
Public wastewater system:
NYSDEC Region 9
Private wastewater system:
Public Health Engineer
Wyoming County Health Department
338 North Main St.
Warsaw, NY 14569
716-237-2666
## Providers of mercury spill clean-up products

<table>
<thead>
<tr>
<th>Provider</th>
<th>Address</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bel-Art Products</td>
<td>Pequannock, NJ 07440-1992</td>
<td>201-694-0500</td>
</tr>
<tr>
<td>Fisher Scientific</td>
<td>52 Fadem Road, Springfield, NJ 07081</td>
<td>800-766-7000</td>
</tr>
<tr>
<td>Lab Safety Supply, Inc.</td>
<td>P.O. Box 1368, Janesville, WI 53547-1368</td>
<td>800-356-0783</td>
</tr>
<tr>
<td>Thomas Scientific</td>
<td>99 High Hill Road @ I-295, P.O. Box 99, Swedesboro, NJ 08085</td>
<td>800-345-2100</td>
</tr>
<tr>
<td>VWR Scientific Products</td>
<td>5 Marway Circle, Rochester, NY 14624</td>
<td>716-247-0613</td>
</tr>
</tbody>
</table>

Note: The provision of these names does not imply an endorsement, nor is it intended to be all-inclusive. Each user is responsible for verifying vendor information. The list is provided for informational purposes only.

## Contacts for further information

<table>
<thead>
<tr>
<th>Contact</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monroe County Department of Environmental Services</td>
<td>716-760-7610, Extension 7055</td>
</tr>
<tr>
<td>Monroe County Department of Health</td>
<td>716-292-3935</td>
</tr>
</tbody>
</table>
## Summary of Recycling and Disposal Options

<table>
<thead>
<tr>
<th>Waste Type</th>
<th>Source</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amalgam particles - noncontact</td>
<td>Excess mix, broken or unusable capsules</td>
<td>Send to a recycler.</td>
</tr>
<tr>
<td>Amalgam particles - contact*</td>
<td>Chair-side traps</td>
<td>1. Change regularly.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Send sludge to a recycler.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Discard trap in the trash.</td>
</tr>
<tr>
<td>Amalgam particles - contact*</td>
<td>Vacuum pump filters</td>
<td>1. Change regularly.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Decant some of the liquid.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Put on the lid and recycle in the original shipping carton.</td>
</tr>
<tr>
<td>Elemental mercury</td>
<td>Past use of bulk elementary mercury</td>
<td>Manage as hazardous waste; send to a recycler.</td>
</tr>
<tr>
<td>Empty amalgam capsules</td>
<td></td>
<td>Discard in the trash.</td>
</tr>
</tbody>
</table>

* Amalgam that has been in the patient’s mouth
Appendix N

Mercury Waste Recyclers in the Northeast U.S.

The northeastern U.S. mercury waste recyclers listed below are “full service” recyclers. In general, they will accept the full range of mercury waste from a hospital: thermometers, gastrointestinal tubes, laboratory chemicals, batteries, lamps, relays, switches, thermostats, manometers, metallic mercury, and mercury-contaminated material. They also accept dental amalgam from hospitals that have a dental clinic. See the following pages for a list of fluorescent lamp recyclers.

Specific services vary from company to company. Each user is responsible for verifying vendor information. The list below does not imply an endorsement of any company, and it is not intended to be all-inclusive, but is provided for informational purposes only. In addition to contacting the companies listed, you can ask your current hazardous waste hauler to put you in contact with a mercury recycler.

Advanced Environmental Recycling Co.
2591 Mitchell Ave.
Allentown, PA 18103
800-554-AERC
FAX: 610-797-7696

Bethlehem Resource Recovery Division
890 Front St.
P.O. Box Y
Hellertown, PA 18055
610-838-7034

Global Recycling Technologies
218 Canton St.
Stoughton, MA 02072
781-341-6080
FAX: 781-341-6088

Mercury Refining Company, Inc.
1218 Central Ave.
Albany, NY 12205
800-833-3505
FAX: 518-459-2334
Fluorescent Lamp Recyclers in the Northeast

Advanced Environmental Recycling Corporation
2591 Mitchell Avenue
Allentown, PA 18103
(800) 554-AERC

ALR-American Lamp Recycling, LLC
22 Stage Door Road
Fishkill, NY 12524
(800) 315-6262

Bethlehem Resource Recovery Division
890 Front Street
PO Box Y
Hellertown, PA 18055
(610) 838-7034

Dynex Environmental, Inc.
Customer Service
P.O. Box 1323
Fond du Lac, WI 54936-1323
(800) 932-6216

Envirocycle, Inc.
P.O. Box 5367
High Point, NC 27262
(910) 869-8836

Global Recycling Technologies
218 Canton Street
Stoughton, MA 02072
(781) 341-6080

Light Cycle, Inc.
1222 University Avenue
St. Paul, MN 55104
(612) 641-1309

Mercury Refining Company
1218 Central Avenue
Albany, NY 12205
(800) 833-3505

Northeast Lamp Recycling, Inc.
250 Main Street
East Windsor, CT 06088
(860) 292-1992

Recyclights, Inc.
401 W. 86th Street
Bloomington, MN 55420
(612) 948-0626
(800) 831-2852

Recyclights, Inc.
4220 Perimeter Drive
Columbus, OH 43228
(800) 831-2852
(614) 276-3000

USA Lamp and Ballast Recycling, Inc.
5366 Este Avenue
Cincinnati, OH 45232
(800) 778-6645

Specific services vary from company to company. Each user is responsible for verifying vendor information. The list above does not imply an endorsement of any company, and it is not intended to be all-inclusive, but is provided for informational purposes only. In addition to contacting the companies listed, you can ask your current hazardous waste hauler to put you in contact with a fluorescent lamp recycler. For information on the regulations concerning recycling or disposal of fluorescent lamp bulbs or ballasts, contact the New York State Department of Environmental Conservation at (518) 485-8988.
Appendix O
Infrastructure Control Measures

(Information taken from a draft version of the *Mercury Management Guidebook*, now under preparation by the MWRA/MASCO Mercury Work Group, Boston, MA)

[This Appendix cites the current Massachusetts wastewater discharge limit of one part per million which does not apply in New York State. The recommended discharge limit established by the New York State Department of Environmental Conservation for mercury wastewater discharge is: a practical quantifiable limit of 0.8 micrograms per liter (µL) and a method detection limit of 0.2µ/L.]

The MWRA/MASCO Mercury Work Group, a public-private partnership of the Massachusetts Water Resources Authority (MWRA) and sewer dischargers (including hospitals, universities, and other industries), was established in 1994 to study and implement ways to reduce mercury discharges to the MWRA sewerage system. One institution, the Medical Academic and Scientific Community Organization, Inc. (MASCO) that represents many local Boston hospitals, has worked from the beginning of this effort to help identify the sources and methods of removing mercury from hospital waste streams.

One area studied by the MWRA/MASCO Mercury Work Group was the waste piping infrastructure of a facility because elemental mercury waste deposits and mercury-contaminated bacteriological growth (biomass) were identified as possibly significant contributors to chronic mercury contamination in wastewater discharges. Some of the accumulated mercury could be biologically converted to methyl mercury which is both soluble and highly toxic. In addition, research by several hospital institutions found that the biomass within their “Special Waste” plumbing systems would readily absorb and accumulate mercury, with concentrations reaching as high as 1,000 mg/kg (ppm). Fragments of biomass were seen to periodically break off and carry the absorbed, concentrated mercury to the sewer discharge. Because of these concerns, the Work Group developed in its Mercury Management Guidebook a section called Infrastructure Control Measures to assist facilities that experience mercury-contaminated biomass within their waste piping infrastructure.

Infrastructure control measures may include the following steps:

- source reduction
- source segregation, waste piping modifications
- waste trap sampling, cleaning, or replacement
- waste piping cleaning or replacement
- wastewater collection for offsite disposal
- wastewater pretreatment (possibly consisting of solids sedimentation, multistage filtration, or other process steps).

While these steps are listed in a possible chronological order, the actual number and order of steps could be different depending upon the facility and its action plan.