Santa Cruz County Sanitation District

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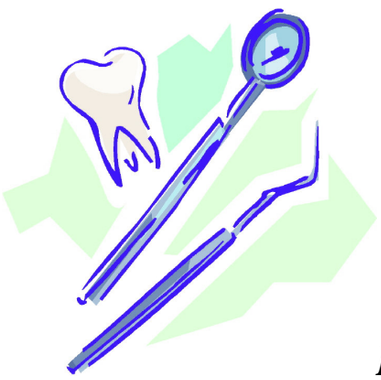
JOHN J. PRESLEIGH, DISTRICT ENGINEER

Meet legally required Best Management Practices and protect the local environment by utilizing…



DENTIST

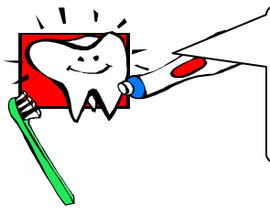
Best Environmental Management Practices

Dental facilities generate a number of wastes that have the potential to impact sewer wastewater with contaminants. These contaminants can damage sensitive habitats and pollute our bay and ocean. **Yet dentists are important to our community**. The good news is that implementing the best management practices detailed in this pamphlet can drastically reduce environmental impacts from dental facilities.

The main environmental concern associated with dentists is mercury from amalgam waste. Mercury is a persistent bioaccumulative toxin that does not degrade in the environment and is acutely toxic in extremely small amounts. Once mercury reaches an aquatic environment, it changes to highly toxic methlymercury which bioaccumulates in the food chain. If discharged improperly, mercury can find its way to the Monterey Bay Marine Sanctuary and contaminate fish and harm the marine ecosystems. Eating fish contaminated with mercury can be harmful to humans. Mercury is a neurotoxin that affects cognitive abilities and can also cause damage to the spinal cord and kidneys. Especially at risk are pregnant women, children, and developing fetuses.

This pamphlet has been prepared to familiarize dentists, dental assistants, and office staff with the best management practices for dealing with typical wastes generated in dental facilities. It also details the Santa Cruz County Sanitation District requirements specific to your facility. ***Use this pamphlet as a tool to ensure that your business is in compliance, to save money on costly spill cleanups and waste disposal, and to train all employees.*** Leave it posted in a visible location.

Best Environmental Management Practices



Pollution Prevention Tips

- **Use some of the available alternatives to mercury thermometers, such as electronic sensors, digital thermometers, and temperature strips.**
- **Switch to non-mercury composite filling materials**
- **Always recycle amalgam and mercury waste.**

Never rinse amalgam traps over the sink or discard as trash or as biohazardous waste in medical waste containers.

Amalgam waste is made up of approximately 50% mercury and if improperly disposed can enter the environment. If discharged to the sanitary sewer, mercury can either become concentrated in our sludge and reduce the likelihood of our sludge being used for agricultural purposes and/or pass through our treatment plant and be released into the Monterey Bay.

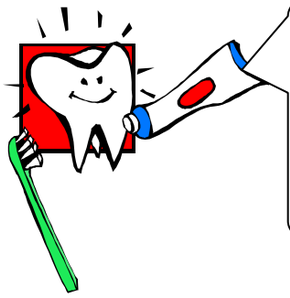
Typical waste mercury sources found in dental facilities:

- Old Fillings
- New Fillings
- Teeth Cleaning/ Other procedures
- Thermometers

Take the following steps to properly manage mercury and amalgam waste:

- Use precapsulated alloy to eliminate the possibility of an elemental mercury spill.
- Use amalgam substitutes such as porcelain or plastic composites where they are appropriate.
- At the end of a procedure, place excess amalgam waste in an airtight container clearly marked **"Scrap Amalgam"**. Maintain a log for the amount of waste generated and disposed of.
- Collect used, broken, or unusable amalgam capsules and place in the "Scrap Amalgam" container.
- Amalgam that is collected in traps and filters should be placed in an airtight container labeled **"Amalgam for Recycling"**. Disposable traps and filters should also be recycled in this container.
- Have a licensed waste hauler pick up your amalgam wastes for recycling. If your amalgam is mixed with water or oil, it cannot be recycled and must be treated and disposed of as a hazardous waste.
- If using bulk mercury, place the unwanted waste in an airtight container labeled **"Bulk Mercury Waste for Recycling"**.
- **Make sure that your facility has a mercury spill kit**. Before purchasing a kit, ensure that it is equipped with complete instructions on how to perform a spill clean up. Make sure that all employees are trained in proper spill response procedures.
- **Even if you use only non-mercury composite filling materials, you still need to capture the amalgam waste that is generated when old fillings are replaced.**
- Do not send mercury containing thermometers home with patients.

Managing Mercury



Pollution Prevention Tips

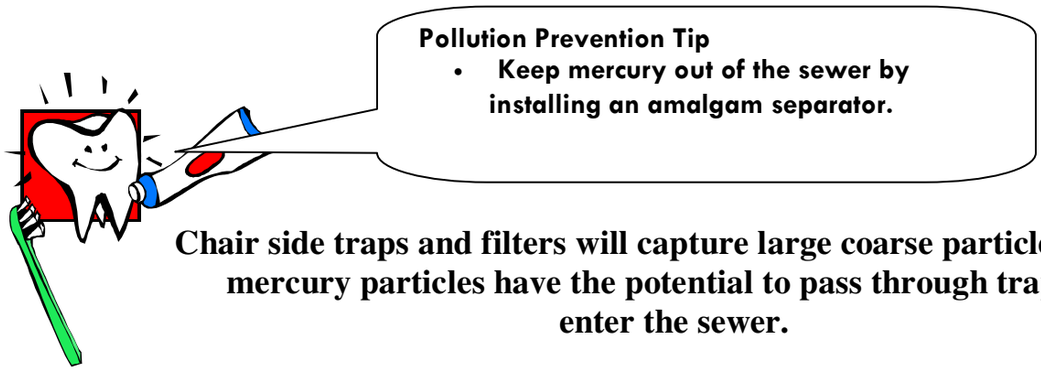
- **Never wash used traps or filters over the sink, discard in the trash, or as biohazard.**
- **Consider moving to a finer grained mesh trap. Finer mesh screens may be more effective in trapping amalgam particles.**

In order to properly prevent dental amalgam waste from entering the sewer, you must properly manage your traps and filters used in your chair-side dental unit.

Always use universal precautions when handling traps.

- Disposable amalgam traps are preferable to reusable ones because it is difficult to remove all amalgam particles without discharging them into the drain or the garbage.
- Change amalgam traps at least once a week or as needed by volume of business generated. Recycle the traps.
- Before changing the chair side trap, flush the vacuum system with line solution. Do this at the end of the day and then change the trap the next morning. This allows particles in the trap to dry. Talk to the manufacturer about which line solution to use. **Avoid using line solutions containing bleach because it will dissolve mercury out of the amalgam.**
- Secondary vacuum pump filters should be changed in accordance with the manufacturer's recommendations. If filters contain amalgam they should be recycled along with the traps.

Chair Side Traps and Filters



Chair side traps and filters will capture large coarse particles. However, fine mercury particles have the potential to pass through traps and filters and enter the sewer.

Amalgam separators have the ability to remove fine mercury particles and consequently remove mercury before dental wastewater enters the sanitary sewer system and the environment. Recent studies have shown that amalgam separators have the ability to reduce mercury discharges from dental facilities by 95%.

Some counties require that all dental facilities install amalgam separators due to high mercury levels in receiving wastewater. The Santa Cruz County Sanitation District may require your facility to install one.

When you purchase an amalgam separator, be prepared to shop around for the type that works best for you. Amalgam separators vary in process and compatibility with chair side dental units. Before purchasing a separator, research which systems are compatible with your existing equipment. Furthermore, make sure that the company who sells you the device provides you with the appropriate information on how to capture amalgam. The separator should be ISO-11143 certified with an efficiency rating that complies with State and Federal Requirements.

Types of amalgam separators:

- Filter
- Centrifuge
- Settlement Chamber
- Ion Capture Unit

Amalgam separators removal effectiveness varies with the mercury particle size, wastewater flow rate, plugging and channeling, and the choice of disinfectant chemicals.

Maintenance:

- Disinfect lines (no bleach!) daily to weekly depending on use.
- Clean/Replace parts. Large facilities should do this monthly and smaller “one-dentist” offices should do this every few months.
- Recycle amalgam.

Amalgam Separators

Pollution Prevention Tips

- **Dispose of lead waste through a licensed waste hauler.**
- **Do not put lead foils, bitewings or aprons into the trash or the biohazard bag!**

Lead is a persistent bioaccumulative toxin that can cause a variety of dangerous health problems. Lead accumulates in the blood, bone, and soft tissue and can cause damage to the kidney, liver, nervous system, and other organs.

If discharged to the sanitary sewer, lead has the potential to pass through the treatment plant and enter the environment. If lead enters marine systems it can cause reproductive damage in aquatic life and cause neurological changes in fish and other aquatic animals. If disposed of in the trash, lead can enter the environment via soil.

Dental offices generate lead waste from things such as:

Lead Foils Protective Shields/Aprons

Bitewings

These things are considered hazardous waste unless they are recycled for their scrap metal content.

- Keep lead waste in an appropriate container. Properly label it **"Lead Waste"**.

There are several companies throughout the area that coordinate lead-recycling programs for dentists. See the Hazardous Waste Haulers page for information on businesses accepting lead waste.

Pb

Lead Waste

Pollution Prevention Tip

- **Eliminate silver bearing waste by switching to digital processing for X-rays.**

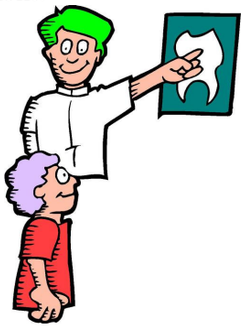
X-ray wastewater contains substances that are prohibited from being discharged to the sanitary sewer. Problem substances include silver (in spent processor solutions), chromium (in developer cleaners), and selenium (in some toners).

Since x-ray film has an especially high silver content, spent fixer from X-ray developing operations has been a major source of silver for the wastewater treatment plant. The Santa Cruz County Sanitation District requires all commercial and industrial facilities, including dentist offices, to either treat silver-containing wastes to remove the silver or have them hauled off-site as hazardous wastes.

- In a large facility, centralized treatment of spent fixer reduces the amount of sampling required as well as the number of systems to be maintained-easily offsetting the increased effort required to collect and consolidate the waste.
- If processors are cleaned with a chromic acid solution such as Kodak's Liquid Developer System Cleaner, spent cleaning solutions and rinse water must also be disposed of as a hazardous waste. They must not be mixed with spent fix from which silver will be reclaimed.
- Spent photo chemicals containing selenium such as Kodak Rapid Selenium Toner must be disposed of as hazardous wastes. Never pour selenium-bearing solutions down a sink or drain!
- Newer, well-maintained equipment generally uses less water and smaller volumes of chemicals, with reduced carry-over of silver-bearing fixer into the rinse water.

Persons in charge of x-ray processing must be provided with the Santa Cruz County Sanitation District Photoprocessing Facilities Best Management Practices pamphlet, which details the requirement for photo processing in Santa Cruz.

See the Hazardous Waste Haulers page for a list of vendors accepting silver-bearing waste from x-ray development.

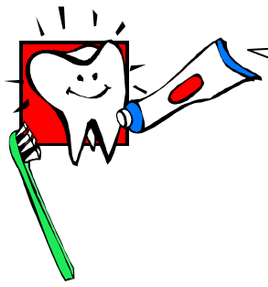


X-Ray Waste

Company	Phone Number	Wastes Collected
EcoSolutions/Stericycle- Milpitas	(510) 562-1781	Amalgam wastes, Biohazard, X-ray fixer, lead foils
Safety-Kleen Corporation –San Jose	(408) 294-8778	Amalgam wastes, Biohazard, X-ray fixer, Lead foils
Phillip Services Company- Martinez	(408) 588-1791	Amalgam
Photo Waste Recycling	(415) 459-8807	Amalgam wastes, X-ray fixer, Lead foils
California Radiographics-Santa Cruz	(831) 462-8397	X-ray fixer
Dental Recycling North America	(800) 361-1001	Amalgam wastes, sharps, lead foils, X-ray fixer

This list is not inclusive. To be included on this list, please call the Sanitation District at 831.477.3907.

Hazardous Waste Haulers



Pollution Prevention Tip

- **Consider switching to closed loop sterilization systems like gas phase hydrogen peroxide.**

Of the wide range of sterilizing processes used by dental facilities, those of most concern to the Santa Cruz County Sanitation District are certain cold sterilants (glutaraldehyde, formaldehyde, and phenols).

- Cold sterilizing solutions containing glutaraldehyde or formaldehyde have been commonly discharged to the sanitary sewer in the past. Use of these chemicals should be minimized or eliminated where possible. Spent solutions must be treated as hazardous waste using a neutralizer such as Formalex, or collected and properly disposed. Activated glutaraldehyde solutions lose their toxicity when held for a period of time (usually 14 to 21 days). Alternative sterilization methods are nearly always possible.
- Sonic sterilization may be used alone or in conjunction with solutions. This alternative may be used with less toxic solutions that don't pose a threat to the environment if discharged to the sanitary sewer.
- Alternative liquid sterilants include, among others, formulations of per-acetic acid, acetic acid and hydrogen peroxide (Renalin, Actril, Steris, etc.). These products are currently being used primarily on dialysis equipment, but may have other uses. Chemicals in the spent solutions do not pose a problem for the water treatment plant if they are disposed of properly.
- Steam sterilization (autoclaving) produces little or no chemical waste. However, without cooling water recirculators or sensors to keep cooling water use to a minimum, autoclaves can be your facility's largest water users. Water-saving modifications to autoclaves easily pay for themselves with savings from water and sewer bills.
- The sterilizing gas ethylene oxide (EtO) is normally applied to equipment held in a sterilizing chamber. Use of EtO requires air emissions control devices. The wastewater from emission control scrubbers that convert the EtO to an ethylene glycol solution may be discharged to the sanitary sewer.
- Other proposed alternative sterilization methods include gas phase hydrogen peroxide, electron beam, gas plasma, and microwave. Although none of these appear to pose significant risks related to the sanitary sewer or wastewater disposal, they are not yet widely available.

A solution of per acetic acid, acetic acid and hydrogen peroxide (such as Renalin, Steris, or Actril) can be substituted for formaldehyde-based disinfectants. These products yield decomposition products that are easily handled by a wastewater treatment plant's biological treatment processes. Since formaldehyde is a suspected carcinogen, use of a substitute may have other significant benefits for both patients and technicians.

Sterilization

Pollution Prevention Tips

- **Purchase reusable or recyclable products wherever possible.**
- **Reduce or eliminate the hazardous materials that you use.**
- **Encourage the segregation of non-infectious waste. Inclusion of such items as batteries, X-ray film, electronics, thermometers, hazardous waste, and packaging (often with metal-containing pigments) with infectious waste contributes significantly to metals loading in the waste stream.**

Recycling is not only good for the environment, it is good for business $$

- Fluorescent bulbs release mercury when broken. They should never be discarded in the trash destined for landfill. They should be stored and labeled properly and used bulbs should be recycled as a mercury waste by your waste hauler.
- Whenever possible, switch to low-mercury lamps.
- Recycle all batteries. Do not place them in the trash, or in biohazard bags.
- Use disinfectants containing less-hazardous materials such as quaternary amines. Quaternary amines should still be handled as hazardous waste, yet they are less likely to cause discharge problems for the sanitary sewer.
- Alcohols, ethers, and peroxides must be disposed of through a hazardous waste hauler.
- Office waste such as aluminum, glass, corrugated cardboard, and office paper can be easily recycled through your garbage hauler.

Infectious Waste

Infectious or "red bag" biohazard waste is usually sterilized and then land filled, recycled, or incinerated. In any case, the cost of infectious waste disposal is high. Wastewater produced by incinerator scrubbers can contain significant amounts of metals. One partial solution to both of these problems is to minimize the amount of infectious waste generated throughout your facility.

- Educate all employees about the nature of appropriate red bag waste and the cost of its disposal. A large portion of this waste is often non-infectious paper products or other office trash. Workers may place these materials in the infectious waste receptacle because it is more convenient, or because the user is unaware that these items can be discarded as normal trash.
- Red bag waste containers should only be placed where they need to be. Remove all red bag containers from the following areas: in hallways, bedside washing sinks, and restrooms.

See the Hazardous Waste Haulers page for a list of potential waste haulers and the types of wastes they receive.

Waste Minimization and Management

No hazardous materials or waste may be discharged to the sanitary sewer or storm drain!
Keep a record of disposal of hazardous wastes to their final resting place. You are liable for these wastes after they leave your facility.

The most common hazardous waste generated by dental facilities include the following:

- Silver bearing wastes from x-ray development
- Lead foils and lead shields
- Dental bitewings
- Amalgam
- Dental traps and filters

All hazardous materials and wastes should be labeled and stored according to federal, state, and local regulatory requirements. Chemical storage practices should follow County of Santa Cruz Environmental Health Services Department requirements.

- It is essential to segregate non-compatible materials and provide secondary containment, which keeps spilled materials from spreading.
- Floor drains should be eliminated in all areas where hazardous materials are handled or stored.
- Material Safety Data Sheets (MSDSs) should be readily available for all of the materials used and accessible to all staff. Each product's use and its MSDS should be evaluated regularly to ensure that the material is handled properly and that alternative, less toxic chemicals are considered when possible. However, it is important to remember that MSDSs do not list all ingredients. Some substances that pose significant environmental problems (e.g. copper or zinc) may be omitted from MSDSs or supplier literature. If you suspect that a chemical may contain a hazardous constituent, check with the supplier. If there is any doubt, dispose of spent materials as hazardous waste until the question has been resolved.
- Each waste stream must be characterized and profiled to ensure proper handling and disposition.
- Label containers, instruments, and processes that hold or use problem materials so that each user is aware of his or her responsibility for proper use and disposal.
- Keep bottled chemicals in secured storage, on low shelves (never over sinks) or in storage cabinets with latching doors. Follow Fire Department regulations and County of Santa Cruz Environmental Health Department regulations.
- Prevent bottle breakage and spills by using trays with lips or other specialized carrying containers (carboys) to transfer chemical bottles between storage areas and labs.
- **Check all containers on a regular basis for potential holes and leaks.** Leaks on steel drums can appear as rusted out spots or indentations initially. If a leak is discovered, place drip pans or absorbent material under the leak and then attempt to repair the leak immediately. Keep lids, bungs, and tops secured on waste barrels and containers at all times, except when adding waste to containers or dispensing product.
- In areas where hazardous materials are stored, make sure there are adequate spill cleanup materials (see the section on Spill Prevention, Control, and Response). Hazardous waste containers must be labeled and stored according to hazardous waste regulations. For more information on Best Management Practices for Hazardous Materials Storage, contact the County of Santa Cruz Environmental Health Services Department at **831.454.2022.**

Hazardous Materials Management

The best spill control is prevention! Spills are cheaper to clean up when quickly contained. Write a Spill Response Plan. Post a short version of the plan throughout the office (see the following page for an example Posted Spill Control Plan). Train employees on the plan annually. During the required annual training, perform drills to ensure that employees can put the Plan into action safely. Adequate spill prevention and clean-up materials must be kept on-site and readily available for use.

- **Mercury Spills**: Clean up all visible mercury with a mercury spill kit. Place all contaminated materials used during the clean up procedure in a plastic bag labeled mercury waste. Dispose as a hazardous waste to a waste hauler.
  If a mercury spill occurs, immediately keep all people away from the spill area. Minimize the mercury that vaporizes by turning off any heaters and turn up the air conditioning. Ventilate the area by opening windows. **Never use a vacuum to clean a mercury spill.** The mercury will contaminate the vacuum and the heat from the vacuum will evaporate the mercury and further distribute it throughout the office.

If it is a large bulk mercury spill, dial 911!

Other material that may be necessary for spill response:

- Absorbent mats - When obtaining mats, ensure that the material you have chosen will absorb the appropriate fluids. Some only absorb water-based fluids, or solvents, while others absorb oil and grease. There are also absorbents that neutralize as well as absorb for acids or bases.
- Portable berms and dikes - such as absorbent socks, plastic berms.
- Drain blockers - These are rubber mats that are generally stored on the walls and can be quickly thrown down to cover a drain to prevent a spill from going into the drain.
- Absorbent "socks" - These can be used as a temporary berm.
- Waste containers – Drums or other UN-rated, Department of Transportation (DOT) approved containers for any wastes generated during cleanup.
- Personal protective equipment such as gloves, bunny suits, safety goggles, face shields, etc.

There are several commercial vendors that distribute these materials. They can usually be found on the Internet.

Spill Prevention, Control, and Response

Posted Example
Spill Control Plan

Spill Response Procedures:

1. **Protect yourself first. Be sure and put on the appropriate personal protective equipment: gloves, goggles, and an apron.**
2. **Contain the spill with trays, or absorbent materials. Do not allow the material to reach storm or sewer drains.**
3. **Check the MSDS for the spilled substance for safe handling and disposition.**
4. **Clean up the spill as directed on the MSDS.**
5. **For Mercury spills use a specified Mercury Spill Kit for proper clean up.**
6. **Use dry clean-up methods. Do not send any wash water to the storm drain!**
7. **Package and label all contaminated materials (absorbents, PPE, liquids) for off-site disposal.**
8. **Notify the manager/owner that a spill has occurred (see below).**
9. **Notify the appropriate government agency (see below)**

Spill Response Personnel

Manager Name:	**Pager/Phone:**
Owner Name:	**Pager/Phone:**
Government Entities	***Phone***
Santa Cruz County Sanitation District, Environmental Compliance: Amy Gross, Dan Chua, Nick Dybdahl	**831.477.3907**
Fire Department	
Environmental Health Services	**831.454.2022**

Posted Spill Control Plans do not need to be elaborate. They should be short and to the point so that they are just enough information to quickly and efficiently prevent a spill from spreading. However, if your facility has an Industrial Wastewater Discharge permit, a written Spill Control Plan is required. Call the County of Santa Cruz Industrial Wastewater Pretreatment Program (831) 477.3907 if you would like an example template.

Make sure that all employees understand and follow Best Management Practices. Mistakes and misunderstandings can lead to violations and costly cleanups!

The following page can be used as a training log. Ensure that all employees are trained on Best Management Practices upon hiring and annually thereafter. Log the training. See the following page for an example training log. Use the following as training and education tools:

- This Best Management Practices pamphlet.
- Your written Spill Response Plan.
- Drills on emergency spill cleanup.

Post and/or label the following:

- Post multiple copies of this pamphlet throughout your facility.
- Emergency telephone numbers to your local Fire Department and Wastewater Treatment Facility (831.420.6050).
- Post signs above all sinks prohibiting the discharge of amalgam/mercury wastes.
- Label all drains and pipes within your facility indicating whether they flow to a treatment system, directly to the sanitary sewer, or to the storm drain.
- Stencil or post signs near all storm drains on your property with a message- "No Dumping-Flows to Ocean."

How do you know you're complying? Use the Best Management Practices Checklist at the end of this pamphlet. Enlist a different employee to perform this inspection every month so that they familiarize themselves with the Best Management Practices and solidify their training.

Training

Training Record

Date: _____

Training Topic _____

Trainer Name _____

Trainer Signature _____

Printed Name of Attendee	Attendee Signature

Date: _____

Training Topic _____

Trainer Name _____

Trainer Signature _____

Printed Name of Attendee	Attendee Signature

BEST ENVIRONMENTAL MANAGEMENT PRACTICES CHECKLIST All items marked "NO" will require corrective action. Items marked "N/A" do not apply to this area.		
YES NO	INSPECTION ITEM	CORRECTIVE ACTIONS/COMMENTS/DATES OF COMPLETION
☐ ☐	1. Ask an employee if they know what Best Management Practices are. Can they list an example Best Management Practice? Have they been trained on BMPs in the last year?	
☐ ☐	2. Are employee's carefully calculating chemical needs to reduce the amount of excess waste? Are expired or surplus chemicals returned to vendors?	
☐ ☐	3. All scrap amalgam, and bulk mercury is being recycled.	
☐ ☐	4. All chair side traps and filters are being recycled for their amalgam content. (If using disposable ones)	
☐ ☐	4. All waste containers are properly labeled.	
☐ ☐	5. Only appropriate containers are used for hazardous wastes and all containers are labeled and in good condition.	
☐ ☐	6. All employees are trained on proper equipment operation and maintenance. A routine maintenance schedule is followed.	
☐ ☐	7. Equipment is not leaking any fluids? If so, are leaks adequately contained with absorbents or drip pans until they can be repaired?	
☐ ☐	8. All spent sterilization chemicals are being disposed of as a hazardous waste.	
☐ ☐	9. All lead foils, shields, and bitewings are being recycled, or disposed of as hazardous waste. .	
☐ ☐	10. Spent fixer from X-Ray procedures is being captured for silver recovery or hauled away for treatment.	
☐ ☐	11. Are all chemical and hazardous waste containers (in storage or in use) in secondary containment?	
☐ ☐	12. Are floor drains absent in production areas where a potential spill could occur?	
☐ ☐	13. All hazardous wastes are secondarily contained and are stored indoors away from floor and storm drains.	
☐ ☐	14. Lids, bungs, and tops are secured on containers at all times, except when adding waste to containers or dispensing product.	
☐ ☐	15. There is a posted version of the Spill Response Plan in areas where hazardous materials are used and stored.	
☐ ☐	16. There is a mercury spill kit in areas where potential spills may occur. Employees are trained in proper spill response procedures.	
☐ ☐	17. Dry clean up methods are being used in preference or always before wet clean up methods (those using water).	
☐ ☐	18. Only non-corrosive cleaners are being used to mop floors and they are being diluted appropriately. The mop bucket water is being poured into a drain going to the sanitary sewer.	
☐ ☐	19. Waste removal manifests and product use logs have been properly maintained.	
☐ ☐	20. Your facility is using an amalgam separator (s) to ensure that the maximum amount of amalgam is captured.	
☐ ☐	21. Your facility is using precapsulated alloy to reduce the possibility of an elemental mercury spill.	
☐ ☐	22. Amalgam substitutes such as porcelain or plastic composites are being used where appropriate.	