

MANAGING CHEMICALS From Hospitals and Biomedical Labs

X-RAY and PHOTO PROCESSING CHEMICALS



Typical black and white photo and X-ray processing results in spent developer and spent fixer. If you keep the waste fixer and developer separate, the developer is acceptable for disposal in the sanitary sewer. However, the fixer solution contains concentrations of toxic silver that are much too high to be discharged to the sewer.

Several options are available for handling spent fixer solution:

- Send it for silver recovery
- Use silver recovery units to meet the sewer discharge limit of three parts per million¹
- Dispose of the fixer as hazardous waste.

Several companies sell small scale silver recovery equipment.

There are two common types of silver recovery units, metallic replacement and electrolytic. Electrolytic recovery systems do not remove enough silver from fixer to meet sewer discharge limits. The fixer is still considered a hazardous waste after this treatment. Metallic replacement units have the potential to remove enough silver from the fixer to meet sewage discharge limits, if they are set up and run properly. Metallic units are often used as a polishing unit after an electrolytic machine provides primary treatment. If metallic replacement is used without a primary system, two units are used. The fixer is run through both.

Another option is to collect the waste fixer and send it to a local silver recovery company such as one of the companies listed in the *Hazardous Waste Directory for Small Businesses* (available at <http://www.metrokc.gov/hazwaste/yb/photof.html>). Some of these companies have pick up services, others allow you to deliver it yourself. Be sure to contact them first to verify arrangements.

If you decide to use this option, you will need to transport your wastes in accordance with the Department of Transportation (DOT) regulations found in Title 49 of the Code of Federal Regulations (CFR) Parts 171 through 180. For guidance on the DOT regulations, contact DOT at (360) 753-9875. Also, contact your automobile insurance company to ensure that you are covered for this type of vehicle usage. Always transport the waste in containers that are tightly sealed and secured to prevent spills during transport.

If you do color development or a more exotic process, check the material safety data sheets (MSDSs) to see if your chemicals contain cyanide, chromium, or other heavy metals. Also check the MSDS to see if the pH is less than 5.0. If any of the above metals are listed, you must test the waste to determine if it meets the treatment plant's limits. If it doesn't, it must be treated or disposed as hazardous waste.

TESTING X-RAY and PHOTO PROCESSING WASTEWATER

Fixer solution going through silver recovery cartridges needs to meet your local sewer limits for silver (three parts per million (ppm) in King County). It usually takes two recovery cartridges and proper maintenance of the cartridges to reach these limits. The Department of Ecology has a booklet titled *A Guide For Photo Processors* which has best management practices (see page 17) to help ensure you are meeting the discharge limits. Contact Ecology at (425) 649-7000 to request a copy.

It is recommended that you send a sample of the cartridge outflow to an analytical laboratory for silver analysis. This will give you an idea of how well your current silver recovery system is working. When sending a sample of spent fixer to a laboratory, consider the following:

- Discuss your sampling plan with your analytical lab before you take samples. This gives the chemist time to investigate appropriate methods for analyzing silver.
- Deliver your samples to the lab as quickly as possible after they are taken (the same day is best.)
- Improve your chances that the chemists at the lab are aware of the special problems with silver analysis. Write this on the chain of custody form:
Sample contains photo processing chemicals and silver. Silver may precipitate as a black solid during nitric acid digestion, which can cause the silver to be undetected. Select an alternate method of sample preparation (check the method for more details.)
- Ask the lab to analyze the sample quickly, to minimize loss of silver by adherence to the sample containers through storage.
- Then it's up to your analytical chemists to apply their knowledge to your samples.

This fact sheet was created by the Medical Industry Waste Prevention Roundtable as part of a seminar series designed to help medical industry professionals control costs through product stewardship and waste reduction. Please pass this sheet on to others who may be interested.

Medical Industry Waste Prevention Roundtable



What is the Medical Industry Waste Prevention Roundtable? The Roundtable was established in early 1999 to bring together medical industry professionals who are interested in exchanging ideas on, and developing new ways of, preventing and reducing waste. During 2000 and 2001 the group is hosting a series of seminars to develop cost-effective, environmentally sound solutions for managing major medical wastes such as products and packaging.

The Medical Industry Waste Prevention Roundtable is sponsored by:



For more information on the Roundtable, visit our Web site at http://dnr.metrokc.gov/swd/bizprog/waste_pre/medical.htm or contact Kinley Deller at (206) 296-4434 or kinley.deller@metrokc.gov.