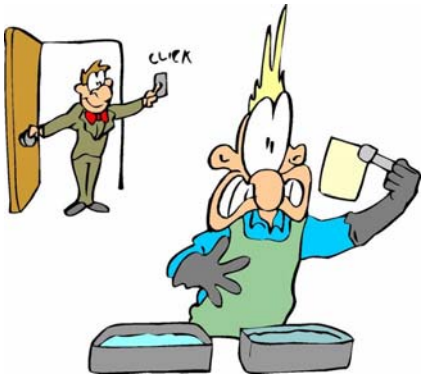
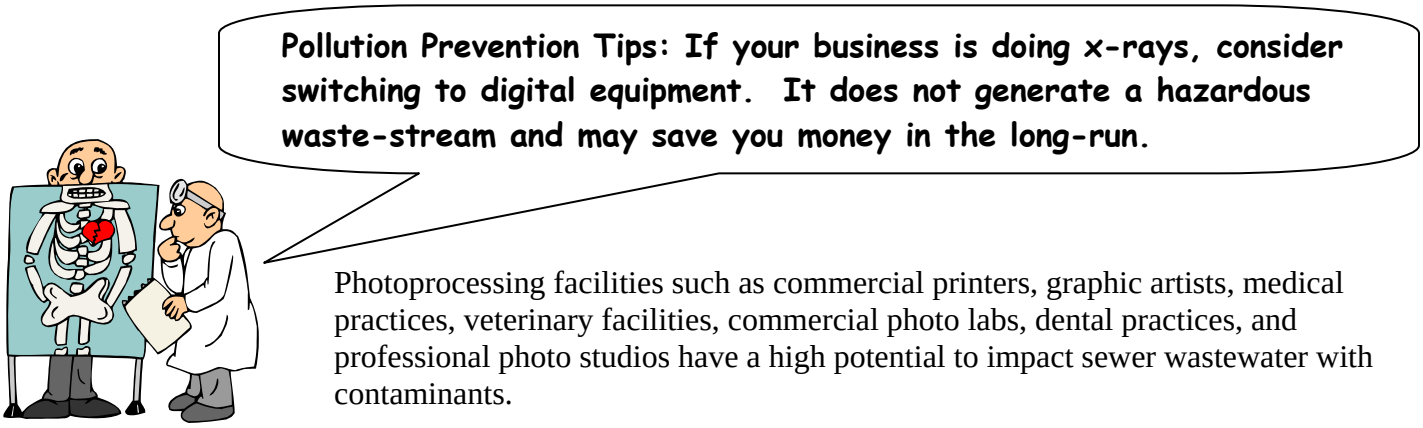
Help us save tax dollars by protecting our environment and our Publicly Owned Treatment Works…



Photoprocessing Facilities



Photoprocessing facilities such as commercial printers, graphic artists, medical practices, veterinary facilities, commercial photo labs, dental practices, and professional photo studios have a high potential to impact sewer wastewater with contaminants.

Contaminants such as silver, selenium, chromium, and caustic wastewater can eventually pollute our bay and ocean. Yet these industries 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 photoprocessing facilities.

The main environmental concerns associated with photoprocessing are silver and organic chemicals. Large amounts of silver cannot be removed from wastewater by the local sewage treatment plant. This results in silver discharges to the Monterey Bay. The silver that can be removed is concentrated in the sludge, which reduces the likelihood of the sludge being reused for agricultural purposes. This pamphlet has been prepared to familiarize printing and photoprocessing shop owners and their employees with the best management practices for dealing with typical wastes generated in the industry. It also details the County of Santa Cruz Industrial Wastewater Pretreatment requirements specific to your facility. Use this pamphlet as a tool to ensure that your business is compliant, to save money on costly spill cleanups and waste disposal, and to train all shop employees. Leave it posted in a visible location.

Best Environmental Management Practices

No hazardous materials or waste may be discharged to the sanitary sewer or storm drain!

All hazardous materials and waste must be secondarily contained, or placed in a bin that can contain up to 100% of the entire contents of the containers should there be a leak.

Keep these items stored indoors or in a covered area outdoors. Do not store these items near a sanitary sewer drain or near a storm drain. If these items are stored near a drain, a spill has the potential to travel off of your property, making cleanup more costly and exposing poor business practices to the public. If storage near storm drains is unavoidable, keep drain blockers (rubber mats that seal a drain) in close proximity to the drain at all times and place berms around the storage areas.

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.

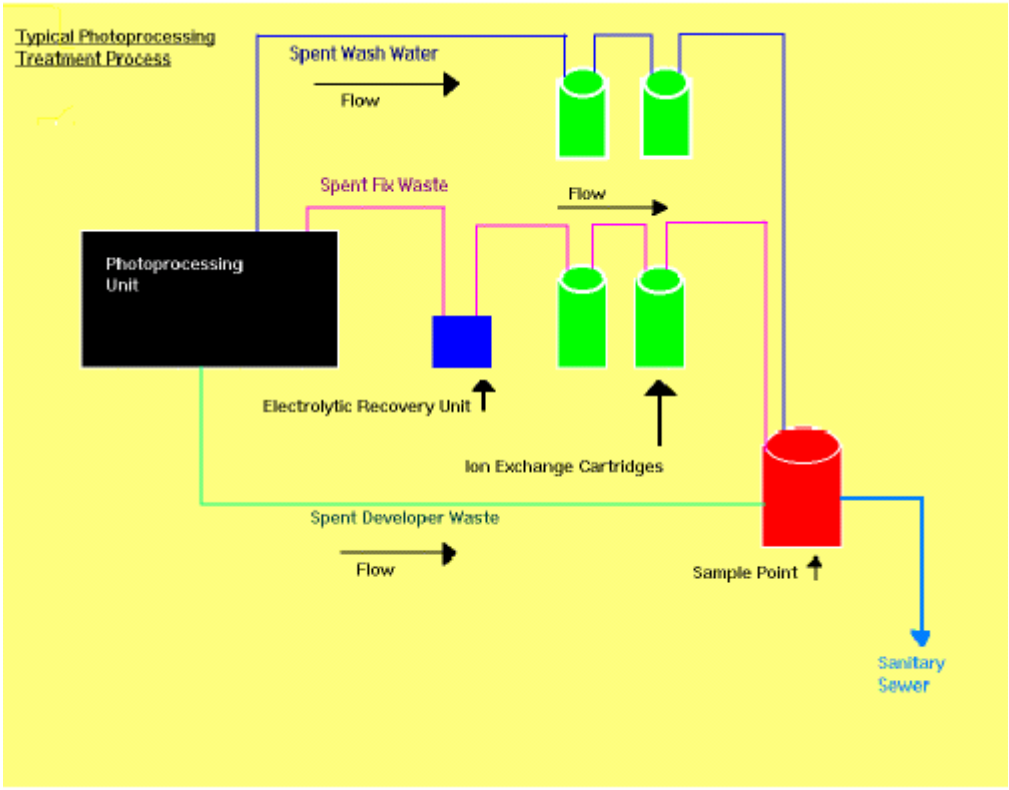
Hazardous Materials Storage

The most common silver recovery systems consist of metallic replacement (steel wool) cartridges, also known as chemical recovery cartridges or CRCs. These cartridges recover silver from photoprocessing wastewater by an oxidation-reduction reaction with elemental iron and silver thiosulfate, which results in ferrous iron and metallic silver. Often, an electrolytic recovery unit will be used prior to cycling the wastewater through the CRCs. An electrolytic recovery unit passes a direct current between positive and negative electrodes immersed in the photoprocessing wastewater. The positively charge silver in solution is converted to metallic silver, which adheres to the negative electrode. In some instances of silver recovery, the treatment system provider can give you a rebate for the recovered silver. See the diagram on the following page.

Silver recovery system operational guidelines:

- Ensure that the treatment system is serviced at the recommended intervals and keep records of all servicing.
- Train your employees so that a person knowledgeable about the treatment system is present whenever it is in operation.
- Test the system for silver removal and determine optimum times for cartridge replacements. Future cartridge replacements may then be based on flow, square footage of film developed, or time in service. The Photographic and Image Manufacturers Association, Inc, (PIMA) has recommended practices for test methods for silver recovery equipment at the following URL: http://www.pima.net/standards/it04/rp1-1999.pdf
- Test the silver concentration of each batch before and after the recovery system to ensure proper system operation. This can be done with either silver test papers, an analytical test kit or lab analysis. Record test results in a silver recovery log.
- Make sure that service contracts with the treatment system provider include specific guidelines addressing disposal of waste material. You are still liable for the waste after someone takes it from your facility. Make sure it is being disposed of appropriately. Ensure that transportation manifests track the waste from cradle to grave, or preferably from cradle to cradle (recycled).

Silver Recovery Systems


Typical Photoprocessing Treatment Process
Spent Wash Water
Flow
Spent Fix Waste
Flow
Photoprocessing Unit
Electrolytic Recovery Unit
Ion Exchange Cartridges
Spent Developer Waste
Flow
Sample Point
Sanitary Sewer

Purchase reusable or recyclable products wherever possible. Hazardous materials are costly to purchase, costly to manage, and result in a higher liability for your company after disposition. Reduce or eliminate the hazardous materials that you use. Where necessary, modify the process so that it is most efficient. Never combine a non-hazardous waste stream with that of a hazardous waste stream. Keeping the waste streams separate will minimize both cost and liability. It is worthwhile to spend the time up front to know the products you are buying and their ability to be reused. It will save time and money in the long run. It is also helpful to standardize the types of solvents and cleaning solutions used in the shop. Using the same fluids for as many applications as possible facilitates reuse, recycling, treatment, storage, and disposal.

- Use squeegees, pinch rollers, or air knives in processing systems to wipe excess liquid from photographic films and papers.
- Recover silver from effluent prior to discharge. Be sure and keep high pH developers away from the silver recovery unit, as this will reduce the efficiency of the silver recovery.
- Reuse fixer
- Regenerate developer. Be sure and select a developer that is capable of being regenerated.
- Use counter current rinsing. Treat and recycle rinse water through the system rather than a continual water flow.
- Use plumbing-less minilabs.
- Carefully calculate the amount of material required. Attempt to return any excess, expired, or off-spec material to the vendor for re-use. Use a "first-in, first-out" materials management policy (i.e. use the materials in the order that they were received) to make sure stockpiled materials do not expire before use.
- Store paper at cool temperatures to preserve it.
- Use floating lids or balls on developer solution tanks to prevent loss of potency through oxidation or evaporation.
- If processors are cleaned with a chromic acid solution, spent cleaning solutions and rinsewater must also be disposed of as a hazardous waste. They must not be mixed with spent fix from which silver will be reclaimed. It is better to choose a cleaning solution without chromic acid.
- Spent photochemicals containing selenium (certain toners) must be disposed of as hazardous wastes as well. Attempt to use toners that do not contain selenium.

Waste Minimization

The best spill control is prevention!

Spills are cheaper to clean up when quickly contained! Write a Spill Response Plan. See the example Posted Spill Control Plan on the following page. 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. Examples of such materials are the following:

- Vermiculite (kitty litter)
- 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
- 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.

Spill kits are available that contain a combination of the above-mentioned materials and are put together based on the quantity of liquid your facility has the potential to release in a worst-case scenario. Plan on getting enough material to clean up the largest quantity of material your shop has onsite. There are several commercial vendors that distribute these materials. They can usually be found on the Internet. Some of the larger suppliers are Lab Safety Supply (www.labsafety.com) and New Pig (www.pigalog.com 1.800.hot.hogs).

Minimize the distance between waste collection points and storage areas and, when transferring wastes, keep lids and containers secured. Attempt to use secondary containment "carboys" when transferring wastes so that if there is a spill, it will hopefully be contained in the carboy. Always use both hands when carrying wastes.

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. **Use dry clean-up methods first, then wet clean-up methods. Do not send any wash water to the storm drain!**
6. **Package and label all contaminated materials (absorbents, PPE, liquids) for off-site disposal.**
7. **Notify the manager/owner that a spill has occurred (see below).**
8. **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	**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 Response Plan is required. Call the County of Santa Cruz Industrial Wastewater Pretreatment Program (831) 477-3907 if you would like an example template.

Discharge of any wastewater other than storm water directly or indirectly to a storm drain, a creek, an underground percolation sump, or other water body is strictly prohibited. Seal all floor drains connected to the sanitary sewer and storm drains in production areas. Never discharge any process water, mop water, cleanup water, or other chemicals into outdoor storm drain inlets, blacktop, landscaping or other connections to the storm sewer system. Never wash equipment or filters outdoors or in any area that could drain to the storm drain system.

Minimize the use of acid and/or alkaline cleaners. Such cleaners will not only damage your pipes but also will impact the Publicly Owned Treatment Works and adversely affect water quality. If these are used, the rinse water must discharge to the sanitary sewer and it may need to be treated to comply with pH and other limits prior to discharge.

Utilize dry clean-up methods wherever possible. Clean up spills by using a shop vacuum, sweeping, and/or by using rags or dry absorbents. Remove all unnecessary hoses to discourage employees from washing down floors and outdoor paved areas. Once the dry clean up is complete, floor and paved areas may be mopped. Take the following steps while mopping floors:

- Clean up spills with dry absorbent.
- Sweep the floor. Do not wet mop the floor in machining areas until all metal or other particles have been removed.
- Mop the floor using a bucket of non-corrosive cleaner and water diluted as specified on the label. If possible, only spot mop the area that requires cleaning.
- Discharge the mop water to the sanitary sewer via a sink or toilet.

Floor Drains and Floor Cleaning

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. Use the following as training and education tools:

- This Best Management Practice 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 vehicle fluids and wastes.
- Label all drains 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 Green Photo Inspection 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

GREEN PHOTO INSPECTION CHECKLIST

All items marked "NO" will require discussion and/or 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 employees carefully calculating chemical needs to reduce the amount of excess waste? Are expired or surplus chemicals returned to vendors?	
☐	☐	3. All waste containers are properly labeled.	
☐	☐	4. Only appropriate containers are used for hazardous wastes and all containers are in good condition.	
☐	☐	5. Wastewater emanating from photoprocessing operations are being treated prior to discharge to the sanitary sewer. No wastewater is entering storm drains.	
☐	☐	6. Equipment and or baths are not leaking any fluids? If so, are leaks adequately contained with absorbents or drip pans until they can be repaired?	
☐	☐	7. When processing film, is every attempt made to reduce water use? Water is not allowed to continuously flow?	
☐	☐	8. For non-automated systems only: is spent fix being captured for silver recovery?	
☐	☐	9. Spill cleanup material is available in the immediate area. Employees are trained appropriately to cleanup spills and are familiar with the Spill Response	
☐	☐	10. Are all chemical and waste containers (in storage or in use) in secondary containment?	
☐	☐	11. Are floor drains absent in production areas where a potential spill could occur?	
☐	☐	12. All hazardous wastes are secondarily contained and are stored indoors away from floor and storm drains.	
☐	☐	13. Lids, bungs, and tops are secured on containers at all times, excepting when adding waste to containers or dispensing product.	
☐	☐	14. There is a posted version of the Spill Response Plan in areas where hazardous materials are used and stored.	
☐	☐	15. Dry clean up methods are being used in preference or always before wet clean up methods (those using water).	
☐	☐	16. 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. Floors are not being hosed down.	
☐	☐	17. Are batches of wastewater tested before and after being sent throught the silver recovery system? Are these test results being recorded?	
☐	☐	18. Waste removal manifests and product use logs have been properly maintained.	
Pollution Prevention Measures for a Green Business (not required but recommended)			
☐	☐	17. Is continuous silver recovery used to reduce fixer replenishment and discharge quantity?	
☐	☐	18. Are bleach and regular fixers kept separate? Bleach fix reduces silver recovery efficiency.	
☐	☐	19. If using an automated processer, are the rinse tanks processed through silver recovery equipment? Are there three or more rinse tanks?	

Green Photo Checklist

Spent fixer solution cannot be discharged to the sanitary sewer or storm drain! It must either be treated onsite (silver recovery) or collected by a certified silver recycler. Generally, if your facility is processing large volumes, then an onsite silver recovery system is warranted. If only processing small volumes, it is recommended that all waste be collected and hauled away for treatment.

If your facility is treating photoprocessing wastewater onsite, you are required to have an Industrial Wastewater Permit with the County of Santa Cruz. All wastewater discharged must meet the local discharge limits. All spent chemicals (except developer) must be treated prior to discharge, including fixer, stabilizer, bleach, bleach-fix, and wash water.

If your facility is collecting waste and sending it off-site for treatment, make sure you know where your waste is going. You are liable for your waste from cradle to grave.

Some common types of wastes generated by photoprocessors:

Materials and Byproducts	**Disposition Option**	**Liability***
Spent Developer	Regeneration (must select a developer that has the capability to be regenerated).	1
Acid and alkaline cleaning solution	Neutralize prior to discharge to sanitary sewer.	7
	Contain and haul away for off-site treatment through a licensed and approved vendor	7
Heavy metal solid wastes	Recycling vendor	3
	Treatment and disposal	7
Heavy metals-containing fluids	Treat using metal recovery, send treated fluids to sanitary sewer. Recycle metals	5
	Contain and haul away for off-site treatment through a licensed and approved vendor	7
Spent fixers (including bleach-fix)	Reuse fixers as much as possible. High volume- onsite silver recovery treatment sufficient to meet local effluent limitations and then discharge to sanitary sewer. Recycle silver.	5
	Low volume – haul away for off-site treatment through a licensed and approved vendor. Recycle silver.	7
Concentrated rinse waters	Multiple stage rinse water is highly recommended. Final stage rinsing containing low to no concentrations of silver may be recycled to initial rinse water stage. As the levels of silver rise, treat as below: High volume- onsite silver recovery treatment sufficient to meet local effluent limitations and then discharge to sanitary sewer. Recycle silver	5
	Low volume – haul away for off-site treatment through a licensed and approved vendor. Recycle silver.	7
Waste film, cartridges, cassettes, and canisters	Recycle to film manufacturer or other vendor	1
	Dispose in landfill	7

*Liability is estimated on a scale from 1 to 10: 1 being the least liable and 10 being the most liable.

Photoprocessing Waste Management