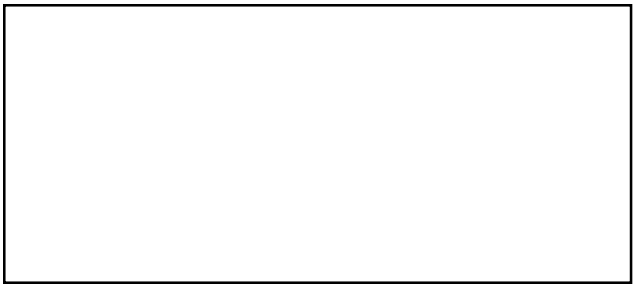
Pollution Prevention Practices for Printers

The Regional Water Quality Control Plant (RWQCP) has developed these guidelines for water quality protection in order to minimize discharge of metals and other potential pollutants from printers to both the sanitary sewer and storm drain systems. We hope you'll join us in our efforts to protect San Francisco Bay.



Contents

Housekeeping

Good housekeeping practices are some of the best ways of preventing pollutants from entering the storm drain system and sanitary sewer.

- If it is absolutely necessary to work outside, be careful to avoid areas near storm drains. In general, outdoor activities—especially those involving hazardous materials or metals—should be avoided. Be sure to clean up after the work is done.

- Indoors, plug all floor drains connected to the sanitary sewer. If floor drains remain open you may be required to obtain an industrial waste discharge permit.

Tip: Contact the Regional Water Quality Control Plant (RWQCP) for information about obtaining a discharge permit for your facility. Call (650) 329-2598.

- Never discharge concentrated inks, solvents, lubricating oils, or other fluids associated with printing operations and equipment maintenance into sinks, outdoor storm drain inlets, or other connections to either the sanitary sewer or storm drain system.

- Promptly transfer used fluids to the appropriate waste receptacles or recycling drums.
- Keep waste fluids segregated to facilitate reuse, recycling, or treatment.
- Install secondary containment around all machines that may leak or drip fluids. Keep secondary containment clean and dry at all times.

- If secondary containment is not feasible, use drip pans or absorbent materials (such as rags, "pigs," sock-type absorbents or pads, or cat litter) to catch drips and leaks.

- When purchasing new machines, select models that have built-in secondary containment.

Spill Prevention and Cleanup

- Prevent spills! Avoid moving inks, cleaning solutions, and waste long distances by placing containers in a convenient and safe place. Properly contain and cover all hazardous materials and hazardous wastes, especially when moving containers around.

- Prepare and implement a Spill Response Plan for your facility. Keep the updated Plan on file at all times, and make sure your employees know where to find it. All employees should be familiar with the plan and trained to handle both large and small spills.

Tip: To help prepare a plan, contact the Printing Industries of Northern California (PINC) at (415) 495-8242 and ask for the "Spill Response and Emergency Procedures" safety sheet.

- Keep spill cleanup materials, such as rags, absorbents, portable berms, and shop vacuums available and accessible at all times.

- If a spill occurs, clean it up immediately! Refer to the "Floor Cleaning" section on the next page for spill cleanup methods.

Tip: Absorbent materials used for spill cleanup should be disposed of as hazardous wastes unless analytical testing proves that the waste is not hazardous. Rags can go to a laundry. Refer to the Management of Shop Towels section on page X for more information.

Floor Cleaning

Sweep or vacuum instead of mopping whenever possible. If wet cleaning is necessary, clean floors using one of the following methods:

Method #1: The 3-step "dry cleanup" process

Step 1: Use a squeegee to recover the spilled material, or use rags or absorbent materials to clean up spills or visible liquids. (Absorbent materials include "pigs," sock-type absorbents or pads, and cat litter).

Step 2: Use a dry shop vacuum cleaner (shop vac) routinely, instead of or before mopping.

Step 3: Follow steps 1 and 2 above, and *then* mop. To minimize the volume of wastewater, clean floors using a damp mop rather than a wet mop, when possible. Dispose of mop water to the sanitary sewer. Never discharge mop water to the storm drain or gutter.

Remember, the solution to pollution is NOT dilution!
Minimize the amount of mop water you use.

Method #2: Discharge after tests confirm compliance

Mop shop floors and collect the mop water in a holding tank. Analyze a representative sample from the holding tank for the appropriate parameters (such as metals discharge limits). If test results indicate compliance with local discharge limits, discharge the contents of the holding tank to the sanitary sewer. If test results indicate noncompliance, either treat to comply with limits and then dispose to the sanitary sewer, or arrange for proper disposal off-site.

Method #3: Pretreatment of cleanup water

Mop shop floors when necessary, and discharge the mop water to a pretreatment system. Pretreatment may include separation, filtration, metals precipitation, or other processes capable of reducing contaminant concentrations below the discharge limit. Test for compliance with discharge limits; when compliance is reached, discharge to the sanitary sewer.

Tip: An industrial waste discharge permit must be obtained from the RWQCP for discharge of cleanup water from Methods #2 and #3. Your facility may also need to comply with county hazardous materials regulations and/or California Department of Toxic Substances Control (DTSC) permit requirements.

Prepress/Image Processing

Problem substances include silver in spent processing solutions, selenium in some toner,s and chromium in developer cleaners. Ways to reduce metals discharges from imagemaking operations include:

Spent processing solutions. The RWQCP service area has a silver discharge reduction ordinance. Businesses with photoprocessing operations are required to treat silver-containing wastes (such as spent fix or bleach fix) or have them hauled off-site as hazardous wastes. Please call the RWQCP, (650) 329-2598, for assistance in complying with the silver discharge reduction ordinance.

Selenium toners. Spent photochemicals containing selenium, such as Kodak Rapid Selenium Toner, must be disposed of as hazardous waste. Never pour solutions containing selenium down a sink or drain.

Developer cleaners. If processors are cleaned with a chromic acid solution such as Kodak's Liquid Developer System Cleaner, spent cleaning solutions and rinsewater must be disposed of as a hazardous waste. Chromic acid cleaners must not be mixed with spent fix from which silver will be reclaimed. Non-chromic acid cleaners are available.

Silver-free film. Alternatives to silver-based film can reduce or eliminate the need for wastewater pretreatment. Diazo and vesicular films have been used successfully, while photopolymer and electro-static films are still gaining acceptance.

Electronic imagesetting systems. Using electronic imaging and/or laser platemaking reduces the need for reshooting and photoprocessing. Page layouts can be produced and edited on a computer rather than on paper. Additional advantages including speed, reduced prepress costs, labor savings, reduced chemical handling and use, and reduced amounts of silver-bearing wastes may contribute to the economics of investment in technology such as:

- Graphics-oriented workstations that run production-level software
- Color Electronic Prepress Systems (CEPS) that perform complete page makeup including color balancing and correction
- Flat-bed scanners capable of scanning both color and black and white pages. Scanners can be used with computers, CEPS or graphic work stations.

Prepress/Image Processing

Proofmaking operations. Aqueous proof-making processes, including Dupont's Color Proof and 3M's Matchprint III, generate waste water that contains metals at very low levels. It is acceptable to discharge such wastewater to the sanitary sewer. However, RWQCP staff hopes you will consider using digital proofing or on-screen "soft proofing" as alternatives that will further reduce prepress wastewater discharges.

Other pollution prevention opportunities

- Use a squeegee to wipe off excess liquid from film and paper during tray developing or manual operations.
- Use counter-current rinsing in the photoprocessing operation to reduce process solution contamination and rinsewater usage.
- Add ammonium thiosulfate to silver-contaminated baths to extend bath life. (Note that the increased bath life will result in an increased silver concentration, making treatment or hauling of the spent solution even more critical.)
- Use floating lids on bleach and developer containers to prevent evaporation.
- Protect process baths that spoil easily by keeping them containerized. Small scale photodevelopers can containerize process baths and use glass marbles to bring the liquid level to the brim each time the liquid is used.
- Silver can also be recovered from scrap film and paper. Check with your silver recovery service to see if they will recycle these materials in addition to your silver containing solutions.

Platemaking

Problem substances include metals and solvents found in spent platemaking solutions. Some aluminum plates contain copper that is etched into the platemaking solutions. Ways to reduce the metals in wastewater discharges from platemaking include:

- **Do not discharge metal platemaking wastes down the drain.** These wastes include acids and alkalis used to clean and develop plates, and associated rinsewater.

- **Replace metal etching processes with a process that generates less waste wherever possible.** Alternative plates include presensitized aluminum, plastic or photopolymer, flexographic, and electrostatic.

Tip: Some presensitized plates contain copper. Either choose an aluminum plate that does not contain copper, or collect the wastewater from aluminum platemaking operations and dispose of it as hazardous waste.

Printing and Finishing

Problem substances include inks and fountain solutions. Ways to reduce the impacts of these materials include:

Inks. Use soybean, walnut, or vegetable oil-based inks whenever possible. Cutting down on the use of solvent-based inks reduces employee health and safety risks, improves air quality, and can reduce regulatory requirements. Water-based inks may be used for certain non-lithographic applications including flexography, screen printing, and some letterpress. Concentrated inks, both solvent- and water-based, must not be discharged to the sanitary sewer.

The composition of inks varies widely. Inks frequently get their color from the metals or hazardous pigments they contain. It is the responsibility of shop owners to determine whether the inks used in your operations are hazardous. For assistance in making the determination,

review the container label or the MSDS, or ask your ink distributor. You can also contact the DTSC Waste Evaluation Unit Helpline at (916) 322-7676 for more information. The Helpline is open from 8 a.m. to 12 noon on Fridays. At other times, you will be asked to leave a message with your name and address.

Fountain solutions. Some fountain solutions contain chromium. Use chromium- free fountain solutions that are available. Spent fountain solutions and cleaning solutions may contain metals from printing inks. In most cases, however, the metals concentrations are low and should be acceptable discharges to the sanitary sewer. In addition, use a fountain solution that contains low concentrations of isopropyl alcohol (IPA) or no IPA at all. IPA emissions can cause air pollution problems and may require the installation of air pollution control equipment.

Other pollution prevention opportunities

Reducing ink purchases by conserving ink—helps prevent water pollution while it saves you money. Here's how to get the most value out of your ink supplies:

- Recover as much ink as possible. Preclean ink trays with rags before rinsing with water.
- Keep containers closed and covered whenever possible to minimize evaporation and reduce chance of spills.
- Fill ink fountains only enough for a particular run or shift. Return all unemulsified inks to their covered containers.
- Clean ink fountains only when changing colors or when the ink might dry out between runs.
- Scrape and use as much ink as possible out of containers.
- Save old inks and market as "house colors" or donate unemulsified inks to trade schools, colleges, etc.

Management of Shop Towels

Inks and solvents that are removed from shop towels by a commercial laundry can add metals and volatile organics to the laundry's wastewater. The RWQCP recommends the following practices in your shop to reduce the levels of solvents and inks in towels before they are sent to

Clean-up procedures. Use plunger cans and squeeze bottles to moisten rather than soak towels before they are used to clean ink from roller blankets. Squeeze bottles can be used to apply solvent directly to the roller blanket. Using this equipment will help to limit the amount of solvent used each day.

Do not pour liquid solvent or ink waste into used towel containers; towels should not be used to soak up solvents and inks that collect in trays. Instead, pour off liquids or use a squeegee or spatula to transfer solutions to the appropriate container. Waste inks and solvents should be collected for hazardous waste disposal in a drum.

Remove excess solvent and ink from soaked towels. If towels do become soaked, a hand-operated wringer can be used to remove excess solvent. The wringer should be made of solvent-resistant materials. Towels can also be hand-squeezed using protective gloves, eye protection, and adequate ventilation.

Use a solvent wash to clean ink from trays. A parts-washing unit with recirculating solvent can be used instead of towels to clean trays. Trays are removed from the press and placed in the washer unit where the solvent is used to remove the ink waste. Another alternative is to use a stream of solvent from a squeeze bottle to wash ink waste to one end of a tray equipped with a drain hole, fitting, and hose to drain the waste into a container.

Screen Printing Operations

In addition to other practices described in this booklet, the following recommendations apply specifically to screen printing operations.

Consider use of automatic screen washers. Totally enclosed systems are commercially available for ink, emulsion, and haze removal or ink only removal. These systems may be expensive but advantages include reductions in screen cleaning chemicals used, air emissions, and labor.

Reduce solvent use for ink removal. Use low-flow spray nozzles to apply solvent directly and evenly. Once applied, brush solvent thoroughly into screen. This should allow effective ink removal while using smaller amounts of solvent.

Another method is to first scrape ink off the screen and collect ink to be reused. The remaining ink is cleaned off the screen using a cloth moistened with solvent.

Use high-pressure water for emulsion removal. Once the ink has been removed from the screen, use a high-pressure water blast to remove emulsion from the screen. Water pressures up to 4000 psi have been used to remove emulsion effectively without damaging screens. Do not clean screens outside.

Tip: Waste water from use of high-pressure water blasts or automatic screen washers should be tested for compliance with local discharge limits shown on page X. Waste water with pollutant concentrations above these limits must not be discharged to the sanitary sewer. Contact the RWQCP for help with disposal options.

Reduce use of haze remover. Apply haze remover only to the affected area instead of over the entire screen. Clean screens as soon after use as possible to avoid the formation of “ghost” images. Applying an ink degradent to the screen before reclamation will also help prevent ghosting.

Materials Management

- Obtain a Material Safety Data Sheet (MSDS) for each chemical used or stored on your premises. Determine whether you can use less toxic substitutes.
- Order minimum amounts of materials and chemicals. This practice reduces waste and leftover materials when procedures are changed, expiration dates pass, or spills occur.
- Use a “first-in, first-out” materials management policy (in other words, use chemicals in the order they are received) to make sure stockpiled materials do not “expire” before use.
- Inspect containers of raw materials closely for leaks before acceptance.
- Standardize the types of inks, solvents, lubricating oils, and other solutions used in the shop. Using the same fluid for as many applications as possible facilitates reuse, recycling, or treatment.
- Whenever possible, select suppliers who provide fresh chemicals and pick up used solutions for recycling.

Outdoor Storage

- Store all materials and equipment indoors if possible. Outside activities or storage areas are subject to compliance with State and Federal storm water regulations
- Do not leave open containers outside and exposed to rain. Prevent water from accumulating in them. Use a tarp for temporary storage or roof over a permanent storage area for protection against the weather.

Training

Train all employees in water quality protection practices, including proper chemical handling, storage, disposal, and water conservation techniques. Provide information for new employees, and refresh all personnel at least annually. Keep your facility’s Spill Response Plan updated and available to employees at all times.

Recycling/Hazardous Waste Storage and Disposal

Many materials used in printing operations can be recycled, including inks, other solutions, paper product,s and other solid wastes.

Tip: For a list of recycling companies and hazardous waste transporters contact the Printing Industries of Northern California (PINC) at (415) 495-8242.

Waste Inks. Most inks can be recycled and blended to make black ink. Consider purchasing inks from a distributor who will take or buy back unused or spent inks.

Other waste solutions. If possible, choose materials that can be recycled and materials that are non-toxic. For example, water-based cleaners can provide acceptable cleaning; experiment with concentrations to find one that works. Recycle spent fix, solvents, and waste lubricating oils if possible.

Solid wastes. Reuse or recycle containers, waste paper and cardboard. Supply boxes may be reusedfor shipping completed jobs to customers. Used metal plates may also be recycled using a licensed waste hauler.

Hazardous wastes. Guidelines to follow for handling hazardous wastes are described below. For more information, call DTSC at (510) 540-2122.

- Segregate waste streams inside the shop to facilitate recycling. Label waste barrels to remind employees to separate wastes and to recycle.
- Storage and disposal of hazardous wastes must be conducted in compliance with local, state, and federal regulations.
- Store and handle hazardous wastes in special hazardous waste containers, or in drums with secondary containment approved by your local fire department or hazardous materials authority. Wastes held for recycling must be stored on-site in accordance with hazardous waste requirements.

Hazardous Waste Management

Hazardous Waste Disposal Requirements

A waste is considered to be hazardous if:

1) It is a specifically listed hazardous waste as defined in the California Code of Regulations (CCR), Title 22

OR

2) It exceeds the "characteristic" standards of ignitability, corrosivity, reactivity, and toxicity as defined in Title 22.

If not reused or recycled, hazardous wastes must be properly disposed of at a Class I hazardous waste management facility.

If hazardous waste is shipped off site, an identification number from DTSC is needed. Depending on the nature and quantity of waste generated, a hazardous waste generator permit from the Hazardous Materials Compliance Division, Santa Clara County Department of Health, or San Mateo County Environmental Health may also be required.

DTSC offers a consultative services program to aid small businesses (50 employees or fewer) in complying with hazardous waste regulations. The program provides both advice and regulatory clarity. For information on setting up a consultation appointment, contact DTSC, (916) 255-3671.

Tiered Permitting/Permit By Rule (PBR)

Under California state law (AB 1772), authorization from the state Department of Toxic Substances Control (DTSC) is required for all persons who treat or dispose of hazardous wastes, and many who store hazardous waste-if those persons are not already required to have federal hazardous waste facility permits ("RCRA permits"). For further information, call the Tiered Permitting Hotline, DTSC Region 2 (Berkeley), at (510) 540-3964.

Hazardous Waste Drop-off Program for Small Businesses

The City of Palo Alto, Santa Clara County, and San Mateo County all operate hazardous waste drop-off programs for businesses that qualify as "Conditionally Exempt Small Quantity Generators" (CESQG) of hazardous waste. In most cases these programs will save a small business money compared with the cost of contracting with a hazardous waste hauler.

A CESQG generates no more than 27 gallons of hazardous waste per month. While the general public may carry no more than 5 gallons or 50 pounds of waste in a private vehicle, CESQGs can obtain a state variance permitting transport of up to 27 gallons or 220 pounds. Call the program in your area for more information.

- In Santa Clara County, call (408) 299-7300 to make an appointment with the County's mobile hazardous waste drop-off program. Disposal costs vary.

Hazardous Waste Management

- In San Mateo County, call (650) 599-1600 to make an appointment to drop off waste. A fee will be charged.
- All RWQCP service area small businesses may use the City of Palo Alto's monthly CESQG drop-off program, which operates at the Regional Water Quality Control Plant, 2501 Embarcadero Way, on the first Saturday afternoon of each month (or the second Saturday in months where a City holiday falls in the first week of the month). An appointment is required; fees include a processing charge and disposal fee. Call Greenfield/Laidlaw, (800) 433-5060, or the City of Palo Alto, (650) 496-6980.

For More Information . . .

Regional Water Quality Control Plant ..... (650) 329-2598

Hazardous Waste Drop-off Programs for Small Businesses

City of Palo Alto 650-496-6980

City of Mountain View ..... (650) 903-6378

Santa Clara County ..... (408) 299-7900

San Mateo County ..... (650) 599-1600

Cal/EPA Department of Toxic Substances Control (DTSC) ..... (510) 540-2122

Tiered Permitting Hotline DTSC Region 2 (Berkeley) ..... (510) 540-3964

DTSC Consultative Services for Business and Industry ..... (916) 255-3671

DTSC Waste Evaluation Unit Helpline ..... (916) 322-7676

Printing Industries of Northern California (PINC) ..... (415) 495-8242

Bay Area Air Quality Management District (BAAQMD) ..... (415) 771-6000

BAAQMD Compliance Assistance ..... (415) 749-4999

Maximum Allowable Discharge Limits

In order to achieve compliance with the Regional Water Quality Control Plant's concentration limits on plant effluent discharged to San Francisco Bay, businesses in our service area must meet the following concentration limits on discharges to the sanitary sewer.

Pollutant	Maximum Allowable Concentration (mg/L)
Arsenic	0.1
Barium	5.0
Beryllium	0.75
Boron	1.0
Cadmium	0.1
Chromium (hexavalent)	1.0
Chromium (total)	2.0
Cobalt	1.0
Copper	2.0
Cyanide	1.0
Formaldehyde	5.0
Lead	0.5
Manganese	1.0
Mercury	0.05
Nickel*	0.5
Phenols	1.0
Selenium	1.0
Silver*	0.25
Single toxic organic*	0.75
Total toxic organics*	1.0
Zinc	2.0
Fluoride*	65.0
Oil/ Grease*	200.0
pH*	5.5–11.0
Suspended solids*	6,000
Total dissolved solids*	10,000

*For discharges greater than 50,000 gallons per day the maximum concentration is one-half the value listed in this table, EXCEPT for substances marked with *.

Note: As of July 1, 1998, most industrial dischargers (other than metal finishers) will have a copper limit of 0.25mg/l.