

Pollution Prevention, Risk Management & Regulatory Compliance for Lithographic Printers

INTRODUCTION

The commercial printing industry (screen, lithographic, flexographic) generates air emissions, wastewater discharges and various solid and potentially hazardous wastes as a result of their operations. This fact sheet addresses the different wastes generated, provides regulatory contacts, and discusses options on how to minimize the amount of waste generated through printing operations.

With ever-increasing environmental regulations impacting a very price competitive industry, many printers are working smarter; reducing waste ink generation, extending the bath life of fixer, and using alcohol-free fountain solutions are all actions that can reduce material input and waste disposal costs.

WHAT IS POLLUTION PREVENTION/WASTE MINIMIZATION?

By eliminating waste generation at the source, rather than dealing with environmental requirements and costs after the waste is generated, you may be able to “prevent pollution.” Many printers have found that pollution prevention increases efficiency, saves money, and improves competitiveness. Pollution prevention/waste minimization is not a set of regulatory requirements but is part of continuously improving your business. Actions to improve your business and prevent pollution include:

- Working smarter and more efficiently;
- Involving employees in the process;
- Making it a priority to run a clean and organized shop;
- Being open to experiment with alternative products or process modifications.

WHAT ARE SOME OF THE BENEFITS OF POLLUTION PREVENTION?

- Reduced air permitting fees, waste disposal fees, and taxes.
- Reduced raw material purchasing costs.
- A safer workplace for employees.
- Reduced compliance requirements.
- Improved business image in the community.

WASTE STREAMS TYPICAL OF THE COMMERCIAL PRINTING INDUSTRY

- Photographic Wastes
- Photo developer, photo fixer, systems cleaner, scrap film.
- Waste Inks/Blanket Wash
Organic and inorganic pigments may contain heavy metals. Solvents in inks and wash solutions may be considered hazardous wastes due to the flashpoint being below 140 degrees Fahrenheit or due to solvent constituents such as acetone, xylene, and toluene.

- Spent Fountain Solution- Typically cannot be discharged to the local sewer due to alcohol or glycol content.
- Waste Wipers and Rags- Tags typically loaded with waste ink and blanket wash
- Used/Empty Containers- Plastic and metal containers may contain residue.
- Lubricating Oils- Should be recycled.

HOW TO PREVENT POLLUTION AT YOUR SHOP

Management Commitment

- An important aspect of any waste reduction program is management commitment. Commitment from the top demonstrates that the business is committed to finding new ways to reduce waste generation and save money in the process. Employees are going to participate only to the level management participates.

Employee Awareness

- The importance of each employees' efforts toward pollution prevention should be emphasized, from the general manager to the press operators to the employees in bindery. Incorporating one aspect of pollution prevention into every weekly or monthly staff meeting drives home the commitment to waste minimization and demonstrates a high priority from management to involve all employees.
- Employee suggestions should be encouraged and rewarded either individually or as a specific working group or shift. Management rewarding positive ideas re-enforces top commitment to pollution prevention.

Good Housekeeping

- Keep careful records to improve inventory control. Implement a first-in, first-out policy of chemical product use. Do not order more than can be used within the shelf life of the product. Once ink containers have been opened, date container and seal tightly with grease or saran wrap, in addition to closing tightly. Ensure the product label is visible and readable before it is put back on the shelf.
- Train employees involved with ink mixing to manage raw materials for proper inventory control and to ensure that all containers are properly contained, sealed, labeled and that a Material Safety Data Sheet (MSDS) is on file for each chemical located within the facility.
- If materials have exceeded their shelf life, check on alternative uses before discarding. Consider contacting nearby theater groups and high school or college graphic arts departments to donate expired materials for their programs.
- In larger businesses, make sure waste generating departments are managed as individual profit centers; waste management and disposal costs broken down into each profit center will allow for easier identification of high priority areas for waste reduction. Waste management and disposal costs covered under a general expense fund do not give specific departments an incentive to reduce their wastes.
- Be innovative in trying new procedures and products.
- Find ways to use paper. Make notepads, poster paper or other products from extra paper. Recycle all paper waste or donate it to schools and churches. Recycle aluminum plates, negatives and other silver laden paper.

Press Maintenance

- Routinely check all dampening rollers and systems; remove and replace bad rollers as needed. Deep clean and recondition rollers on a defined maintenance schedule.
- Keep presses lubricated on a daily, weekly, or monthly basis, as required by the manufacturer. Clean and oil vacuum system.

IMAGE PROCESSING - REGULATORY COMPLIANCE ISSUES

Spent developer, fixer, or scrap film that contains leachable silver at 5 milligrams per liter(mg/l) or greater is considered a hazardous waste due to the silver content under State and Federal regulations. There are also limits to the amount of silver that can be in a wastewater discharge from a business. In Northern Nevada (Reno, Sparks, and Carson City), the wastewater discharge limits are so low (typically .05 mg/l) that it does not make economic sense to recover silver on-site because traditional silver recovery equipment cannot remove silver from the wastewater to the level that makes it allowable to discharge.

Most businesses generating spent fixer in Northern Nevada contract with an outside firm that hauls the spent fix away as a hazardous waste and recovers the silver in a centralized location. In Southern Nevada (City of Las Vegas, Clark County, Henderson), the silver discharge limits are less stringent (typically 2 to 5 mg/l) and most businesses do perform onsite silver recovery of their photo processing chemicals prior to discharging. Before any business drains their image processing wastewaters to a local sewer, they should contact the wastewater treatment authority in their area to inquire about specific regulations.

For further information on wastewater discharge requirements contact:

Washoe County

City of Reno
(775) 334-2167

City of Sparks
(775) 861-4152

Carson City
(775) 887-2355, Ext. 1048

Lyon County
(775) 246-6220 Ext 35

Southern Nevada:

City of Las Vegas
(702) 229-6200

Clark County Sanitation District
(702) 434-6600

City of North Las Vegas
(702) 633-1000

City of Henderson
(702) 565-2810

IMAGE PROCESSING - POLLUTION PREVENTION OPPORTUNITIES

- Use an acid stop bath prior to the fixing bath. This reduces the effect of an alkaline developer on the fixing bath pH. Add acetic acid to the fixing bath, keeping the pH low to maximize soluble complexes. Fixing bath pH should typically be kept between 4 and 5. When the pH reaches 5.5, the fogging preventative becomes less effective, requiring the operator to change the fix bath or lower the pH by adding more acetic acid.
- Add ammonium thiosulfate to silver contaminated baths to extend the allowable buildup of silver. A small amount of silver enters the fix bath solution each time film or paper is immersed. Insoluble compounds form after silver concentrations reach a certain level and cannot be removed from the photographic emulsion. The critical silver concentration for fix baths is 0.27 ounces per gallon (2000 milligrams per liter).
- Use floating lids on bleach and developer containers to keep them fresh.
- Install waterless paper and film developing units to reduce the volume of fixer waste. Segregate fixer from developer waste.
- Employ countercurrent rather than parallel rinse techniques. Countercurrent rinsing means water from previous rinsing is used in the initial film washing stage. Fresh water enters the process at the final rinse stage, at which point much of the contamination is already rinsed off the film.
- Protect process baths that spoil easily by keeping them containerized. Small scale photo developers can containerize process baths and use glass marbles to bring the liquid level to the brim each time the liquid is used.

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WASTE INKS/INK INVENTORY - REGULATORY COMPLIANCE ISSUES

Oil-based inks (petroleum and vegetable) typically contain pigments, solvents, varnishes, and dryers. The pigments in the inks typically contain either inorganic metals such as lead and chromium or organic replacements which contain chemicals such as dichlorobenzene (yellow) or copper phthalocyanine (cyan blue). Many waste inks do not exceed the EPA limits for heavy metals or organics and are determined to not be hazardous waste. Other waste inks are determined to be hazardous waste.

We recommend a Nevada generator of waste ink have laboratory documentation (the 7-11 Toxicity Characteristics Leaching Procedure (TCLP)) if they are not handling their waste inks as a hazardous waste. Many waste inks can be disposed of through fuel-blending operations and cost for disposal can vary between \$50 to \$300 per 55 gallon drum. Questions regarding 7-11 TCLP testing or the hazardous waste regulations within Nevada can be directed to the Business Environmental Program, 1-800-882-3233. This is a free and confidential/non-regulatory assistance service located at the Small Business Development Center, College of Business, University of Nevada, Reno.

The Hazardous Waste Agencies throughout the State include:

Washoe County Health District
(775) 328-2641

Southern Nevada Health District
(702) 759-0600

All Other Areas

Nevada Division of Environmental Protection, Bureau of Waste Management
(775) 687-9473

WASTE INKS/INK INVENTORY - POLLUTION PREVENTION OPPORTUNITIES

- Use inks that do not contain heavy metals and have lower Volatile Organic Compounds.
- Increase accuracy of ink estimating techniques by training employees involved with ink mixing and increase use of existing ink inventory. Computer programs (MixMaster) are available to assist in re-blend existing ink inventory for any PMS color.
- Improve ink handling techniques and train employees to cover and re-seal inks after use. Keep partial containers sealed and dated, with contents leveled to maintain ink quality. Keep accurate documentation of outstanding ink inventory and always use ink on a first in/first out basis.
- Use existing ink stock whenever possible for in-house jobs and for jobs that are not critical, offer customers reduced pricing for use of in stock inks. Contact high schools, county and state printing offices to donate excess ink inventory.

BLANKET WASHES/VOC EMISSIONS - REGULATORY COMPLIANCE

Most blanket washes are considered a hazardous waste when disposed of due to their low flashpoint (any liquid with a flashpoint less than 140 degrees Fahrenheit is considered an ignitable hazardous waste) and well as some of their constituents such as toluene, xylene, and acetone. Most spent blanket wash is absorbed in wipers and rags and it's the spent wipers and rags that need to be handled properly. Blanket washes are also captured in washup trays. If the press wash solvents are hazardous they should be segregated; if the wash solvents are mixed with other wastes such as inks, the entire mixture must be managed as a hazardous waste. Many printers are required to have air permits due to the Volatile Organic Compounds (VOC) emissions that are generated from press operations. Under the Clean Air Act Amendments of 1990, many larger printing operations are going to have new extensive permitting requirements. For more information regarding air permitting requirements and whether your specific shop needs one contact:

Washoe County

Air Pollution Control District
(775)784-7200

Clark County

Air Pollution Control District
(702) 455-5942

All Other Areas

Nevada Division of Environmental Protection, Air Pollution Control
(775) 687-9350

BLANKET WASHES/VOC EMISSIONS - POLLUTION PREVENTION OPPORTUNITIES

- Reduce solvent washups by planning ahead; group jobs with similar ink colors and run jobs from light to dark.
- Use pump cans or squirt bottles to reduce the amount of cleaner used. It's usually more effective to dampen the rag rather than apply solvent directly to blanket. Store used wipers and rags in safety containers with tight fitting lids.
- Use the mildest effective cleaner for each task; use the aggressive, quick-evaporating solvents only for the task requiring heavy cleaning.
- To reduce hazardous waste generation, employee exposure, and VOC emissions, evaluate switching over to an alternative solvent with higher flashpoint and less hazardous constituents.

WIPERS & RAGS - REGULATORY COMPLIANCE

Spent wipers and rags are typically contaminated with waste ink mixed with blanket wash. As of May 15, 1996, the Nevada Division of Environmental Protection, Bureau of Waste Management, has determined that spent wipers that have been wrung out to yield no free liquid may be sent to a commercial launderer. These rags are not subject to a waste determination and are not considered hazardous waste. The waste rags must be stored in a seal tight container to reduce air emissions from the rags. If a printer is going to use wipers that are to be thrown away once the wipers is deemed “used”, then a waste determination is required. The printer will need to manage the waste disposable wipers as either a hazardous or non-hazardous waste, dependent upon the results of the waste determination.

WIPERS & RAGS - POLLUTION PREVENTION OPPORTUNITIES

- Wring out rags to remove and re-use as much blanket wash as possible; this “dirty” blanket wash can be re-used on a first pass of the next blanket cleaning.
- Store spent rags in a seal tight container to reduce volatile air emissions and in turn, help the air quality for all employees in the work place.

FOUNTAIN SOLUTIONS - REGULATORY COMPLIANCE

The dampening system on a lithographic sheetfed press provides fast and complete separation of the image and non-image area of the plate by making the non-image area unreceptive to ink. Fountain solutions typically contain alcohol with concentrations up to 35 percent, with most presses ranging from 15-20 percent alcohol. Spent fountain solutions cannot be discharged to a local sewer system within the state of Nevada due to the alcohol content, possible residual ink, and possibly heavy metal content such as copper. Alcohol free fountain solutions typically contain some glycols (ethylene glycol, glycol ethers, cellosolve ethers) and still cannot be discharged to a local sewer treatment plant. Regulatory questions regarding wastewater discharge can be directed to the contacts listed earlier in this fact sheet under Image Processing.

FOUNTAIN SOLUTIONS - POLLUTION PREVENTION

- Try to extend the life of the fountain solution by adding filters, chillers, and recirculating systems to your press.
- Eliminate to the usage of alcohol in your fountain solution. Alcohol substitutes can reduce VOC emissions because less of the substitute is used and they do not evaporate as easily. When selecting an alcohol substitute, consider the ink, press type and printing constraints.

RESOURCES

In Nevada:

The Nevada Business Environmental Program: A free and confidential resource for Nevada businesses regarding hazardous waste management issues and pollution prevention options (800) 882-3233.

Websites:

Printers' National Environmental Assistance Center <http://www.pneac.org/> . This center uses internet technology to link trade, government, and university service providers to deliver compliance assistance and pollution prevention information to the printing industry.

Trade Associations:

[Printing Industries of America \(PIA\)](#)

Video:

[“Green and Profitable Printing”](#)

A 2 hour taped teleconference providing an overview of key compliance issues for small litho shops and practical waste reduction strategies for prepress, production, and cleanup operations. This tape is available to loan for free through the Business Environmental Program at 1-800-882-3233.

Hazardous Waste Manifest Training Video by PNEAC

The [Hazardous Waste Manifest Training Video](#) introduces the new manifest form, highlights the differences between the new and the previous manifest form, and provides specific instructions to generators, transporters and treatment/storage

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DISCLAIMER: This guidance document is intended as general information and is not provided nor intended to act as a substitute for legal advice or other professional services. BEP advises the regulated community to read all applicable regulations set forth in both US Code of Federal Regulations (Title 40 C.F.R. Parts 260-279) and the Nevada Hazardous Waste Regulations and to keep informed of all subsequent revisions or amendments to these regulations. This guidance document was developed by BEP with funding support provided by the Nevada Division of Environmental Protection.



NEVADA DIVISION OF
**ENVIRONMENTAL
PROTECTION**



The College of Business
AT THE UNIVERSITY OF NEVADA, RENO