

2003
Pollution Prevention
Assessment Project:
**Printing, Publishing and
Allied Industries**



Idaho Department of Environmental Quality
Pollution Prevention Program
January 2004

2003 Pollution Prevention Assessment Project: Printing, Publishing and Allied Industries

Contents

Executive Summary	1-2
Project History	
Best Management Practices	
Assessments	
Project Overview	3-4
Summary of Findings	5-8
Conclusions and Recommendations	9-10

2003 Pollution Prevention Assessment Project: Printing, Publishing and Allied Industries

Executive Summary

The 2003 Pollution Prevention Assessment Project was designed to provide on-site technical assistance and information to an industry sector and establish a baseline measurement of the role of pollution prevention in that sector's business practices. The Idaho Department of Environmental Quality (DEQ) conducted 21 on-site assessments at print shops in the Treasure Valley during the three-month project.

The goals of this project were to:

- *Identify and evaluate pollution prevention opportunities for print shops; and*
- *Provide education and assistance on pollution prevention, waste management, and energy and water conservation.*

Data collected indicate that pollution prevention opportunities exist for the printing sector, especially related to hazardous waste management and solvents. Specific conclusions are:

- New digital imaging technologies and processes streamline the pre-press process and may reduce the volume and toxicity of waste generated during this stage.
- Recycling and reuse is practiced at area print shops. Additional recycling market development is needed for some printshop wastes.
- Additional pollution prevention opportunities exist related to solvent substitution and housekeeping practices.
- Customer requirements may hinder adoption of some pollution prevention practices. Outreach to customers may facilitate implementation of pollution prevention practices.

In addition to the assessments, the following benefits and outcomes also were realized by this project:

- Applied two department principles and values as outlined in DEQ's 2003-07 strategic plan.
 1. Manage proactively by utilizing prevention-based approaches.
 2. Recognize DEQ's greatest resource by developing, attracting and retaining professional staff.
- Measured pollution prevention practices in use by industry.
- Improved exposure of industry sector to DEQ's technical assistance programs.
- Developed new sector-specific fact sheets and Web content:
 - A Resource Guide for Printers
 - Pollution Prevention Checklist for Print Shops
 - Pollution Prevention and Hazardous
 - Waste Management Tips for Print Shops
 - Questions to Ask about Your Waste Storage Site

This report highlights project results and presents a series of recommendations for future pollution prevention outreach and technical assistance for print shops in Idaho.

Project Overview

Pollution prevention is any activity, including the use of materials, processes or practices, which reduces or eliminates the creation of pollutants or wastes at the source. Pollution prevention changes the traditional approach to environmental protection. Instead of trying to control wastes after they have been generated, pollution prevention aims to prevent the initial generation of wastes. Results include reduced volumes and/or reduced environmental impact from generated waste, and associated cost savings and improved worker safety.

With over 600 businesses statewide, the printing, publishing and allied industries represent the largest single category of small businesses in Idaho. Print shop wastes depend on process type and press type, but generally include spent solvents and inks, photo-processing chemicals, and paper.

Opportunities for waste reduction include:

- Reduce the volume and toxicity of solvents and solvent wastes.
- Substitute soy or vegetable-based inks for petroleum products.
- Adopt new plate-processing or direct-to-press technologies.
- Recycle common solid wastes such as paper, aluminum, and silver recovery.
- Implement good housekeeping practices.
- Use inventory systems to minimize expired or unneeded product.

Project History

Using a federal Pollution Prevention for States Grant, the Idaho Department of Environmental Quality's (DEQ) pollution prevention program funded and trained temporary staff to conduct

pollution prevention assessments at print shops from June through August 2002. DEQ assessment staff visited 21 facilities in the Treasure Valley.

The project was accomplished through the collaboration of DEQ's Pollution Prevention Coordinator, Program Staff, and the DEQ Boise Regional Office. DEQ worked with several printers in planning and implementing the program. Temporary staff conducted the on-site assessments.

Best Management Practices

DEQ staff conducted research on printing processes and developed a questionnaire to evaluate environmental best management practices (BMPs) specific to the sector. These practices were identified as common procedures and/or equipment that minimize pollution or environmental impacts from everyday operations.

Many of the practices are common to all industries, such as practicing good housekeeping, minimizing impact from spills, and preventing cross-contamination of chemicals. Others, such as ink selection, job scheduling and press-specific processes, are unique to the printing business.

Print shops have been a focus of pollution prevention programs nationwide and much information exists on best practices for the sector. One goal of this project was to evaluate the accuracy of available information, given changes in technology, and its applicability to Idaho print shops.

Assessments

Assessments were conducted at 21 area print shops housing 65 presses in the Treasure Valley. Nineteen of the

facilities visited use lithographic offset presses. One facility uses screen-printing and a second uses plateless technologies. The lithographic presses evaluated included both web and sheet-fed models.

Facilities were evaluated for opportunities to reduce waste, recycle, and conserve water or energy. All aspects of facility operations were evaluated including purchasing, inventory, chemical use and storage, image processing and press processes.

Summary of Findings

Digital imaging and automated plate-making technologies have been adopted among several printshops visited and may lead to reduced volumes and toxicity of wastes from prepress process.

The prepress stage begins with creating an image for printing. Images must be drafted (by the customer or printer), approved by the customer, and finalized. All print shops evaluated use digital imaging to draft the image. Many offer customers the ability to review proofs electronically, thereby eliminating associated wastes.

Once the image is created, it must be transferred to a plate which is later used on a press to transfer the image to paper. Plates are sturdy and, depending on type, can endure thousands to hundreds of thousands of runs on a press. The plate must pick up ink only where the image has been transferred and must repel ink elsewhere.

In lithographic processes, the image is on the same surface as the non-image area. Plates are chemically treated and, when the image is exposed, the chemical treatment is removed from the image area. Image areas accept oil-based inks. Negative spaces (non-image areas) are water-absorbent and repel the oil-based inks, leaving blank areas.

Images can be transferred to the plate using the following processes:

- ▶ Images can be photographed, a negative developed, and the negative used to expose the image to the plate.
- ▶ Images can be exposed directly onto the plate with newer computer-to-plate or direct-to-plate technologies, eliminating the negatives and associated chemicals. Some fixers, developers, and water are used to control the reaction of developing the image onto the plate, but the volume of corresponding wastes is reduced. Printers report additional benefits of computer-to-plate processes including less worker time spent in the prepress process.

Printers who participated in the assessment project use a wide range of plate-developing technologies. Most printers used multiple technologies as well. Ten reported developing images onto negatives and using the negatives to transfer images to the plate. Others reported phasing out this process in favor of computer-to-plate technologies. Eleven printers have adopted computer-to-plate technologies and two printers report direct-to-press imaging.

Printers in the Treasure Valley facilitate recycling and reuse by purchasing recyclable goods and recycling wastes.

Print shops were questioned on recycling practices and opportunities to reduce waste by reusing materials. Among the waste reduction opportunities available to printers are purchasing recycled paper, recycling waste paper and aluminum plates, and reusing cleaning rags and leftover ink.

Fifteen of 17 printers report offering recycled paper to clients¹. Several printers noted, however, that recycled paper often needs to be specially ordered, thereby extending processing time.

Print shops generate waste paper throughout the printing process from press start-up, test runs, and trimming during the binding and finishing process. Fourteen out of 19 printers reported recycling waste paper.

Imaging plates are made from either aluminum or polyester. Most shops use aluminum plates and all that do so recycle them through a scrap metals processor. Eight shops reported using polyester plates, which are landfilled as no recycling market has as yet been identified in Idaho for spent polyester plates.

Seventeen shops reported using cloth rags during cleaning and all 17 use local laundering services to wash and reuse rags. Participants were provided with information on solvent-contaminated rags regulations issued in 2001 to facilitate reuse/laundry of rags.

In some cases, excess ink may be mixed for reuse. Three shops reporting saving small quantities of leftover ink and mixing it into black ink.

¹ Participants were asked a series of questions during the assessment. Not all participants responded to all questions.

Printers are willing to test and use less toxic chemical substitutes.

Of the facilities evaluated, 12 use soy-based or other alternative inks. Traditional inks are petroleum-based. Soy-based inks are a blend of petroleum and vegetable-based oils, which reduces the overall toxicity of the product. Most printers reported favorable results with soy inks, although some noted drawbacks such as longer drying times and reduced print quality. Some printers noted that customer demands for quick turn-around times might reduce opportunities to use soy-based inks.

During printing, fountain (dampening) solutions are applied to the printing plate. These solutions are mostly water with small amounts of chemicals to control pH and surface tension. The solution migrates to the water-absorbent parts of the plate. Since the oil-based ink and water do not mix, the fountain solution prevents ink from migrating to the non-image areas of the plate. Isopropyl alcohol, a source

of VOC emissions, is a common ingredient in fountain solutions, although alcohol-free solutions exist. Fifteen of 16 printers reporting use fountain solution. Less than half of these printers use alcohol-containing solutions on at least one press.

After a print run is complete, the press may need to be cleaned. Solvents are the preferred cleaner for printshops. Five shops report having switched to less toxic solvents and cleaners such as citrus-based products.

Plateless technologies (ink-jet, laser, electronic etc.) are now used at some print shops. This technology uses an electrostatic or magnetic charge or other method to transfer images onto paper. Since the process does not use a plate, spent plates, and processing chemicals are eliminated. Benefits include the ability to slightly alter each print. For example, thousands of the same letter can be printed but each with its own addressee.

Additional pollution prevention opportunities may exist with respect to press cleaning, solvent use and housekeeping practices.

Printshops were evaluated for good housekeeping practices. Good housekeeping is a low-cost pollution prevention practice that can reduce the frequency and severity of spills, protect work areas and employees from leaking chemical containers, and other unforeseen discharges into the environment.

Good practices for printshops (and any business) include ensuring storage containers are in good condition, clearly labeled, and have tight-fitting, closed lids. Secondary containment, such as a second bucket, can reduce environmental impacts from a leaking container.

Printers may store solvents, solvent-contaminated rags, fixers, developers, inks and other wastes in their facility. Fifteen printers reported having containers with lids. However, only 10 of 13 viewed had lids closed on these containers. Six of 10 printers had containers that were clearly labeled. Six of 12 had secondary containment around chemical storage areas.

All printers visited were provided with information on good housekeeping practices.

Conclusions and Recommendations

Based on these findings, DEQ's pollution prevention program will work to implement the following:

Expand Pollution Prevention and Hazardous Waste Outreach and Education

While new technologies offer opportunities to decrease the quantity of solvents and hazardous chemicals used at printshops, more education on solvent types, solvent alternatives and proper storage of hazardous wastes (housekeeping) is needed.

Recommendation:

Develop workshop for printing and other sectors that covers basic solvent regulations and management, identification of less-toxic alternatives, and evaluation of solvent substitutes.

Facilitate Recycling

Although services (recycling processors and transporters) exist to recycle paper in the Treasure Valley, over one-quarter of shops visited do not recycle waste paper.

Recommendation:

Identify opportunities to facilitate paper recycling and share information with printers.

Many printers are using or switching to polyester plates that currently do not have a recycling market in Idaho.

Recommendation:

Work to identify and facilitate recycling opportunities for spent polyester plates.

Increase Customer Education

Some printers report that the demands of customers may hinder implementation of some pollution prevention practices. For example, some report soy-based inks can take longer to dry and, as a result, more time is needed between color runs to assure optimum print quality. Therefore, quickest turn around may not be feasible with soy-based inks. Similarly, recycled paper may need to be specially ordered and may cost more than its virgin counterpart.

Recommendation:

Develop a fact sheet for print shop customers outlining the benefits of environmentally-friendly printing and actions customers can take to help prevent pollution when working with printers.

Research Pollution Prevention Opportunities Associated with Plateless Printing

Plateless printers (ink-jet, laser, etc.) are replacing presses in some print shops for black ink runs. Wastes generated depend on technology and may include spent toner or ink cartridges, inks, and hydrocarbon-based solvents.

Recommendation:

Follow national research on the impacts and pollution prevention opportunities related to this technology. Contact Printer's National Environmental Assistance Center (PNEAC) for information regarding plateless printing.



Printed on recycled paper. March 2004. Costs associated with this publication are available from the Department of Environmental Quality in accordance with Section 60-202, Idaho Code.