Integrating P2 into the Permitting and Enforcement Processes

Printing Industry

The printing industry is a very diverse industry because of the different processes used. However, several common areas offer P2 opportunities in each printing sector: photographic wastes, press cleaning, ink waste, and solvent emissions. The following P2 opportunities can be applied to printing processes to eliminate or reduce wastes:

- Silver recovery from photodeveloping processes
- Alternative screen or press cleaning technologies
- Waste ink recycling
- Cleaning solvent recycle
- Alternative ink systems

Incorporating those P2 opportunities in the permitting and/or enforcement processes will help companies reduce emissions, wastewater contaminants, and hazardous wastes. It may also reduce the complexity of permits and sometimes eliminate the need for a permit, while improving the state of compliance for printers.

Photo developing: All printers must develop the image to be printed and then transfer it to a plate or screen used to transfer the image to the final substrate. Silver-rich solution from fixer used in the developing processes can be recovered on site to eliminate a hazardous waste stream and recover a raw material with resale value for the printer. Metallic replacement canisters (MRC) and electrolytic units are available that recapture silver from waste fixer.

> **Permitting:** Use of silver recovery units could be incorporated as part of the permitting process or as a BMP or CMP with POTWs, to reduce silver loading at their headworks.
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> **SEP:** POTW could purchase an electrolytic recovery unit and operate it for their small volume dischargers as part of an SEP. Incorporating the use of these units in the business could also be used as a part of an SEP settlement. Electrolytic units range in price from a few hundred dollars to $10,000. SEPs could also be designed to support silver and mercury workshops or print educational materials about the need to recover silver.

Closed-loop solvent dispensing system: Used solvent generated by the removal of ink from used printing screens can be recycled through a closed-loop system which circulates the solvent through a filter, to be cleaned again for reuse. One company using this system cut its hazardous waste generation from 80#/month to 100#/year. Raw material use was decreased by 60%. Reduction in fugitive air emissions was not to be quantified. Equipment costs were $12,000 to install, and savings totalled $10,000 annually.

Permitting: Use of an enclosed solvent washer system could be incorporated as part of a permit strategy to reduce emissions.
SEP: The closed-loop wash system could be used in an SEP to reduce hazardous waste quantities and possibly hazardous waste generator status and regulatory requirements, and to protect natural resources through material conservation

High-pressure screen washers: High-pressure screen washers reclaim inks using pressurized water, usually in conjunction with some reclamation chemicals. Typically, excess ink is carded off the screen prior to cleaning. No ink remover is needed with high-pressure wash systems. The ink and stencil are then removed with a high-pressure water blaster sprayed on both sides of the screen at pressures of up to 3,000 pounds per square inch (psi). Equipment costs, estimated at $5,300 (installed), do not include filtration units, which range in price from $1,300 to $12,000, or maintenance and operating costs which may also vary widely. Eliminating the need for ink remover allowed one company to decrease its annual solvent use by approximately 770 gallons, reduced worker exposure to potentially harmful chemicals, and saved over $13,000 per year in purchasing costs.
Permitting: Use of a recirculating, high-pressure wash system with a filtration system may be incorporated into a discharge permit to reduce contaminant loading and water flow, and in air permitting as an alternative to solvent washing for emissions reduction.
SEP: The high-pressure wash system could be used as part of an SEP to replace a solvent cleaning system, and for emissions and hazardous waste reduction.

Waste Ink: Ink can be recycled off site or onsite to reduce raw material use and waste generation. Wastewater, cleaning solvent, and paper dust sludge are by-products of on-site ink recycle. The water can be sent to the POTW, the solvent can be re-used, and the only waste will be the ink-laden paper dust. Virgin ink is added to improve the color, consistency, and other functional properties of the processed ink to an acceptable range. The ink recycling equipment can be quite expensive and range in price from $50,000 -$300,000. Economic incentive for recycling is the value of the ink and solvent recovered, as well as reduced disposal costs and potentially reduced liabilities through direct control over potentially hazardous waste.
Permitting: No applications.
SEP: On-site ink recycle, especially if the ink has regulated metals in it, could be used to reduce hazardous waste quantities and possibly hazardous waste generator status.