

4.7.1 Printing: Lithographic Printing

Case Study #1

BUSINESS: Herald Review/Itasca Shopper; Grand Rapids, Minnesota
WASTE ORIGIN: Newspaper Printing
WASTE TYPES: Newsprint Paper, Pasteup Paper Pages, Printing Inks, Film Developing Chemicals, and Used Printer Toner Cartridges

COMPANY BACKGROUND:

The Herald Review/Itasca Shopper is a small newspaper and advertising shopper printing operation.

MOTIVATION

Save money by reducing the company's volume of solid and hazardous waste. Reduce landfill disposal fees. Reduce raw materials costs.

STRATEGIES

Recycle and reuse wherever possible. Involve employees in all company departments. Encourage efficient and innovative use of materials.

ORIGINAL PROCESS

Newsprint rollends were thrown away and waste inks were disposed. The company generated three 12-yard dumpsters of solid waste each week.

NEW PROCESS

Rollends are saved and sold for to a local ceramics company as packing material. Waste ink was reused by adding different colors to black inks for no reduction in print quality. Film developing chemicals were reused and its usable life extended with additives. The layout department reused page pasteup sheets. The composing staff reused and refilled each toner cartridge three times before buying new cartridges.

RESULTS

Waste Reduction

Overall company solid waste was reduced by 97 percent.

Dumpster materials reduced by 26,000/year.

Landfilled material quantity reduced to six 30-gallon cans per week (from 36 cubic yards/week).

Overall paper waste reduced by 7,600 pounds/year.

Reduced pasteup sheet usage by 285 pounds/year.

Saved 250 pounds of ink/year.

Economics

Capital Costs: None.

Operating/Maintenance Cost:

Saved \$18,000 per year on contracted waste hauling and disposal costs.

Reused ink saved \$2,600/year.

Rollend sales paid for yearly newsprint costs.

Reused film developer saved \$240/year.

Reused pasteup sheets saved \$570/year.

Reused toner cartridges saved \$900/year.

Payback Period: None required.

4.7.1 Printing: Lithographic Printing

Case Study #2

BUSINESS: Heartland Litho; Madison, Wisconsin
WASTE ORIGIN: Lithographic Printing Operations
WASTE TYPES: Printing Papers and Trimmings, Cardboard, Darkroom Materials (Photoprocessing Fluids, Silver), Pressroom Cleaning Solutions (Chlorinated Solvents), Printing Ink (Petroleum-based), and Printing Plates (Aluminum)

COMPANY BACKGROUND

Heartland Litho is a commercial printing company specializing in high-quality color printing.

MOTIVATION

Reduce the large volumes of solid and hazardous wastes generated, reduce their disposal costs.

STRATEGIES

Reduce or eliminate use of toxic inks and solvents, where possible, or recover and recycle solvents. Separate recyclable materials and contract to haul them away. Reuse packing materials, cleaning towels and rags, and wood pallets.

ORIGINAL PROCESS:

Heartland disposed of virtually all operations' wastes into the landfill.

NEW PROCESS:

Promote to customers the use of recycled papers, vegetable-based inks, and efficient use of paper. Recycling companies are contracted to recycle darkroom fluids, waste negative materials for silver, office paper and cardboard, aluminum plates, and soda cans. Reusable towels and rags are handled by a cleaning contract service. Solvent used in parts cleaning is used to flush empty ink cans, recovered, and recycled.

RESULTS

Waste Reduction

Reduced printing paper and trimmings waste by 14 tons/year.

Reduced cardboard waste by 1.5 tons/year.

Reduced darkroom fluids wastes by 150 gallons/year.

Reduced pressroom solvent wastes by 100 gallons/year.

Ink waste was reduced by 700 pounds/year.

Printing plate waste was reduced by 400 pounds/year.

Economics

Savings: Information not available.

Capital Cost: Information not available.

Operating/Maintenance Cost: Approximately \$4,000/year, plus labor.

Payback Period: Information not available.

4.7.1 Printing: Lithographic Printing

Case Study #3

BUSINESS: Burton & Mayer, Inc.; Brookfield, Wisconsin
WASTE ORIGIN: Printing Process
WASTE TYPES: Volatile Organic Compound (VOC) Air Emissions, Isopropyl Alcohol, and Petroleum-based Inks

COMPANY BACKGROUND

Burton & Mayer is a commercial and advertising printer of labels, booklets, and brochures. It has 70 employees.

MOTIVATION

Process VOCs produce air emissions into the environment and create health hazards.

STRATEGIES

Convert to alcohol substitutes and vegetable oil-based inks.

ORIGINAL PROCESS

An alcohol fountain solution was used on company printing presses. Most of this solution evaporated, emitting volatile organic compounds.

NEW PROCESS

The company uses soy-based inks which are easier to de-ink when recycled. Printing processes are run alcohol-free by converting several presses and buying two new presses that run waterless.

RESULTS

Waste Reduction

Totally eliminated alcohol use in presses, down from 1,815 gallons/year in 1991 and 825 gallons/year in 1992.

After converting to vegetable oil-based inks: reduced petroleum oil usage by 85 percent, reduced VOC levels below 10 percent.

Economics (Information not available.)

HEALTH & SAFETY BENEFITS

Worker safety was greatly improved by eliminating isopropyl alcohol from the printing process. Isopropyl alcohol is an eye and skin irritant, and is a very dangerous fire hazard when exposed to heat, flame, or oxidizers.

TECHNOLOGY TRANSFER

Waterless printing eliminates the use of alcohol from fountain solutions, reducing VOCs. This printing technology can also improve print quality over standard lithographic printing. However, rollers must be chilled and a special, more expensive plate developing process is required.

PROBLEMS

The press converting process took three years to adapt ten machines. Each press needed individual testing to maintain printing quality.

4.7.1 Printing: Lithographic Printing

Case Study #4

BUSINESS: Quad/Graphics, Inc.; Pewaukee, Wisconsin
WASTE ORIGIN: Printing Processes
WASTE TYPES: Paper, Ink, Plastic, Energy, Volatile Organic Compounds (VOCs), Petroleum-derived Ink Oils, and Methyl Ethyl Ketone (MEK) Vapors

COMPANY BACKGROUND

Quad/Graphics is a privately-owned printer of magazines, catalogs, and commercial products.

MOTIVATION

Waste source reduction through conserving, reusing, and recycling all possible sources.

STRATEGIES

Work with clients and vendors to reduce waste, test new equipment, develop new manufacturing processes and materials, and educate employees on environmental stewardship.

ORIGINAL PROCESS

Large volumes of solid wastes and disposals costs were sent to the landfill. Ink wastes required expensive disposal fees. Air emissions from VOC inks and cleaning solvents threatened worker health and environmental regulations.

NEW PROCESS

A new press cylinder pre-wash cuts use of cleaning solvent in half. The company patented a vegetable oil-based ink that replaces petroleum-based inks. A closed-loop ink system captures up to 90 percent of MEK vapor and condenses it for reuse. Energy conservation projects recover heat and earn energy rebates from utilities.

RESULTS

Waste Reduction

Paper waste reduced 133,000 tons, saved 220,000 cubic yards of landfill space in 1994.

Ink waste cut 40 percent in five years.

Plastic waste cut by 287 tons by reuse or recycling in 1994

Solvent use reduced from 1,100 gallons/year to 550 gallons/year.

Natural gas use cut for \$20,000 energy rebates in 1994.

MEK use reduced 6,900 gallons/year.

Ink VOCs reduced 10 to 15 percent by vegetable oil-based inks.

Economics

Savings:

Saved \$6.7 million in solid waste landfill fees in 1994.

\$472,000 in utility company energy rebates.

Projected natural gas savings for 1995 are \$236,000.

Saved \$1,000 per ink drum, \$150 per drum in disposal fees.

Saved \$33,114 in plastic purchasing costs, saved \$14,350 in disposal costs in 1994.

MEK costs reduced \$552,000/year.

Capital Cost: Information not available.

Operating/Maintenance Cost: Information not available.

Payback Period: Information not available.

HEALTH & SAFETY BENEFITS

Worker safety was greatly improved by reducing use of VOC materials. MEK is a strong eye and skin irritant, affects the peripheral and central nervous systems, and is a highly flammable liquid.

TECHNOLOGY TRANSFER

A new cylinder pre-wash system cut cleaning solvent use in half. The company developed the "Ecovap" heat recovery system to cut natural gas use. A closed-loop ink system captures up to 90 percent of MEK and condenses it for reuse. Quad/Graphics patented an ink using a mixture of corn, linseed, and soy oils.

TECHNICAL ASSISTANCE

Quad/Graphics joined other businesses and organizations to learn, share, and promote environmental practices: Businesses for Social Responsibility, Buy Recycled Business Alliance, Climate Wise Initiative, and The Great Printer's Project. The company also designed the "Environmental Purchasing Guide" to help other businesses and vendors.