

Toxics Use Reduction Case Study

CHEMICAL WASTES AND WATER USE REDUCED MORE THAN 90% AT POLY-PLATING, INC.

SUMMARY

Poly-Plating designed and installed integral repurification equipment which filters, recycles and concentrates wastes for reclamation. This equipment reduced acid purchases to 1% of 1989 levels. Reclaiming and recycling has cut disposal costs by 98%. Additionally, water use has been reduced to 880 gallons per day, down from 78,000 gallons per day.

BACKGROUND

Poly-Plating Incorporated, of Chicopee, Massachusetts, employs 13 people in the production of nickel-plated parts. A variety of hazardous and toxic chemicals, in addition to water, are used in the baths to prepare and plate nickel onto metal substrates.

The Nickel plating process consists of up to eight steps. Surface preparation prior to plating includes degreasing, baking (depending on substrate hardness), masking (if necessary), followed by chemical cleaning, rinsing, and descaling. The part is then chemically activated and immersed in a nickel solution. Finally, the part is hot-rinsed, dried and sometimes baked.

TOXICS USE REDUCTION PLANNING

In 1983, the City of Chicopee announced a program of significant future annual increases in water rates, plus the addition of sewer use charges. Material purchases prices for acids and nickel were increasing at 7-10% yearly. Motivated by a desire to cut operational costs and to benefit the environment, Ed Ondrick, President of Poly-Plating, Inc. instituted a research and development program on waste reduction for his plating lines.

Attempts to use turn-key equipment proved unsuccessful. The acids and other chemicals involved in nickel plating were too aggressive on the equipment components. Ondrick then began to modify and develop the technology for new applications some of which have been patented. All plating employees participated in the monitoring of the new equipment, and offered suggestions as to how the process might run more efficiently.

The six-year project led to the establishing of a second company. This firm, Zero Discharge Technologies, manufactures and sells repurification and acid reclamation equipment for the plating industry.

TOXICS USE REDUCTION MODIFICATIONS

All equipment design and construction or modification was performed in-house. Two workers were trained to operate, monitor and maintain all key pieces of equipment. These workers follow specific maintenance schedules and regularly meet with Ondrick to discuss equipment status. In the plating production lines there are 12 integral repurification units that function to remove containments and retrieve metals and acids for production re-use. Additionally, plating water is recycled through a closed-loop system.

RESULTS

Reductions Achieved: Acid purchases have been reduced 99% while production has increased 20% during the same period. Disposal costs are 91% less as a result of the reclaiming and recycling of acids and other chemicals. Water use and sewage fees have been reduced by 98%.

Economics: Savings from reduced water use and sewage fees total more than \$74,032 annually. Reduced purchase of new acid saves \$15,000. The closed-loop design of the system has saved \$14,630 in disposal costs. The elimination of water discharges from the plating process save \$4050 in water testing costs. Overall, the project saves Poly-Plating more than \$107,000 annually. While total costs for R&D on the project were \$755,000, the replacement cost of the system currently in use at Poly-Plating is \$225,000. The payback period is 25 months.

The Office of Technical Assistance (OTA) in the Massachusetts Executive Office of Environmental Affairs facilitates the reduction of toxic chemical use and hazardous waste generation. The Office evaluates statewide needs for toxic use reduction and provides technical information and assistance to users of toxic materials. For further information on this case study and toxics use reduction in general, contact: Commonwealth of Massachusetts, Executive Office of Energy & Environmental Affairs, Department of Environmental Protection (Northeast Regional Office), 205B Lowell Street, Wilmington, MA 01887, tel: (978) 694-3200

ZERO DISCHARGE TECHNOLOGIES, INC. CLOSED-LOOP SYSTEM

Repurification of Process Water and Recovery of Acid for Re-Use at Poly-Plating, Inc., Chicopee, MA.

