



Office of Technical Assistance
Executive Office of Environmental Affairs
Commonwealth of Massachusetts

Toxics Use Reduction Case Study

Chemical and Water Use Reduction 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 Inc., of Chicopee, MA, employs 16 employees in the production of nickel-plated parts. A variety of hazardous and toxic chemicals, in addition to water, are used in baths to prepare and plate nickel onto metal substrate.

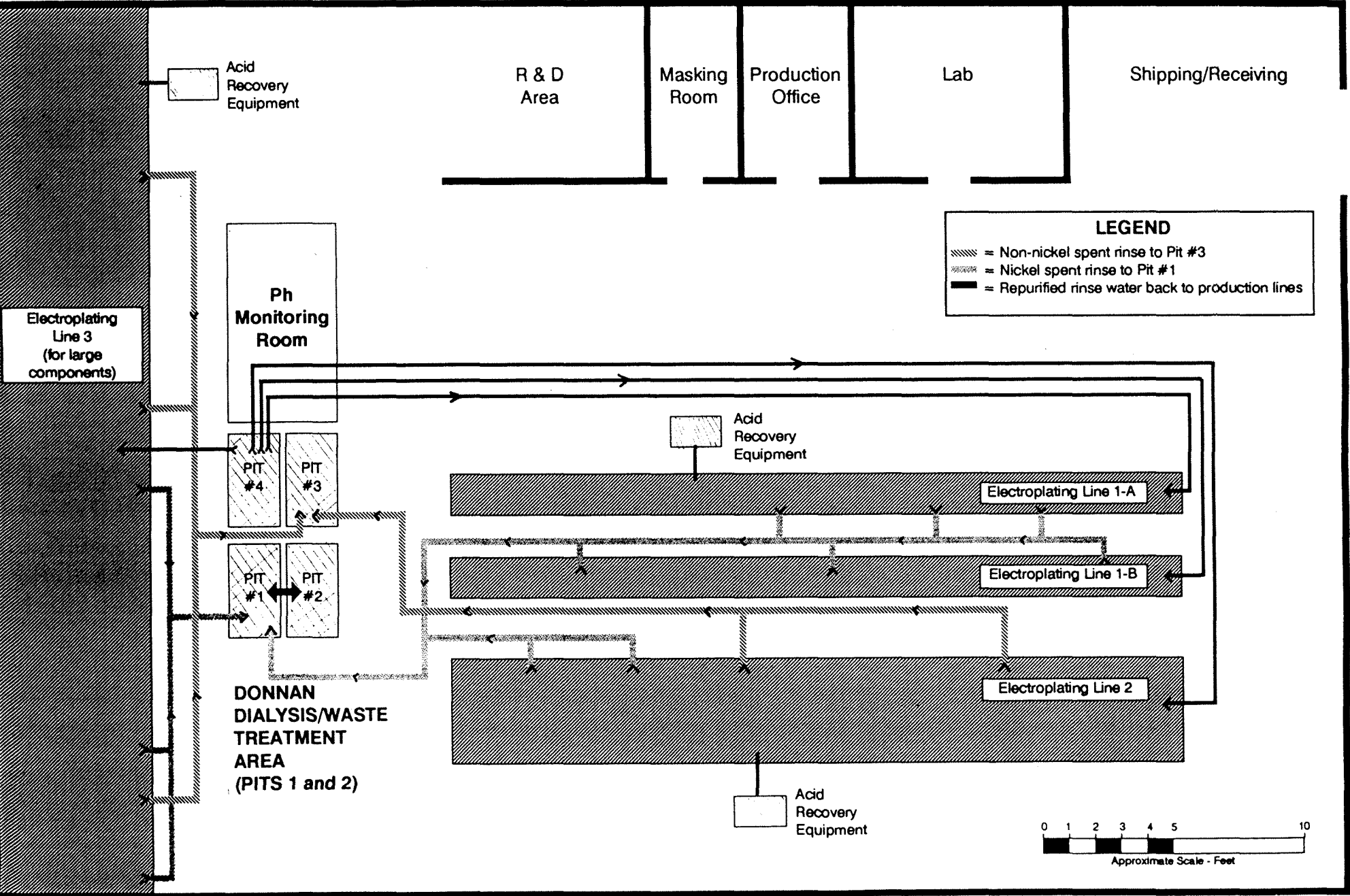
The nickel plating process consists of up to eight steps. Surface preparation prior to plating includes degreasing, baking (depending on substrate hardness), masking (if necessary), followed by chemical cleaning, rinsing, and descaling. The part is then chemically activated and immersed in a nickel solution. 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 yearly escalations of water rates, plus the addition of sewer use charges. Material purchase 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, instituted a research and development program on waste reduction for his plating lines.

Attempts to utilize 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 equipment himself, in the course of which he generated patentable ideas. 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, Inc., manufactures and sells repurification and acid reclamation equipment for the plating industry.

**CLOSED-LOOP SYSTEM... REPURIFICATION OF PROCESS WATER AND RECLAMATION OF ACID FOR RE-USE
POLY-PLATING, INC.**



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. There are twelve repurification units integral to the plating production lines. They function to remove contaminants 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 96% 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 \$74,032 annually. Reduced purchase of new acid saves \$15,034. The closed-loop design of the system has saved \$14,630 in disposal costs. The elimination of water discharges from the plating process saves \$4050 in water testing costs. Overall, the project has saved Poly-Plating over \$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. This gives a payback of 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: Office of Technical Assistance, Suite 1904, 100 Cambridge Street, Boston, Massachusetts 02202, (617) 727-3260.

