

POLLUTION PREVENTION

IN RHODE ISLAND

Case studies of the Rhode Island On-Site Technical Assistance Program

Jewelry Mfg. Copper Plating

Jewelry manufacturer uses ion-exchange to recycle rinse water in a copper plating operation.

Industry \ Contact

SIC Code: 3471 Electroplater, Rhode Island

Contact: Company #14

Technology Description

The company is a costume jewelry job shop that employs about 45 people. The primary operation of the company is electroplating.

After plating, product is rinsed in four tanks. The first three tanks are static rinse tanks which are replenished in a counter current fashion, i.e., fresh water feeds the third tank, the third tank feeds the second tank, etc., with the contents of the first, most-concentrated tank being sent back to the plating bath. The fourth and final rinse was originally sent to the company's chemical treatment system and discharged to the sewer. Ion-exchange has been installed to recycle the water in the final rinse, thereby eliminating this discharge.

When exhausted, the ion-exchange resins are regenerated with sulfuric acid, generating a low-volume, highly-concentrated copper sulfate solution which is sent to batch treatment. The ion-exchange column services all of the rack and barrel copper lines in the facility, all of which use the same rinse tank pattern.

Feedstock Materials

Rinsewater flow rate: approximately 2880 gallons per day (710,000 gals annually).

Waste treatment chemicals: Caustic, Acids, Flocculants.

Wastes

2880 gallons of rinsewater per day sent to sewer.

Copper sludge volume difficult to estimate as the treatment system services many different plating lines. Also, increased production and additional treatment required by NBC in 1994 complicates sludge reduction estimates.

Costs

Copper ion-exchange system plus regeneration station: Approximately \$25,000

Operation \ Maintenance

Pump power: \$60/yr

Regeneration: Sulfuric Acid, \$150/yr

Sodium Hydroxide, \$200/yr

Savings

The company eliminated the purchase of rinsewater from the city -710,000 gallons per year (\$710 savings/year)

Treatment/Disposal costs have decreased, along with sludge volume, due to diminished use of the pretreatment system. Regeneration of the columns still requires chemical treatment.

Payback Period

Not determined; estimated to be 3-4 years.

Impact

The company has eliminated the purchase of city water for the copper plating rinses. In addition, treatment and disposal costs have decreased, as has the dependence of the facility on its chemical treatment system. This facility has also installed a similar system to recover and recycle water and plating solution from its nickel plating lines.