

POLLUTION PREVENTION

IN RHODE ISLAND

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

Textile Engraver Silver Bearing Water

Textile engraver "close-loops" rinsing process, reduces silver discharge and recovers metallic silver.

Industry \ Contact

SIC Code: 3479 Textile Engraver, Rhode Island.

Contact: Company #84

Technology Description

The company produces chrome-plated copper rollers and rotary screens for the textile and paper printing industry. The company employs 43 people at this location.

Originally the company generated 3,500 gallons of wastewater per day in a photographic developing process. The wastewater was generated as film was developed and rinsed in an automatic process. The current discharge limit for silver to the sewer is 0.43 mg/L with a proposed limit of 0.01 mg/L in the future. In 1992, the company was not able to comply with the 0.43 mg/L limit. After consulting with DEM's Pollution Prevention Section, representatives of the company began investigating alternative methods to reduce the amount of silver in their waste stream in an effort to comply with current and proposed sewer discharge limits. The company found that by utilizing ion-exchange technology built on-site, the rinsing process could be "close looped". This change in technology eliminated the discharge of rinse water. To contend with the chemical fixer discharge, the company installed an X-Rite silver recovery unit. Upon installation, the silver discharge was lowered to well below the current sewer silver discharge limit.

Feedstock Materials

3,500 gallons of process water per day

Wastes

3,500 gallons per day of metal bearing wastewater discharged to sewer.

Costs

Ion exchange system (built in-house)
Activated carbon column
X-Rite Silver Recovery System
Labor and treatment chemicals
Total Capital Investment: \$6,350

Operation \ Maintenance

Annual operating costs including price of replacement resin and carbon: \$1,530

Savings

Process water usage reduced from 3,500 gallons per day to 480 gallons per day. (86% reduction in water use)
Annual savings of \$1,145 in water use and sewer charges
Annual income from silver recovered by the silver recovery unit and the resin: \$4,193 (Value of silver is calculated at a 1992 value of \$3.64 a Troy ounce.)

Payback Period

Approximately 2.5 years

Impact

The company has found that by installing ion-exchange technology, it was able to effectively "close-loop" the rinsing operation in a photographic engraving process. As a result, the company was able to reduce its plant water discharge from 3,500 gallons per day to 480 gallons per day. The company has also found that by installing an additional silver recovery unit to the process overflow stream, silver discharge can be decreased dramatically. Silver concentrations in the plant effluent have been reduced to less than 0.04 mg/L. This concentration is well within current limits and very close to proposed limits. Additional work on recovering waste fixer solution is planned.