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POLLUTION PREVENTION

IN RHODE ISLAND

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

Die Caster
Tubbing Solution

Die caster eliminates zinc-bearing waste discharge to the sewer through a closed-loop ultrafiltration system.

Industry \ Contact
SIC Code: 3089 Precision Zinc Die Castings Manufacturer, Rhode Island.
Contact: Company #30

Technology Description
The company manufactures precision injection and compression molds and zinc die-castings. The company also has toolmaking operations. The average employment is 18.

The company has a small tubbing operation which is used in the manufacture of zinc die-casts. The operation originally generated 100 to 150 gallons per day of zinc-bearing waste solution. In 1989, a chemical treatment system was installed to remove zinc from the tubbing solution prior to discharge to the sewer. Despite this installation, however, zinc levels in the effluent were not always in compliance. The chemical treatment process created large volumes of sludge that required additional labor and increased off-site disposal costs. After receiving recommendations from DEM's Pollution Prevention Section, the company installed a used PUFS ultrafiltration system and began using a new soap, (Oakite Stripper M-3, manufactured by Oakite Products Inc. of Berkeley Heights, NJ). As a result, the company was able to close-loop the operation in which the soap solution is continually recirculated through the PUFS ultrafiltration system.

Feedstock Materials
150 gallons of water per day
Treatment chemicals

Wastes
150 gallons per day (GPD) of zinc-bearing wastewater discharged to sewer.

Costs
A used PUFS ultrafiltration system, manufactured by Sanborn Environmental Systems of Wrentham, MA: $2,500
Total capital investment, including additional components, plumbing and installation: $7,500.

Operation \ Maintenance
Annual filter replacement costs: Approximately $500
Annual labor costs (3 hours/week x $9/hour x 50 weeks/year): $1,350
Annual energy costs: negligible
Total annual operational costs: $1,850

Savings
Annual feedstock savings: 37,500 gallons of water
Annual savings in treatment chemicals: $1,500
Sludge disposal reduced by over 50%

Other
Annual cost savings on quarterly analytical testing: $1,000
Annual savings on operation/maintenance (458 hours/year x $9/hr): $4,122
Annual cost savings of management time (8 hours/month x $33/hour x 12 months/year): $3,168.

Payback Period
Approximately 9 months

Impact
The company no longer uses 37,500 gallons of water per year in its tubbing operation. The company has found that ultrafiltration allows for a closed-loop tubbing process. By recycling the tubbing solution, the company has eliminated discharge to the sewer. Also, since no cleaning water is discharged to the sewer, compliance is not an issue.

Ultrafiltration creates far less sludge than chemical treatment. The advantages of ultrafiltration technology are that operating costs are low and there are no hazardous chemicals used.