

POLLUTION PREVENTION

IN RHODE ISLAND

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

Drilling Machine Manufacturing Machine Coolant

Precision drilling machine manufacturer recycles machine coolant with the aid of ultrafiltration.

Industry \ Contact

SIC Code: 3541 Precision Drilling Machine Manufacturer, Rhode Island.

Contact: Company #5

Technology Description

The company is principally engaged in the manufacture of precision gun drilling machines and specialty transfer machines. The company employs 45 people at this location.

In a parts fabrication process, oily wastewaters are generated. The process uses a machining coolant which becomes contaminated with lubricating oils. The waste fluid is primarily an emulsified oil/water mixture containing approximately 95% water. Prior to February 1990, the company shipped approximately 1,888 gallons per year off-site for disposal. After meeting with DEM's Pollution Prevention Section representatives, the company decided to use a synthetic machining coolant and install a PUFs ultrafiltration system to separate the emulsified oil/water mixture, recovering both the coolant and water for reuse in the process.

Feedstock Materials

143 gallons per year of *The Cooler* coolant, manufactured by Spartan Chemical Co. of Toledo, OH.

1744 gallons per year of process water

Wastes

188 gallons per year of spent machining coolant shipped off-site for disposal.

Costs

55 gallons-per-day (GPD) PUFS ultrafiltration system, manufactured by Sanborn Environmental System of Wrentham, MA: \$4,000

Operation \ Maintenance

Annual electricity and labor costs: less than \$1,000

Savings

Information not determined, due to periodic changes in operations.

Annual cost savings for oily waste water transportation and off-site disposal: \$2,388

Payback Period

Approximately 2 years

Impact

The company has reduced its off-site disposal of oil wastewater from 2,388 gallons per year to less than 55 gallons per year. The company has found that ultrafiltration allows the coolant and the water used in the machining process to be recycled. By subjecting the machine coolant solution to ultrafiltration, only small amounts of sludge are generated, thus dramatically reducing the off-site disposal needs of the company. The advantages of membrane technology are that no hazardous chemicals are used and operating costs are low.

The main advantage of using synthetic machining coolant over conventional oil-containing coolant is that it can be more easily recycled using ultrafiltration. Conventional, oil-containing coolant (water-soluble coolant) cannot be recovered with ultrafiltration. If hundreds of gallons per day of water-soluble coolants are used, then other technologies (like centrifugation) become more cost-effective for recycling. In low volume applications, the water-soluble coolant can only be disposed of. Synthetic coolants, on the other hand, can be cost-effectively recycled with a small ultrafiltration system.