



Metal Finishing Services, Inc.

OUR GOAL - NEAR ZERO DISCHARGE

Rex E. Riddle, President, Metal Finishing Services

Metal Finishing Services is a small job plating shop located in Sumter, SC. The company specializes in industrial silver plating, with a customer base which includes manufacturers of electronics, electrical distribution equipment, fluid handling systems, and aerospace components. The company began operations in the Spring of 1983, and has had a growth of more than 1000% over the past fourteen years. Current employment stands at eighteen people.

In 1991, Metal Finishing Services developed a process for selectively silver plating on threaded stainless steel parts. The geometry of these parts caused a considerable increase in solution drag-out. During the succeeding two years, a production line was added, a second shift was started, and sales more than doubled.

In 1993, a **five year goal of near zero discharge was established**. Justification for this project was both economical and environmental. Valuable metals were being lost and hazardous waste generation had dramatically increased.

The first phase was to establish minimum quality standards for process water, and to find a method to conserve and/or reuse the rinse water. This was accomplished with the design and installation of a water management process which uses a system of spray rinses and air-operated diaphragm pumps. All rinse water

is used a minimum of four times before flowing into the waste treatment system. This resulted in a 30% reduction in water usage at a time when production increased an additional 25%.

Research of the available technologies convinced Metal Finishing Services' management that for their particular operation, the best way to recover metals and cyanide was by vacuum evaporation. Phase two of this project involved the purchase and installation of a deionizer on the process influent. This prevents salt build-up on the liquor produced by the evaporators. Some improvement was also noticed due to a reduction in the surface tension of the deionized water.

For assistance in this project, representatives from the **Center for Waste Minimization** were invited to perform an on-site waste assessment in July 1995. Their recommendations have been most helpful in its implementation.

Phase three of the project, which began in 1996, consisted of the design, purchase and installation of two vacuum evaporators. Since acid/alkali rinses and cyanide-bearing rinses had always been segregated, the nickel bearing rinses and the silver/cyanide rinses were relatively easy to capture. The first evaporator captures all the nickel bearing-rinse water and evaporates it, returning the condensate for reuse as rinse water, and returning the

liquor generated to the nickel strike plating tank. Installation of this unit resulted in another 30% reduction in water usage, a 55% reduction in the volume of F006 sludge generated, and a 75% reduction in the usage of nickel chloride. These savings were accompanied by an additional 35% increase in production volume.

The second evaporator was installed in November 1996 to capture all cyanide-bearing rinse water. The condensate from this unit is also returned to the plating process for reuse as rinse water. The liquor, containing a high concentration of both cyanide and silver metal, is returned to the silver plating tank. This has resulted in an additional 37% reduction in sludge volume, an 80% reduction in silver metal usage, and a 77% reduction in potassium cyanide usage.

The fourth phase of this project will be to capture, treat, deionize, and/or coagulate solids from the acid/alkali rinse waters so that they can be reused, thus discontinuing the regular discharge of waste water. This phase is expected to be completed by January 1998.

Metal Finishing Services does not claim to have solved all of its waste treatment problems. For instance, the cyanide evaporator returns a very small amount of cyanide with the condensate which requires eventual treatment. How-

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The Center Reaches Milestone 2,000 Assistances

Christine Steagall, Pollution Prevention Section Chief

On March 20, 1997, the Center for Waste Minimization reached another milestone in its continuing efforts to help South Carolina's businesses and organizations in their efforts to prevent pollution and protect the environment. On that date, less than seven years after its inception, the Center responded to its 2,000th request for assistance. Even more significant, is the fact that included in these 2,000 assistances are over 420 on-site waste assessments.

Follow-up surveys of the Center's clients through 1995 indicated that the Center has helped them reduce their management costs by \$2,800,000 annually.

In these reductions are included:

- 4,000 tons of air pollutants
- 329,000 tons of solid waste
- 630,000 pounds of hazardous waste, and
- 619,000 gallons of oils and solvents.

Over 60% of the waste reduction opportunities, identified by the Center, have been implemented by their clients, which include not only all types of manufacturing operations, large and small, but also commercial, governmental and military organizations.

It is also very gratifying to the Center staff to know that seven of their clients have won the coveted Governor's Pollution Prevention Award or have received Honorable Mention.

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ever, great strides have been made and progress is continuing. With the completion of phase four and with continued diligence, management believes the company will be positioned for survival and prosperity well into the twenty-first century. Perhaps, more importantly, it's the right thing to do.

This newsletter is published by the Center for Waste Minimization to promote the use of source reduction and recycling techniques/strategies. Any reference to company names, products or services does not imply endorsement by DHEC.

Questions, comments or requests to be added to the newsletter mailing list are welcome and should be forwarded to the following:

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