OhioEPA

Office of Pollution Prevention

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Governor's Pollution Prevention Award, 1999 Recipient

General Extrusions, Inc.

The Governor's Awards for Outstanding Achievement in Pollution Prevention have been presented annually since 1986. General Extrusions, Incorporated was one of nine recipients to receive the award in 1999. These awards recognize outstanding commitments to improve Ohio's environment through pollution prevention. Evaluation criteria for the awards include: the reduction of waste at the source, recycling or recovery of materials, cost-effectiveness, ability of the program to serve as a model for others, and effectiveness in promoting pollution prevention as the preferred long-term approach for environmental management.

General Extrusions Inc., is recognized for:

- **reducing use of toxic chemicals and metals by product substitution;**
- **converting to powder coating from wet spray;**
- **reducing paper and wood waste disposal; and**
- **saving $1.4 million from the water reduction program in the anodize department.**

General Extrusions, Incorporated

General Extrusions, Incorporated (GEI) located in Youngstown, is an aluminum extruding facility with more than 300 employees. GEI extrudes, fabricates and finishes parts for communications equipment, office furniture, heavy duty equipment, computers, appliances, medical equipment, and more.

The finishing departments provide powder coating and a wide array of anodizing and conversion coating finishes.

Commitment to Pollution Prevention

GEI has been an active participant in *Ohio Prevention First*, the state of Ohio's voluntary program to reduce pollution in Ohio by encouraging pollution prevention and reduction planning. GEI is committed to its environmental policy Statement. GEI pledges to eliminate or greatly reduce use of substances which are harmful to the environment. It intends to minimize the use of energy and the generation of all wastes wherever possible. Prevention of pollution at the source is the preferred method to achieve GEI's environmental goals.

GEI has established a reporting commitment that recognizes the importance of reporting all reductions achieved through pollution prevention activities separately from reductions made through treatment, energy recovery and other pollution reduction methods.

Pollution Prevention Activities and Goals

In meeting the *Ohio Prevention First* goal of 50 percent reduction in toxic releases and hazardous waste generation by the year 2000 from a baseline year of 1992, GEI has established the following goals:

1) A 90 percent reduction in solvent hazardous waste generation by 1995, and a 90 percent reduction of other hazardous waste generation in 2000;

2) A 100 percent reduction in organic acid wastewater releases by 1995 through treatment;

3) A 50 percent reduction in paint volatile organic chemical (VOC) emissions by 1995, and an additional 30 percent reduction by 2000;

4) A 50 percent reduction in toxic chemical release emissions by 2000; and

5) A reduction in the use of the following metals and toxic chemicals in its chemical processes:

- 90 percent of cyanide by 1995;
- 100 percent of lead by 1996;
- 100 percent of hexavalent chromium in 2000; and
- 50 percent of nickel by 2000.

All of these have been achieved except for goal four. GEI is currently evaluating product substitutions in an effort to meet this goal.

Installation of a Powder Coating Line

In 1992, GEI installed a small paint booth for powder coating. Realizing the benefits and quality achieved by powder coating its products, GEI installed a new $1,000,000 powder coating line in February 1995. By converting to a powder coating line from a wet spray process, GEI eliminated the generation of hazardous wastes paint and solvent associated with the wet spray process. GEI met the goal for a 90 percent reduction in solvent waste generation (part of goal one) in mid 1995 with the installation of the powder coating line and removal of the wet spray line altogether.

GEI also eliminated VOC emissions associated with the wet spray line and increased productivity threefold from the painting process. GEI reduced VOC emissions from a baseline of 4,100 pounds in 1992 to 0 pounds in 1998. By converting to a powder coating line, GEI has also met goal three, a 50 percent reduction in paint VOC emissions by 1995 and the additional 30 percent reduction by 2000 **(Figure 1**).

Cyanide Elimination Project

In October 1992, GEI achieved part of goal five, a 90 percent reduction of cyanide, with a product substitution. Cyanide was eliminated from both GEI's chromate conversion baths in the Anodizing and Paint Line Departments by changing from a product with a complex cyanide activator to one with a nickel nitrate and hydrofluoric acid additive. This product change also reduced the occupational exposure risk associated with cyanide.

Lead Cathode Project

GEI completed another part of goal five, a 100 percent reduction of lead in its chemical processes by 1996, in August 1995. GEI replaced the old system of lead cathodes and copper busbar for each anodize tank to an all aluminum cathode system. This switch replaced the only source of lead in the anodizing process. The aluminum is a better conductor than lead, which also increased productivity. GEI paid for the aluminum cathodes by selling the lead and copper from the tanks to a scrap dealer.

This process change also reduced energy consumption by 30 percent.

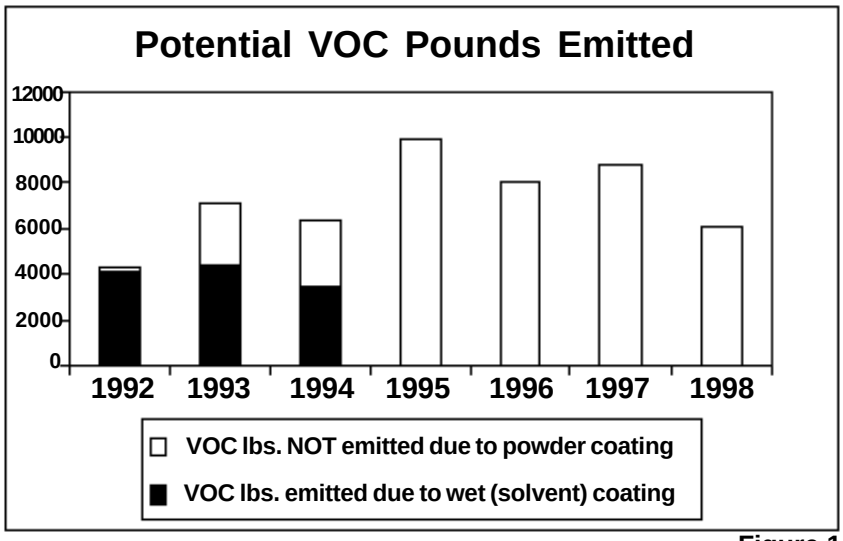

Figure 1

Hexavalent Chromium Elimination

GEI accomplished the third part of goal five, a 100 percent reduction of hexavalent chromium by 2000, with three product substitutions in April 1999.

Hexavalent chromium was removed from the paint line in February 1995 when the powder coating line was installed. GEI was able to substitute an iron phosphate (non-chrome) conversion coating in the pretreatment process for the previous hexavalent chromium process.

A dichromate was used in the alkaline cleaner as a wetting agent during the anodizing process. GEI changed from an alkaline product to a dispersion cleaner that was chrome free in 1992. The new dispersion cleaner has an oil dispersion attribute which extends the life of the cleaner bath by allowing the skim off of excess oils. The new dispersion cleaner yields a longer tank life and lower oil and grease levels in the rinse waters. The extended tank life saves $4,000 per year.

The anodize line completed its goal of removing all hexavalent chromium in May 1998. A totally non-chrome conversion coat process was implemented. This process proved to be the equal of the previous chrome in areas of salt spray testing and paint adhesion properties. Long term cost savings were also documented over the chrome process, especially in the waste treatment areas.

Total elimination of hexavalent chromium increased health and safety benefits plus reduced hazardous waste generation for outside processing (see goal one on page two).

Nickel Seal Substitution

As for the final part of goal five, a 50 percent reduction in nickel usage in chemical processes by 2000, GEI has achieved a 40 percent reduction through product substitution. The anodize seal process was modified by the addition of a second "cold seal" nickel bath in 1993. This was a "no dump" bath and resulted in nickel use reduction, coupled with high energy savings and lower water evaporation losses.

In 1996, this bath was replaced with a superior non-nickel seal that outperformed its nickel counterpart in the quality of seal attained. It also is a "no dump" bath due to the much higher contaminant tolerance level of operation.

Nonhazardous Waste Goals

GEI has also established reduction goals for nonhazardous wastes:

1) A 50 percent reduction in paper and wood product disposal by prevention and recycling efforts by 2000 from a baseline year of 1992;

2) A 50 percent reduction in nonhazardous waste shipments requiring treatment by outside contractors by 2000 from a baseline year of 1992; and

3) A 75 percent reduction in water usage in 1994; 80 percent total reduction in 2000 from a baseline year of 1992.

All three of these nonhazardous waste goals have been achieved.

Polyethylene Dividers and "Redi Crates"

GEI achieved nonhazardous goal one, a 50 percent reduction in paper and wood product disposal, with two major product substitutions for cardboard dividers and wooden crates.

Cardboard dividers were used to prevent damage of products during transit. Cardboard dividers absorbed the oil and coolant that were on the parts, but dirty cardboard was difficult to recycle. Between January and March 1998, GEI purchased 5,000 polyethylene sheet dividers to replace the cardboard. This material withstands saw chips, oils and coolants well and is still in active use. In October 1998, 5,000 bright yellow polyethylene dividers were purchased for dedicated use internally between the finishing and packing departments for work-in-progress. Therefore, dividers could be segregated from the "dirty" fabrication areas and the "clean" finishing areas.

Polyethylene sheets' life expectancy is three years and GEI purchased $14,300 worth in 1998. The total annual cost of the original cardboard dividers was $20,500. GEI saved $6,200 in 1998 and $20,500 in 1999 by substituting for

cardboard dividers. The polyethylene dividers also divert 105 cubic yards of cardboard per year from landfills.

GEI replaced wooden crates in 1998 with "redi crates." These are processed from paper pulp waste and eliminate wooden crates outright. In 1998, GEI used 1,800 of these crates for customer shipments. "Redi crates" have a $32 savings per crate versus wood. "Redi crates" reduced the amount of virgin wood waste produced by GEI. GEI also met the 50 percent wood waste reduction goal by purchasing high volume standard pallets and reusing pallets from incoming materials.

Coolant Substitution and Oil Separation

GEI achieved nonhazardous goal two, a 50 percent reduction in nonhazardous waste shipments, with a combination of product substitution and use of an oil separator for the Computer Numerically Controlled (CNC) Milling Department.

Before 1996, the coolant used in the CNC milling machines was water based and would load with tramp oils. This resulted in periodic cleaning, replacement and shipment of non-hazardous waste coolant to an outside processor. A synthetic base coolant replaced the original coolant which resulted in longer coolant life, improved health concerns and lower waste generation.

The department also purchased an oil separator and skimmer unit in 1995 to process the contaminated coolant from the CNC milling machines. Each machine is periodically drained and refilled with reconditioned coolant on a regular preventive maintenance schedule.

The synthetic base coolant and oil separator contributed to lower waste generation and nonhazardous waste shipments with a savings of $6,681 per year.

Water Reduction Program

GEI achieved nonhazardous goal three, a 75 percent reduction in water usage in 1994; 80 percent total reduction in 2000, through the team effort in the Water Usage Reduction program.

From 1991 through 1994, GEI's Anodize Department organized an employee involvement team to assess water usage data and determine where and at what rate water was being used. By monitoring flow rates and conductivity, optimizing the number of counter current flow rinse tanks, installing flow meters in all rinse tanks, installing a recirculation system for the brite dip scrubber, and practicing other water conservation and monitoring measures, GEI has significantly reduced its water usage.

The team's efforts reduced the water usage in the Anodize Department from nearly 250 gallons per minute (gpm) to just more than 50 gpm, an 80 percent reduction. This relates to a savings of more than 70,000 gallons per day, or more than 30,000,000 gallons per year, and $1,400,000 in accumulated savings from 1990 through 1998.

For more information

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The Office of Pollution Prevention was created to encourage multi-media pollution prevention activities in Ohio to reduce risk to public health, safety, welfare and the environment. Pollution prevention stresses source reduction and, as a second choice, environmentally sound recycling while avoiding cross media transfers. The Office develops information related to pollution prevention, increases awareness of pollution prevention opportunities, and can offer technical assistance to business, government, and the public.

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