



Success Story



COMMONWEALTH OF PENNSYLVANIA • DEPARTMENT OF ENVIRONMENTAL PROTECTION

Process Change and Raw Materials Substitution in the Locomotive Production Industry

COMPANY	GE Transportation Systems - Erie, Pa.
PRODUCT/INDUSTRY	Freight and passenger locomotives, transit propulsion systems and motorized wheel systems
WASTE STREAM/CHEMICAL	Chemical use reduction and elimination of ozone depleting chemicals including methylene chloride, 1,1,1- trichloroethane, Freon 113
PROCESS	Cleaning metal parts
POLLUTION PREVENTION COST	Over \$1,400,000
SAVINGS/OTHER BENEFITS	Reduction in chemical inventory of \$900,000 50 percent reduction in number of chemicals used Elimination of 22.9 tons of hazardous waste annually Elimination of 15.6 tons of CFC emissions annually Chemical purchase reduction \$2 million annually
POLLUTION PREVENTION METHOD	Process change Raw materials substitution Chemical management

BACKGROUND

GE Transportation Systems' (GETS) facility was established in Erie, Pa. in 1910. The Erie plant manufactures freight and passenger locomotives, transit propulsion systems and motorized wheel systems. Traditionally, GETS used organic solvents including Freon 113, methylene chloride and 1,1,1-trichloroethane to clean some parts. Since the implementation of a program called Pollution, Waste & Emissions Reduction (POWER), which encourages every GETS employee to think in terms of prevention instead of control, the concept of pollution prevention has been integrated into product design, production and packaging. Teams of employees using continuous improvement techniques have completed a number of initiatives to minimize the generation of hazardous and nonhazardous waste including replacement of some solvent cleaning processes with aqueous cleaning systems.

PROCESS CHANGE

GE Transportation Systems set up a centralized chemical management system along with procedural changes such as improved scheduling, inventory control, materials handling and storage. As a result of the chemical management system, GETS was better able to review and eliminate the use of ozone-depleting chemicals.

1. Evaluations were conducted on all work stations then process changes and chemical substitutions were initiated to reduce chemical usage. The chemical management system requires employees to order chemicals for their workstations on an as needed basis and limits use to approved chemicals. By centralizing receipt and storage of chemicals and limiting storage in manufacturing areas to only materials in use, GETS has achieved significant improvements in housekeeping, safety and the risk of chemical spills. In addition, the centralized system has reduced chemical inventories, increased inventory turnover and significantly reduced waste from out of date stock.

- Before 1990, GETS used about 120,000 pounds of Freon 113, methylene chloride and 1,1,1-trichloroethane per year to clean components prior to painting or assembly. Aqueous cleaners replaced these chemicals when GETS replaced several vapor degreasing systems with ultrasonic dip tanks and multi-stage spray parts washers. In addition, a cleaning system using aqueous cleaner was installed to replace a circuit board cleaning system that used Freon 113. The computerized chemical management system enabled GETS to screen all chemicals in use for ozone depleting ingredients and to identify environmentally friendly replacements.

ENVIRONMENTAL RESULTS

Reduced Solvent Purchases, VOC Emissions, Hazardous Waste Disposal and Other Benefits

The improved handling procedures associated with the centralized chemical management system have resulted in a 50 percent reduction in the number of chemical products used, a 20 percent reduction in chemical purchasing costs and a reduction in chemical inventory of about \$900,000. The house-keeping and safety improvements resulting from centralized chemical receiving and storage are significant but not measured in financial terms.

The elimination of the use of ozone depleting chemicals resulted in the reduction of 22.9 tons of halogenated solvent hazardous waste and 15.6 tons of CFC air emissions annually.

COST SAVINGS

Financial Benefits and Other Improvements

GETS invested \$1.4 million into the chemical management system. The payback is reflected in an overall chemical purchase cost reduction of \$2 million per year.

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POLLUTION PREVENTION GOAL

This case illustrates how industry can use process change and raw materials substitution to protect the environment and contain costs.

The goal of source reduction is to eliminate the generation of waste at the beginning of an industrial process or to modify the process so the amount of materials used is reduced. GE Transportation Systems in Erie was able to significantly reduce waste production, which earned them the Governor's Waste Minimization Award in 1994.

**For more information about
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This fact sheet and related environmental information are available electronically via Internet.
Access the DEP Web Site at <http://www.dep.state.pa.us>
(choose Information by Environmental Subject/choose Pollution Prevention).