

RESEARCH SUPPORT TO THE POLLUTION PREVENTION PROGRAM
OF THE US POSTAL SERVICE

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INTRODUCTION

The USPEA Risk Reduction Engineering Laboratory's (RREL) Pollution Prevention Research Program focuses on the question "How should consumer, government and industrial products and processes be designed, manufactured, used, and/or performed so that their manufacture, use, disposal, or performance will have a minimal effect on the environment." Research projects addressing this issue are divided into five areas: (1) Clean Technology Projects; (2) Clean Products Projects; (3) Longer Term P2 Research; (4) P2 Assessments; and (5) Cooperative P2 Projects with Other Federal Agencies.

Under the general heading of Cooperative P2 Projects with Other Federal Agencies, a specific research program exists at RREL, which is referred to as the WREAFS Program (Waste Reduction Evaluations At Federal Sites). Many of the projects with the Departments of Defense (DOD) and Energy (DOE), are funded under the Strategic Environmental Research and Development Program (SERDP). The primary components of the WREAFS program are: (1) opportunity assessments; (2) research, development and demonstration; and (3) technology transfer.

Most of the WREAFS projects involve Pollution Prevention Opportunity Assessments (PPOA) and have been conducted in conjunction with DOD facilities; however, several "civilian" agencies are now beginning to participate in the program, as well. One major player which is emerging as a leader in addressing P2 on an agency-wide basis is the US Postal Service (USPS). Like most agencies, the USPS' operations entail many industrial-type processes that are common to the private sector industrial complex.

METHODOLOGY

The PPOAs were conducted by an assessment team that was composed of personnel from EPA, USPS, and SAIC, under contract with EPA. The assessments followed the procedures described in the EPA Report, *Facility Pollution Prevention Guide* (EPA/600/R-92/088), which identifies the four major phases of an assessment: (1) Planning and Organization, which includes organization and goal setting; (2) Assessment, which includes a careful review of a facility's operations and waste streams and the identification and screening of potential options to reduce waste; (3) Feasibility Analysis, including an evaluation of the technical and economic feasibility of the options selected and subsequent ranking of options; and (4) Implementation, which involves procurement, installation, implementation, and evaluation.

Many of the pollution prevention opportunities identified during WREAFS projects involve low-cost changes to equipment and procedures that can often be implemented by the facility without extensive engineering evaluations. Other pollution prevention opportunities identified require further study before full implementation can be realized. Typically, opportunities requiring further evaluation are those that have the potential to affect the process and/or require the use of new procedures or equipment. In such cases, it may be necessary to conduct demonstration projects.



Depending on the nature and state of development of the pollution prevention option selected for demonstration and evaluation, these projects may include: (1) process design, (2) detailed design and specification, (3) system procurement, (4) installation and start-up, (5) monitoring, and (6) reporting. Some projects may require bench-scale and/or pilot testing prior to, or as a part of, the demonstration project. Other projects may utilize full-scale equipment directly on the production line.

RESULTS

An example of the PPOA process as applied by the US Postal Service is the assessment conducted at a USPS facility complex in Buffalo, NY. The complex encompasses 25 acres with a vehicle maintenance facility (VMF) and general mail facility (GMF). At the VMF, a staff of automotive technicians maintain a fleet of 1,200 vehicles, which range from light delivery vehicles to 18-wheel tractor trailers. In a year, approximately 2,500 to 3,000 maintenance and repair jobs are performed and 500 vehicles completely painted with USPS colors at this facility alone, which is only one of 350 such facilities nationwide.

The GMF consists of a three-story building and a one-story 276,000 square foot mail processing floor (another building on the site houses the Computerized Forwarding System and the Undeliverable Bulk Business Mail (UBBM) operation). Dock positions for more than 50 trucks are located here and the building is occupied 24 hours every day by up to 1,515 full-time employees. The facility receives nearly two million pieces of mail each day for processing; nearly three million pieces are sent out daily for delivery. The Buffalo GMF processes all mail from the eastern seaboard destined for Canada, and as such serves as a concentration center for mail transportation equipment.

These industrial-type facilities generate industrial-type pollution. The GMF generates approximately 537 tons of waste per year, at an annual solid waste disposal cost of approximately \$42,000. The wastes are comprised of 253 tons of old corrugated cardboard, two tons of computer paper, 46 tons of mixed office paper, 30 tons of metals, 13 tons of plastic film, 192 tons of "undetermined wastes," and an undetermined amount of machinery maintenance wastes (oil, grease and parts-cleaning solvent). Typical wastes that were produced by the VMF include about 4,100 gallons of waste petroleum naphtha generated annually during brake and engine parts cleaning operations and about 300 antifreeze were disposed of as hazardous waste.

As an example of the PPOA findings and recommendations:

Paint wastes comprise approximately 16 percent of all hazardous wastes generated by the VMF and are responsible for half of the hazardous waste management costs. The three primary PPOA recommendations for reduction of paint related wastes are described below.

- *Investigate water-based or high-solids paints* - Investigations at the VMF indicate that water-based primers may be substituted for conventional ones without affecting performance. Water-based top coatings, however, have been shown to exhibit insufficient durability. One solution currently under evaluation at the VMF involves the use of a waterborne primer with an acrylic enamel top coat.
- *Conversion to HVLP paint application systems* - HVLP spray guns operate at a much lower pressure than conventional spray guns, resulting in considerably lower paint waste due to bounce-back. Two HVLP spray guns were purchased for the VMF and have resulted in improved-quality paint jobs and savings in paint usage. Because the equipment was installed only recently, the VMF has not been able to provide accurate data on the incurred savings. The VMF's conservative estimate is a twenty percent reduction in paint usage per vehicle, with an associated reduction in VOC emissions. These figures are based on a four-month test period.

- *Install a paint-gun washer station* - At present, paint guns are washed in an open solvent tank. The PPOA recommended using specially designed enclosed paint-gun washing stations which reduce VOC emissions by 75 to 90 percent. The VMF has plans to purchase a paint-gun washer station during FY94.

CONCLUSION

Many of the recommendations made in the PPOA have been successfully implemented at the Buffalo facility. Approximately 624 tons of solid waste were disposed of by the GMF in 1992, incurring disposal costs of \$42,120. In fiscal year 1993, waste generation was reduced to approximately 244 tons. Additional cost reductions are expected as further plans are implemented.

Aerosol chemical use has been eliminated in all postal facilities in the western New York District. Portable sprayers are used to dispense maintenance products, which are purchased in bulk five gallon containers. As a result, significant reductions have been achieved in waste aerosol cans and packaging. In 1992, over 2,400 aerosol paint cans were used at the VMF.

In the past, approximately 4,100 gallons of waste petroleum naphtha were generated annually during brake and engine parts cleaning operations at the VMF. This represented about one third of the total hazardous waste costs. The VMF has recently converted to an aqueous cleaner for cleaning brakes, which will eliminate over 2,000 pounds of hazardous waste annually. In addition, a longer-lasting solvent for cleaning automotive parts is in use which should also result in a substantial reduction in hazardous waste generation.

The Buffalo PPOA was just the beginning. PPOAs are, or have been conducted at other representative USPS facilities throughout the United States. These facilities include: a forensic laboratory; an engineering and research development laboratory; a stamp distribution center; a bulk mail center; an area supply center; and customer service centers. Results of these assessments and P2 plans will be shared with other Federal agencies and the private sector as they are received.