



## Project Summary

# Pollution Prevention Assessment U.S. Postal Inspection Service National Forensic Laboratory

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As part of its Waste Reduction Evaluation at Federal Sites Program, the U.S. Environmental Protection Agency (EPA) National Risk Management Research Laboratory worked cooperatively with the U.S. Postal Service (USPS) to integrate waste prevention and recycling activities into the waste management programs at various postal facilities through the conduct of pollution prevention opportunity assessments (PPOA).

This PPOA documented and quantified waste generation at the National Forensic Laboratory, a Postal Inspection Service crime laboratory that examines physical evidence and performs chemical analyses relevant to crimes involving USPS operations.

The report makes recommendations concerning procurement of office supplies, maintenance supplies and hazardous materials; management of hazardous materials and wastes; purchase of chemicals on EPA's 33/50 list; improvement of source separation and recycling of paper and paper products, metals, and plastics; management of unwanted equipment; and other options for reducing or eliminating pollution.

*This Project Summary was developed by EPA's National Risk Management Research Laboratory, Cincinnati, OH, to announce key findings of the research project that is fully documented in a separate report of the same title (see Project Report ordering information at back).*

## Introduction

Since 1988, EPA's National Risk Management Research Laboratory (NRMRL) has managed a technical support effort known as the Waste Reduction Evaluations at Federal Sites (WREAFS) Program. WREAFS was established to provide pollution prevention solutions to environmental issues through research, development and demonstration of pollution prevention techniques and technologies, and transferring lessons learned within the federal community and related private sector industries.

The U.S. Postal Service (USPS), in cooperation with NRMRL's WREAFS program, is engaged in an effort to integrate pollution prevention and recycling activities into the waste management programs at postal facilities. The purpose of this project was to perform pollution prevention opportunity assessments (PPOAs) at Postal Service facilities, recommend implementation strategies, and develop facility guidance that could be incorporated into a revision of the USPS *Waste Reduction Guide*. The project was funded by the U.S. Postal Service through an interagency agreement with EPA NRMRL.

This report describes the findings of the PPOA conducted for the U.S. Postal Inspection Service, Forensic and Technical Services Division's National Forensic Laboratory in Dulles, VA. The PPOA was conducted during the week of November 14, 1994.

## Facility Description

The National Forensic Laboratory is situated in a rural industrial park several miles from Dulles International Airport. Three other Postal Service facilities are located at this site: a Stamp Distribution Network, a Vehicle Maintenance Facility, and a mail Processing and Distribution Center. The Forensic Laboratory is a two-story building of approximately 44,000 square feet, divided into six functional areas or sections. The Chemistry Section examines controlled substances submitted by postal inspectors; Forensic Photography provides photographic support to all the sections; Technical Services supports a national communications network; the Physical Evidence Section examines explosive devices, firearms, and toolmarks; the Latent Fingerprint Section processes evidence to develop latent fingerprints; and the Questioned Document Section identifies handwriting and establishes document authenticity.

## Waste Description

The nature and volume of the workload at the Forensic Laboratory depends on Postal Inspection Service criminal cases. Quantities of waste disposed or released to air and water may vary considerably from month to month and year to year; however, on the average, the Forensics Laboratory generates approximately 31 tons of solid waste per year. Annual cost of solid waste management is approximately \$6,000. Exhibit 1 presents the primary components of the Forensic Laboratory's solid waste stream. In addition to solid waste, the Forensic Labora-

tory generates small quantities of hazardous wastes. Most hazardous materials are utilized in very small quantities. The Forensic Laboratory has had occasion to dispose of hazardous waste only once in the past three years.

## Pollution Prevention Opportunities

The PPOA identified several pollution prevention opportunities at the site. Some of these opportunities simply reduce the quantity or toxicity of the waste stream, while others offer the USPS economic as well as environmental benefits. Exhibit 2 presents the pollution prevention opportunities that offer the USPS significant cost reductions in addition to reducing pollution. The annual savings for the combined facilities could be as high as \$25,000. In addition, by marketing dependable quantities of quality materials, the postal facilities increase the possibility of receiving revenues from the sale of their recyclables. All of the pollution prevention opportunities identified by the PPOA team are addressed below.

## General Recommendations

- Reduce the amount of packaging, including corrugated containers, shrink/stretch wrap, and strapping, entering the facility. Reuse incoming containers and utilize reusable packaging whenever possible.
- Introduce and promote a variety of techniques to reduce the quantity of paper generated for disposal.
- Repair unwanted equipment and/or donate to schools and other facilities for reuse.

- Provide training for professional and custodial staffs on source separation.
- Establish a multi-facility recycling program for the four Postal Service operations located in Dulles, VA.

## Affirmative Procurement

- Establish preference programs and adopt EPA guideline recommendations for the purchase of products made with recovered materials.
- Substitute products that do not contain ozone depleting chemicals; exhaust the current stock and then modify procurement specifications to prohibit purchase of products containing 33/50 chemicals.

## Procurement of Chemicals and Laboratory Supplies

- Centralize ordering and stock/inventory control, including budgeting for supplies, at the laboratory director level. Utilize the existing on-line inventory program to track current and future chemical inventory and optimize ordering and stock rotation to avoid the need to dispose of expired chemicals.
- Establish a single point of responsibility for receipt and labeling of chemicals.

## Carbon Filters

The Forensic Laboratory uses 22 Flanders Model T-2V-N63-F16, GG-16, V-Bed Carbon Adsorber Cells, located within seven ventilation systems, the largest of which includes nine cells. The filters contain nuclear grade carbon and have an estimated life expectancy of three years, according to the manufacturer. Actual use of the filter systems is very light so the replacement of the filters on a three-year schedule may not be warranted. The changeout of all of the filters will generate 2,200 pounds of spent nuclear grade carbon and will cost more than \$30,000. As shown in Exhibit 3, during the first changeout of the filters, the cost per filter will be slightly lower due to the purchase of spare filters. During subsequent changeouts, however, the per filter cost should be significantly lower than the purchase of new filters and will prevent the disposal of spent carbon. In addition, as shown in Exhibit 4, the per pound replacement cost of nuclear grade carbon is substantially higher than commercial grade carbon. If the Forensic Laboratory converts from nuclear grade to commercial grade carbon, cost savings of \$5,455 can be realized when the carbon is replaced.

**Exhibit 1.** Forensic Laboratory Solid Waste Stream

Waste	Waste components
Paper	Mixed office paper, computer printout, corrugated cardboard, paperboard packaging, paper towels
Food	Food scraps, food-contaminated paper products
Metal	Food and beverage containers, aerosol cans, paint cans, electronic equipment, wire
Glass	Containers from laboratory and photoprocessing chemicals, food and beverage containers, broken laboratory glass
Plastic	Containers from photoprocessing chemicals, food and beverage containers, gloves, shrink/stretch wrap, bubble wrap, packaging peanuts
Wood	Pallets, cable spools
Other	Toner cartridges, circuit boards, communication equipment, computer equipment, carbon filters
Batteries	Various sizes and types

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**Exhibit 2. Cost-Saving Pollution Prevention Opportunities**

<i>Item(s) of Concern</i>	<i>Current Practice</i>	<i>Pollution Prevention Opportunity</i>	<i>Estimated Potential Savings</i>
<i>Carbon filters</i>	<i>Replace all carbon filters after 3 years</i>	<i>Measure filter breakthrough</i>	<i>Eliminate costs associated with unnecessary filter replacement*</i>
<i>Carbon filters</i>	<i>Replace all carbon filters after 3 years</i>	<i>Rejuvenate filters on rotating schedule</i>	<i>\$600-\$1055 in filter replacement and disposal fees**</i>
<i>Carbon filters</i>	<i>Filters contain nuclear grade carbon</i>	<i>Convert from nuclear grade to commercial grade carbon filters</i>	<i>\$1,000 certification fee for disposal of nuclear grade carbon</i>  <i>\$4,455 replacing 22 nuclear grade carbon filters with commercial grade carbon filters</i>
<i>Recyclables</i>	<i>Collect aluminum, plastic and glass mixed food and beverage containers, and paper products</i>	<i>Establish one multi-facility recycling program for 4 local Postal Service operations</i>	<i>\$4,440 in fees for container rental and collection of recyclables</i>  <i>\$544 for smaller container and less frequent pick up charges</i>
<i>Procurement of chemicals and laboratory supplies</i>	<i>Decentralized process</i>	<i>Centralize ordering and inventory control</i>	<i>Eliminate expenses associated with overstocking and disposal of expired chemicals*</i>

\* Dollar figure associated with potential savings is unknown.

\*\* The per filter cost to replace and dispose of the carbon filters is estimated to be approximately \$1600. The estimated per filter cost to regenerate the carbon filters is between \$545 and \$1005; however, for the first changeout, the per filter cost is estimated to be approximately \$1600 due to the extra expense of purchasing spare filters.

## Conclusions and Recommendations

The USPS has encouraged reduction and recycling activities in its facilities. Emissions to air and water from the Forensics Laboratory are minimal. The Laboratory faces a significant expenditure in replacing the carbon filters and should seek a

regeneration option. The full report provides detailed analyses regarding the cost of various filter options.

Additionally, annual solid waste expenditures could be reduced 83%, from \$6,000 to \$1,016, by coordination of reduction and recycling activities with the other USPS facilities. The laboratory could also establish a centralized system for chemi-

cal receipt and labelling to reduce waste and minimize disposal of expired or unneeded chemicals.

The full report was submitted in partial fulfillment of Contract No. 68-C2-0148, Work Assignment No. 3-10 by Science Applications International Corporation under the sponsorship of the U.S. Environmental Protection Agency.

**Exhibit 3. Options for Filter Management**

<i>Option 1: Dispose of 22 spent filters and replace</i>	<i>Option 1 Costs</i>	<i>Option 2: Regenerate carbon in the filters</i>	<i>Option 2 Costs</i>
<i>Testing costs: Prior to disposal, the Forensics Laboratory must test the carbon to determine whether it is a hazardous waste.</i>	<i>\$230</i>	<i>Testing costs: Prior to regeneration or disposal, the nuclear grade carbon must be tested for contaminants.</i>	<i>\$450-600 *</i>
<i>Disposal costs including collection and transport: 22 spent Flanders Filters at an estimated weight of 2,200 lbs. as nonhazardous waste at \$80 per filter (the steel may have recycling value)</i>	<i>\$1,760 or</i>	<i>Regeneration costs: Regeneration of Flanders Filters V-bed Carbon adsorber cells</i>	<i>\$525-978 each</i>
<i>22 spent Flanders Filters at an estimated weight of 2,200 lbs. as hazardous waste at \$130 per filter.</i>	<i>\$2,860</i>	<i>Purchase costs: One time purchase of nine spare Flanders Filters Model T-2V-C63-F16, GG-16, V-Bed Carbon Adsorber Cells. Each adsorber complete with an initial charge of commercial grade carbon.</i>	<i>\$11,595-14,400</i>
<i>Purchase costs: 22 Flanders Filters Model T-2V- C63-F16, GG-16, V-Bed Carbon Adsorber Cells complete with an initial charge of commercial grade carbon.</i>	<i>\$32,150</i>		
<b>Total</b>	<b>\$34,140 - \$35,240</b>		<b>\$23,537 - \$36,516</b>
<i>First Changeout Cost Per Filter</i>	<i>\$1,552 - \$1,602</i>		<i>\$1,070 - \$1,660</i>
<i>Second Changeout Cost Per Filter</i>	<i>\$1,552 - \$1,602</i>	<i>Second changeout does not require purchase of new filters</i>	<i>\$545 - \$1,005</i>

\* Price range reflects bids from different vendors.

**Exhibit 4. Replacement Cost of Carbon**

<i>Material</i>	<i>Quantity</i>	<i>Cost/lb</i>	<i>Total</i>
<i>Nuclear grade carbon</i>	<i>90 lbs./filter; 22 filters</i>	<i>\$3.75</i>	<i>\$7,425</i>
<i>Activated carbon</i>	<i>90 lbs./filter; 22 filters</i>	<i>\$1.50</i>	<i>\$2,970</i>

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**James S. Bridges and N. Theresa Hoagland** are the EPA Project Officers (see below).

*The complete report, entitled "Pollution Prevention Assessment, U.S. Postal Inspection Service National Forensic Laboratory," (Order No. PB97-100010; Cost: \$21.50, subject to change) will be available only from*

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