



**POLLUTION
PREVENTION
PLAN**

March 2002



U.S. Army Aberdeen Proving Ground

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LIST OF ABBREVIATIONS

ABCDF – Aberdeen Chemical Agent Disposal Facility
ACANF – Aberdeen Chemical Agent Neutralization Facility
ACE – Aberdeen Conserves Energy
ADS – Activity Distribution Site
AEC – Army Environmental Center
AMC – Army Materiel Command
AMSAA – Army Materiel Systems Analysis Activity
APG – Aberdeen Proving Ground
ARL – Army Research Laboratory
ASL – Atmospheric Services Laboratory
ATC – Aberdeen Test Center
BRAC – Base Realignment and Closure Program
CARC – chemical agent resistant coating
CAS – Chemical Abstract Service Registry
CDTF – Chemical Demilitarization Training Facility
CERCLA – Comprehensive Environmental Response,
 Compensation, and Liability Act
CHPPM – Center for Health Promotion and Preventative Medicine
CID – Criminal Investigations Division
CNG – compressed natural gas
COE – Corps of Engineers
CY – calendar year
DCFA – Directorate of Community and Family Activities
DENTAC – Dental Clinic
DIO – Directorate of Installation Operations
DLES – Directorate of Law Enforcement and Security
DoD – Department of Defense
DOIM – Directorate of Information Management
DPSDBO – Defense Printing Service Detachment Branch Office
DRMO – Defense Reutilization and Marketing Office
DSHE – Directorate of Safety, Health and Environment
DSHE-FIRE – Directorate of Safety, Health and Environment’s
 Fire Prevention and Protection Division
DTC – Developmental Test Command
ECBC – Edgewood Chemical and Biological Center
ECRD – Environmental Conservation and Restoration Division
EDSI – Engineering Documentation Systems, Inc.
EO – executive order
EPA – Environmental Protection Agency
EPCRA – Emergency Planning and Community Right-To-Know
 Act
FMIB – Foreign Military Intelligence Branch
FUDS – Formerly Used Defense Sites
FY – fiscal year

HW – hazardous waste
HWTS – Hazardous Waste Tracking System
IRP – Installation Restoration Program
KUSAHC – Kirk U.S. Army Health Clinic
LEPC – Local Emergency Planning Committee
MD ARNG – Maryland Army National Guard
MDE – Maryland Department of the Environment
MIB – Military Intelligence Battalion
MRICD – Medical Research Institute of Chemical Defense
MSDS – material safety data sheet
NBC – nuclear, biological, and chemical
NEPA – National Environmental Policy Act
NGIC – National Ground Intelligence Center
OC&S – Ordnance Center and School
ODC – ozone-depleting chemical
P2 – pollution prevention
PMCD – Project Manager Chemical Demilitarization
RMRL – Rodman Materials Research Laboratory
SARA – Superfund Amendments and Reauthorization Act
SBCCOM – Soldier and Biological Chemical Command
SERC – State Environmental Response Committee
SMPT – School of Military Packaging Technology
TCE – trichloroethylene
TEU – Technical Escort Unit
TMDE – Test, Measurement, and Diagnostic Equipment (TMDE)
Support Center
TRI – Toxic Release Inventory
VOC – volatile organic compound

1. PURPOSE

The Aberdeen Proving Ground Pollution Prevention Plan for 2002, an up-date of the 2000 plan, is a framework for managing the installation's pollution prevention initiatives and for fostering environmental awareness. The strategies described herein clearly make pollution prevention the installation's highest environmental protection priority.

The Pollution Prevention (P2) Plan provides a cost-effective means by which to meet state and national policy goals in an era when Army installations are subject, simultaneously, to stricter environmental standards, public criticism of their environmental records, and declining budgets. To avoid cleanup costs estimated in the hundreds of millions of dollars at other installations, this plan protects public health and the environment by encouraging conservation and the use of the least toxic materials, fuels, and chemicals that will do the job. In that way, it reduces liabilities associated with waste disposal, and it saves money by reducing raw material purchases as well as waste treatment and disposal costs.

The plan reflects changing technologies, products, and approaches that address old and new problems. It is designed as a resource for all Aberdeen Proving Ground (APG) employees in daily operations and planning. In accordance with Army Materiel Command (AMC) policy, the plan will be revised every two calendar years (CYs).

2. SCOPE

The Aberdeen Proving Ground P2 Program and P2 Plan apply to all activities on or within the real property boundaries of the installation. Activities include those of the active Army, the Army National Guard, the U.S. Army Reserve, APG tenants and tenant organizations, and other government agencies and their contractors. Any activity outside the installation's real property boundaries must consult its host organization's pollution prevention plan. All contractors must certify that they will comply with applicable hazardous chemical storage and toxic chemical release reporting requirements of the Emergency Planning and Community Right-to-Know Act of 1986 (42 U.S.C. 11001-11050)

and the Pollution Prevention Act of 1990 (42 U.S.C. 13101-13109).

This P2 Plan covers policy/procedural modifications, process/equipment modifications, material substitutions, material reuse, process efficiency improvements, and inventory controls.

3. BACKGROUND

Aberdeen Proving Ground, the Army's oldest active proving ground, was established on October 20, 1917, six months after the United States entered World War I. It provided a facility where design and testing of ordnance materiel could be carried out in close proximity to the nation's industrial and shipping centers.

Today, as a center for Army materiel testing, laboratory research, and military training, the installation is a key element in the nation's defense. For instance, all tanks and wheeled vehicles that have served U.S. forces for the past 50 years (from the M4 Sherman tank of World War II to the M1 tank and the high-mobility, multipurpose, wheeled vehicle of today) have been tested at Aberdeen Proving Ground.

Further, the APG Edgewood Area has been a center for chemical warfare research and development. From the trenches of France and Belgium in World War I to the desert battlefields of Iraq nearly 75 years later, the installation has contributed to the defense and safety of American forces threatened by chemical, biological, and radiological weapons.

In the course of meeting defense goals, environmental stewardship is an essential component of all APG activities (see appendix A). The installation and its tenants invest millions of dollars annually for environmental compliance, pollution prevention, conservation, and restoration programs. In the last several years, pollution prevention has become the preferred approach to environmental management.

The following APG characteristics make environmental management particularly challenging.

- Aberdeen Proving Ground is located in a nonattainment area for ozone.

- Edgewood Area and Michaelsville Landfill are on the Environmental Protection Agency (EPA) national priority list for remediation under the Comprehensive Environmental Response, Compensation, and Liability Act.
- On the installation, there are approximately 163,000 containers of hazardous materials, comprising more than 235,300 chemicals and chemical products that require tracking and reporting under the Emergency Planning and Community Right-To-Know Act (EPCRA).
- Common pollution prevention requirements of numerous tenants with diverse missions and procedures must be coordinated in a single program.
- The installation must consider its impact on the ecologically sensitive Chesapeake Bay watershed and fulfill its commitment to Businesses for the Bay, a group of some 200 organizations dedicated to reducing the amount of pollutants released into the bay.
- The installation must reduce nutrients at APG sewage treatment plants.

Every APG employee is responsible for incorporating pollution prevention practices into daily operations by reducing or eliminating pollutants at the source of generation as well as by recycling, treating, and disposing of them properly. To the greatest extent practicable, employees must observe the following practices:

- Use processes that produce the least pollution.
- Use nontoxic, low-maintenance materials.
- Purchase products that are made from recovered materials and that are environmentally preferred and energy efficient.
- Purchase only essential quantities of hazardous materials.
- Properly track all hazardous materials using the APG automated tracking system.
- Reuse and recycle materials, including, but not limited to antifreeze, used oil, tires, appliances, office paper, and scrap metal.

- Attend pollution prevention training, provided several times each year.
- Provide interesting training and outreach opportunities for APG employees and residents to equip them with tools to prevent pollution at work and at home.

Individual commitment to prevention enables organizations to accomplish the following goals:

- Provide a clean and safe environment in the community.
- Ensure a safe and healthy workplace for employees.
- Comply with applicable federal, state, and local laws and regulations.
- Accomplish military missions efficiently.
- Reduce waste generation and waste management costs by implementing innovative, environmentally sound technologies.
- Reduce future liability for waste disposal.

Aberdeen Proving Ground is on track to achieve its pollution prevention goals through improved hazardous material management; material substitution; process modifications; education and outreach; and research, development, and technology demonstration/validation.

4. GOALS

The goals of the Army Materiel Command (AMC), the installation's parent command, are both general and specific. The general goals must be achieved and are expressed as measures of merit.

General Installation Pollution Prevention Goals

Executive Order (EO) 13148, Greening the Government Through Leadership in Environmental Management, was signed on April

22, 2000. It lists pollution prevention goals that federal agencies are required to meet. They are as follows.

- Ensure that strategies are established to support environmental leadership programs, policies, and procedures through the development and implementation of environmental management systems.
- Establish and implement environmental compliance audit programs and policies that emphasize pollution prevention as a means to both achieve and maintain environmental compliance.
- Through timely planning and reporting under EPCRA, act as leaders and responsible members of communities by informing the public and workers of possible sources of pollution resulting from facility operations.
- Prevent or reduce pollution at the source whenever feasible and cost-effective.
- Fund regulatory compliance programs so as to emphasize pollution prevention as a means to address environmental compliance.
- Reduce or eliminate harm to human health and the environment from releases of pollutants.
- Reduce, by 10 percent annually or by 40 percent overall by December 31, 2006, the releases and off-site transfers of toxic chemicals that are listed in the EPA Toxic Release Inventory (TRI). Applicable target chemicals are listed in appendix B.
- Reduce the use of selected toxic chemicals and hazardous substances as well as the generation of hazardous and radioactive waste by 50 percent by December 31, 2006, through the identification of proven substitutes and established facility management practices, including pollution prevention.
- Phase out the procurement of Class I ozone-depleting chemicals (ODCs) for all unaccepted uses by December 31, 2010, by evaluating present and future uses of ODCs and by maximizing the purchase and use of safe, cost-effective, and environmentally preferable alternatives.

- Promote sustainable management of federal facility lands through the implementation of cost-effective, environmentally sound landscaping practices and through programs to reduce adverse effects on the natural environment.

Specific Installation Pollution Prevention Goals

In July 1997, the Army issued a revised policy for the elimination of ODCs from Army installations. The Assistant Chief of Staff Installation Management Memorandum, DAIM-ED-P2, 3 July 1997, *Elimination of the Dependency on Ozone-Depleting Chemicals (ODCs) in Army Facilities*, stated the following points:

- Installation commanders are responsible for ODC elimination.
- All tenant commanders are responsible for complying with host ODC policies and supporting host ODC elimination efforts.
- Class I ODCs must be eliminated from all facilities on Army installations by the end of fiscal year (FY) 2003.
- Installations may not contract for the use of Class I ODCs.
- All Class I ODCs installed in Army facilities must be recovered.

APG Pollution Prevention Program Goals

APG specific Pollution Prevention Program goals were developed in support of AMC goals.

- Comply with right-to-know laws and pollution prevention requirements.
- Track users and quantities of all hazardous materials by location and report the same to the State Environmental Response Committee (SERC), the Local Emergency Planning Committee (LEPC), and EPA.

- Maintain an automated hazardous inventory tracking system that provides centralized tracking of hazardous material receipts, issues, and inventories.
- Maintain an automated centralized reference library for all material safety data sheets (MSDSs).
- Inform and train installation personnel in pollution prevention awareness.
- Identify annual pollution prevention initiatives for major industrial and hazardous waste streams.

The pollutants of concern at Aberdeen Proving Ground, based on CY 1994 TRI reports, include methylene chloride and refrigerant R-22. Chlorine was also identified in TRI reporting as a Section 313 toxic chemical used in excess of the 10,000-pound reporting threshold. However, the Directorate of Safety, Health, and Environment (DSHE) did not consider it a pollutant of concern in this plan because it is used as a process chemical in the treatment of water and wastewater and, as used, dissociates into chloride ions and chloride salts. In 1995, the installation reported refrigerant chlorodifluoromethane to the TRI. In 1996, the installation did not exceed TRI reporting thresholds.

5. TRAINING

Training and outreach are integral parts of the Aberdeen Proving Ground P2 Program. As required by AMC, the APG training program educates all personnel about pollution prevention issues and technologies. As employees and residents learn new ways to prevent pollution on the job and in their homes, they are able to make responsible choices to protect their health and the environment. Through training classes, DSHE provides opportunities to learn more about saving money, conserving natural resources, and using less hazardous materials.

The P2 Program makes training available upon request and at no cost to APG military, civilian, and contract employees. Classes address the following subjects:

- Air pollution

- The Chesapeake Bay
- Storm water pollution
- Solid waste management and recycling
- Hazardous material management
- Pollution prevention requirements
- Material safety data sheets
- Environmentally preferable products
- Life-cycle assessment
- Green building
- Pollution prevention awareness and hazardous materials management
- Pollution prevention training tailored to the needs of a particular activity
- Pollution prevention opportunity assessment training that directs staff to identify opportunities in their areas of expertise or within their facilities
- Affirmative procurement

The pollution prevention training program is periodically evaluated to reflect changes in pollution prevention practices, personnel, and tenant and support activity operations. To continually improve training, all students complete an evaluation at the end of each class.

Pollution prevention training classes may also be available through individual tenant activities. Each tenant's activity environmental coordinator has specifics.

6. COMPLETED AND ONGOING POLLUTION PREVENTION PROJECTS

Policy or Procedural Modifications

Alternatively Fueled Vehicles. Aberdeen Proving Ground (APG) currently has 11 dedicated compressed natural gas (CNG) vehicles, 82 bi-fueled vehicles, and 32 gas/ethanol vehicles.

Energy Conservation. Project Aberdeen Conserves Energy (ACE) emphasizes energy conservation awareness and education for all APG employees by organizing energy action teams and generating publicity. Approximately 250 building energy monitors have been trained, and residents and employees are informed of the program through various forms of publicity including banners, newspaper articles, and posters. The Directorate of Installation Operations (DIO) continues an aggressive energy conservation program that includes holiday closures and compressed work schedules for employees. Beginning with the 1997 Thanksgiving holiday, all employees have been encouraged to take one additional day of leave so that the majority of facilities on the installation are closed for four consecutive days. Lighting, equipment, and computers are turned off during this period, which results in substantial energy savings. Since March 26, 1998, 66 percent of the APG workforce has been on compressed work schedules, and some major activities are on a uniform compressed work schedule, resulting in the closure of many facilities for 20, three-day weekends. DIO estimates a potential savings of 93,679 million British thermal units (BTUs) and \$1 million per year from the holiday closing and compressed work schedule initiatives.

Aberdeen Proving Ground was selected as the Army Materiel Command (AMC) Energy Award Winner for 2002 and has been nominated by the command for the Secretary of the Army Award.

Lighting Retrofits. Aberdeen Proving Ground, an EPA Green Lights partner, is replacing standard polychlorinated biphenyl (PCB) containing fluorescent light ballasts with energy-efficient, PBC-free, electronic ballasts. With more than 98 percent of the retrofits complete, DIO met its Green Lights goal four years ahead of schedule. The remaining two percent of the fixtures have a smaller payback and will be replaced by the end of their life or upon failure. The new fixtures last longer and reduce electricity demand by more than 5 megawatts and annual consumption by more than 6,050,000 megawatts. DIO estimates that the \$4 million project saves the installation \$1.2 million per year.

7. NEW AND ONGOING PROJECTS

Policy or Procedural Modifications

Activity Distribution Site (ADS). The Aberdeen Test Center (ATC) is currently creating a central storage point for all its hazardous materials, allowing for ease of tracking, elimination of overstocking, and proper shelf-life rotation.

Green Technology. The Army Research Lab (ARL) is developing a memorandum of agreement between it and the Corps of Engineers Research Lab in Champaign, IL, to introduce green technologies into the Rodman Materials Research Laboratory (RMRL).

Identification of Environmentally Preferable Products

- ATC Environmental Team personnel review all supply order forms to ensure minimum use of products containing hazardous materials and maximum use of recycled content products.
- ATC Environmental Team personnel, using data from the Hazardous Inventory Tracking System, have identified products containing PBTs in the ATC inventory. These products cannot be reordered unless an environmentally preferable alternative is not available.

Investigations

- ARL performed a gap analysis pertaining to conformance with International Organization for Standardization (ISO) 14001 standard at RMRL. The report led to the designation of RMRL as the pilot facility for implementing an environmental management system at ARL.
- ARL is conducting a land management study to identify opportunities for pollution prevention related to storm water runoff, invasive species control, and biodiversity improvement. Results are due in late September 2002.

P2/EMS Team. ARL established an internal integrated process team, the Pollution Prevention/Environmental Management System (P2/EMS) Team, to handle technical issues related to pollution prevention and environmental management system implementation efforts as they relate to experimental research.

Reduced Chemical Purchases. ATC has reduced x-ray chemical purchases 50 percent through facility consolidation and improved inventory management.

Training and Awareness

Awards. ARL is establishing an environmental awards program to recognize environmental protection achievements through P2/EMS projects.

Laboratory Training. The Chemical Demilitarization Training Facility (CDTF) revised its laboratory training procedures to minimize the quantity of hazardous wastes generated during training activities.

Pollution Prevention Program Website. The Directorate of Safety, Health and Environment (DSHE) P2 Program created an educational and informative website (www.apg.army.mil/ap2g/index.htm). This website contains all of the information previously maintained in the P2 Handbook. Additionally, it contains links to reports published by the DSHE P2 Program, regulations, training slide shows, newspaper articles, manuals, and more information. This website is reviewed periodically to keep it as up to date as possible.

P2 Land. The DSHE P2 Program created a new training tool to raise pollution prevention awareness. P2 Land is a competitive trivia game that is used in training classes to reinforce important lecture points and raise general environmental awareness.

Process or Equipment Modifications

Aberdeen Chemical Agent Disposal Facility (ABCDF). Transitioning from the ABCDF to the Aberdeen Chemical Agent Neutralization Facility (ACANF) presented the Installation with many opportunities to prevent pollution (table 1).

Battery Recycling. Aberdeen Test Center (ATC) is participating in a closed-loop battery recycling program. Under this program, used automotive batteries are palletized and removed to be recycled. This eliminates the manual addition of battery acid and all waste components associated with batteries. Exide Battery provides new batteries made with recycled lead and removes old batteries for recycling. Prior to this arrangement, batteries were purchased from

**Table 1. Projected Waste Disposal Quantity Reductions
Resulting from Changeover from ABCDF to ACANF**

Waste	Total Disposal Quantity (lbs)* ABCDF†	Total Disposal Quantity (lbs)* ACANF‡	Projected Waste Disposal Quantity Reduction (%)
Strainer materials	41,640	24,956	40
Carbon	919,254	67,632	93
HEPA filters	39,961	8,352	79
Maintenance components and parts	191,543	138,600	28
Misc. lab waste (liquid)	12,492	8,415	33
Misc. lab waste (solid)	49,968	17,820	64
Aqueous liquid waste	144,433	109,692	24
Clarifier bottoms	1,086,068	0	100
Hydrolysate	126,000,000	63,080,867	50
Misc. solids	1,545,661	1,188,000	23
Acidic waste from air stripper cleaning	1,367,293	0	100
Biotreatment sludge	3,567,648	0	100
Systemization chemicals	193,600	0	100
Lab packs	132,000	43,956	67
Sand from sandblasting	110,000	27,500	75
Concrete dust from scabbing	55,000	13,750	75
Excess caustic	198,000	44,000	78
Refrigerant	60,500	44,000	27
Heat transfer fluids	93,500	44,000	53
Debris	7,200,000	3,600,000	50
Total waste	143,960,039	68,854,390	52

* Includes weight of appropriate packaging (drums, supersacks, etc.)

†ABCDF: Aberdeen Chemical Agent Disposal Facility

‡ACANF: Aberdeen Chemical Agent Neutralization Facility

various sources, and old batteries were disposed of as hazardous waste. This program is expected to save \$8,000 per year.

Chemical Demilitarization Training Facility (CDTF). The CDTF has eliminated laboratory discharges to the sanitary sewer system.

Compressed Gas Tank Exchange. ATC returns all tanks of CO, CO₂, NO, NO₂, NH₃, and some fire suppressant gases to the manufacturer, eliminating any disposal of gases or tanks.

Consolidation of Development Labs. ATC use of a mobile x-ray truck has eliminated all development labs on the ATC main front and has eliminated the need for the Edgewood Area development lab.

Digital Photography

- ATC uses digital x-rays in 90 percent of tests, eliminating the need for hazardous development chemicals.
- Edgewood Chemical and Biological Center (ECBC) purchased new digital imaging equipment to eliminate wet photo processing from the Microland's electron microscope operation. This eliminates the generation of waste fixers and developing solutions. ECBC estimated a 650-pound reduction in hazardous waste fixer in calendar year (CY) 2000.

Inventory Control

- The Center for Health Promotion and Preventative Medicine (CHPPM), to reduce turn-in of excess chemicals in laboratory and animal testing, orders only the smallest quantity deemed necessary.
- CHPPM returns excess products received for toxicological testing to the manufacturer for disposal whenever possible.

Silver Recovery

- ATC captures silver generated by the x-ray development process in a silver recovery unit and the recovered silver is taken to the Fort Meade DRMO for resale.
- The Dental Clinic (DENTAC) installed silver recovery systems to capture the silver discharged during film processing. This new equipment not only saves workspace in the dark room but also eliminates the need for personnel to transport five-gallon drums of wastewater in a government vehicle to a satellite accumulation site (SAS) for storage. Because of the recovery systems, DENTAC can now discharge waste into the sanitary sewer.

Water Treatment. The Canal Creek Groundwater Treatment Plant is under design and construction. The plant will consist of a 440,000-gallon-per-day groundwater treatment system in renovated building E5236. An Ambersorb 563 resin-based adsorption system will remove volatile organic compounds (VOCs) from groundwater extracted from the Canal Creek Aquifer. Ambersorb was chosen due to its efficiency in the removal of the contaminants of concern as well as its ability to be regenerated on-site, using steam. The project as a whole, as well as the use of Ambersorb, provides a number of pollution prevention and waste minimization benefits. They include the following:

- Removal and treatment of groundwater from the aquifer prevents the potential spread of contaminants.
- Selection of Ambersorb media over carbon reduces the volume of hazardous process residuals. Since Ambersorb is regenerated on-site, spent media will not have to be disposed of, as with carbon. Also, the amount of hazardous material for off-site disposal from an Ambersorb-based process is less than that with a carbon-based treatment system.
- The process equipment required for the Ambersorb-based treatment system are smaller than the equipment required for a carbon-based treatment system, and thus less energy is consumed by the process.

Material Substitutions

Automobile Substitutions. ATC has switched from using Brake Kleen solvent to ShopSolv solvent in building 402. Brake Kleen solvent was purchased and used in 18-ounce individual aerosol containers. ShopSolv is purchased in 55-gallon drums and dispensed into hand-held, air-charged sprayers. This substitution will reduce the volume of aerosol cans needing to be disposed of by two 55-gallon drums every month. The estimated savings are expected to be \$2400 per year.

Laboratory Substitutions

- ECBC is phasing out its use of mercury thermometers in analytical laboratories. The mercury thermometers pe-

riodically break, sometimes generating relatively large quantities of hazardous wastes. This project is expected to save ECBC approximately \$250 in disposal costs and eliminate a 50-pound-per-year waste stream.

- ECBC has replaced a paraffin/wax mixture with a nontoxic, water-soluble adhesive. This substitute has eliminated a 17,000-pound-per-year waste stream. It also saves approximately \$11,400 per year by eliminating the costs for disposal, drums, administration, training, and storage. Previously this waste stream had to be disposed of commercially, but now it is discharged to the sanitary sewer.

Paint Shop Substitutions. ATC uses low-content volatile organic compound (VOC) paint when performing paint jobs, lowering the amount of VOCs emitted to the environment.

Material Reuse

Automotive Reuse

- ATC uses retread tires on commercial vehicles. Prior to this program, only new tires were used, and all old tires were disposed of through an APG Garrison contract. Now old tires are turned in for recapping. This saves approximately \$794.16 per year.
- ATC purchased an antifreeze-recycling machine to filter and recharge used antifreeze, eliminating the disposal of used antifreeze and the purchase of new antifreeze. This saves approximately \$15,350 per year.

Canal Creek Ground Water Treatment Plant. Building E5236 is being renovated rather than demolished to serve as the site for Canal Creek Ground Water Treatment Plant. During the renovation process, many items have been salvaged for reuse including the following:

Salvaged Scrap Metal: Approximately 95,000 pounds of ferrous metal was recovered and delivered to the Defense Reutilization and Marketing Office (DRMO).

Equipment Salvaged for Reuse
4 Dayton-Dowd pumps/motors

- 1 air conditioner
- 1 instrument panel
- 1 electric hoist
- 1 water fountain
- 4 steam heaters, including all valves and appurtenances
- 1 shower stall
- 1 water heater, including safety switch box and valves

Closed Loop Wash Racks. The ATC Churchville, Perryman, Building 338, and Munson wash facilities sanitize and filter wash water through a sand filter, oil/water separator, and ultraviolet (UV)/ozone sanitizers before reuse.

Container Reuse

- ARL recertified sixty 250-pound cylinders through a contract vendor and put them back into circulation. The action diverted numerous hazardous cylinders from the solid waste stream and saved ARL well over \$100,000 in potential disposal costs.
- ATC purchases reconditioned 55-gallon drums for various uses throughout ATC. This saves approximately \$2,148 per year.

Laboratory Reuse

- ARL transferred over 5,400 pounds of excess aluminum powder and 35 pounds of red phosphorous to the ECBC's pyrotechnics team for reuse in making pyrotechnic formulations. The action diverted these hazardous substances from the waste stream and saved ARL an estimated \$6,900 in disposal costs.
- ATC reuses chemicals that are used in lab processes until they are completely spent, reducing hazardous waste disposal and new chemical purchases.
- ATC returns fuels being tested (i.e., diesel) to users for use rather than being disposed of as hazardous waste.
- ATC recycles and reuses fixer used in x-ray development, saving money on disposal and new product purchase.

- CHPPM reutilizes the solvents (xylene and alcohols) used in tissue processing and slide staining for the purging cycle of the tissue processor. After the solutions are determined no longer effective, they are turned in.
- CHPPM reuses various percentages of glycerin during the skeletal staining procedures for developmental studies.
- CHPPM reuses solutions of Formalin and Bouins for the preservation of archival tissues.

Remanufactured Cartridges

- ARL returns unused and or expired toners (liquid, solid, and ribbons) to the manufacturer. This saves \$160 to \$230 per year.
- ATC purchases remanufactured toner cartridges and returns old cartridges for remanufacturing. This saves \$9,500 to \$10,000 per year.

8. FUTURE POLLUTION PREVENTION PROJECTS

Process or Equipment Modifications

Parts Washers. The Chemical Demilitarization Training Facility (CDTF) will investigate substituting the existing solvent parts washer in building E-4516 with a more environmentally friendly citrus-based system.

Material Substitutions

Methylene Chloride. CDTF will investigate the elimination of methylene chloride used for organic extraction training.

Product Research. The Directorate of Safety, Health and Environment's Environmental Compliance Division (DSHE-ECD) will investigate several categories (e.g., industrial/institutional cleaners, glues/adhesives) of hazardous materials to determine whether comparable environmentally preferable substitutes are

available. Information from the studies will be used to develop both standards and policies in the purchase of materials used in the research, development, testing, and evaluation arenas.

Product Substitution. DSHE-ECD will develop a substitution list for hazardous products that will be electronically linked to hazardous product lists. This will automatically inform the user that an environmentally preferable substitute is available and will provide details about the chemical makeup and attributes of the substitute product.

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