Introduction

Pollution can adversely affect the Department of Defense's (DoD's) mission by harming military personnel and affected communities, property DoD holds in the public trust, and the facilities required to maintain military readiness. Because controlling existing pollution and reversing the effects of pollution is costly, DoD strives to prevent pollution at the source. DoD remains committed to protecting human health and the environment through its pollution prevention initiatives.

DoD's pollution prevention approach includes recycling, reducing the use of hazardous materials and developing safer alternatives, reducing all sources of pollution (air, water, and waste), eliminating the use of ozone-depleting substances (ODSs), purchasing environmentally preferable products, and ensuring that DoD activities do not adversely impact the nation's air, water, and land resources.

Highlights of Activities in Fiscal Year 2002

DoD works hard to ensure that its Pollution Prevention Program is implemented at all DoD installations. In Fiscal Year (FY) 2002, DoD continued to meet and surpass its pollution prevention goals and objectives.

Affirmative Procurement

DoD has established itself as a leader in developing programs to implement Executive Order (E.O.) 13101, "Greening the Government through Waste Prevention, Recycling, and Federal Acquisition," by purchasing products that are recyclable, renewable, and reusable and are made from recycled materials. DoD's Affirmative Procurement Program (APP) focuses on purchasing these types of products.

Products made from recycled materials minimize natural resource use, solid waste disposal, and energy requirements. Products that are renewable and reusable reduce life-cycle costs and have fewer environmental impacts. Affirmative procurement also reduces the use of hazardous materials and prevents air and water pollution. DoD ensures that personnel at all levels are committed to and trained in procuring and using these products.

In addition to internal DoD efforts, the Department has remained active and engaged in the E.O. 13101 Interagency Work Group and the APP Reporting Subgroup to work for a more effective and

streamlined approach to affirmative procurement reporting. DoD helped the White House Task Force on Recycling pave the way for widespread improvements in APP performance.

In 1999, DoD proposed an approach to measure affirmative procurement that uses the Federal Procurement Data System (FPDS) and associated electronic DD Form 350 as a data tracking and reporting tool. In October 2001, these APP-related changes to DD350 became effective. The electronic infrastructure of the FPDS and the Defense Federal Acquisition Regulations now support electronic tracking and reporting of the APP. The changes made to the FPDS and DD350 will streamline data gathering, ensure more comprehensive and accurate capture of APP data, and provide a basis for internal and external auditing of APP performance.

In FY 2002, DoD began developing guidance to establish a comprehensive management system for integrating and complying with the affirmative procurement requirements of E.O. 13101; the Resource Conservation and other Federal procurement preference programs.

FOCUS ON THE FIELD

FORT IRWIN SAVES MILLIONS WITH POLLUTION PREVENTION INITIATIVES

Fort Irwin, California, exceeded DoD's goal of a 40 percent diversion rate for all solid waste generated by the year 2005. The combined effect of Fort Irwin's pollution prevention initiatives resulted in a $2 million reduction in hazardous waste disposal costs from 1997 through 2001. In addition, the composting facility diverted 30,000 cubic yards of solid waste from the landfill waste stream.

The installation reduced its use of hazardous substances by eliminating 8,000 pounds of gaseous chlorine from its wastewater treatment plant and booster station. Reducing the use of hazardous materials at the plant reduces the amount of hazardous waste generated and decreases the contact base personnel have with hazardous materials, improving health and safety.

Fort Irwin also boasts successful water conservation initiatives. Modifications to the reverse osmosis plant and wash rack facilities save 44 million gallons of water annually.

Fort Irwin's rotational unit field maintenance area water recycling plant

Focus on the Field

Lake City Army Ammunition Plant—A Leader in Pollution Prevention

Lake City Army Ammunition Plant, Missouri, was not only instrumental in the development of DoD's lead-free "green" bullet, but also initiated a resale program for scrap aluminum and fired shell cases that will result in 194 tons of material being sold for re-use instead of incineration.

The plant also has a highly successful recycling program, which generated 3,756 tons of material for recycling from FY 2000 to FY 2001. The plant successfully tested and approved non-volatile organic compound substitutes for methyl chloroform, an ozone-depleting compound, in both its pyrotechnic mix and ammunition case mouth waterproofing for 5.56mm, 7.62mm, and .50 caliber ammunition.

Lake City reduced Toxic Release Inventory chemical releases and off-site transfers by 55 percent, hazardous waste generation by 80 percent, and solid waste generation by 51 percent.

Bio-Based Products

The Department of Defense is committed to increased procurement of environmentally preferable products, such as recycled materials, energy efficient products, and, increasingly since enactment of the Farm Bill, biobased products. The Department is supporting the Federal Buy-Bio initiative by participating in the Buy-Bio Interagency Work Group and partnering with the Offices of the Federal Environmental Executive and Federal Procurement Policy. DoD participated in an October 2002 Buy-Bio panel discussion with industry representatives. This initiative satisfies the guidance established in the FY 2003 Appropriations Act Senate Appropriations Committee Report 107- 213.

To date, much of DoD's purchasing of biobased products has been limited to biobased fuels, or biofuels. Compared to conventional petroleum diesel, biofuels, especially biodiesel, produce significantly less air pollution while reducing the Department's consumption of petroleum. The Defense Energy Support Center has reported that requests for biodiesel increased from 1.4 million gallons during the last contracting period to 5.2 million gallons for the upcoming period.

In the future, DoD plans to increase purchases of biobased products as an integral part of the Department-wide plan for increased procurement of all categories of environmentally preferable products. The plan will establish a systematic approach to "green procurement" that is based on DoD policy and is effectively implemented, measured, and managed at the field level. Two data tracking tools, one in the Federal Procurement Data System for contract purchases and one under development by Defense Logistics Agency (DLA) , are intended to assist in monitoring purchases. These tools provide field-level commanders and managers with vital information to assist them in tracking green procurement performance. The FPDS-based tool is currently in its first year of operation.

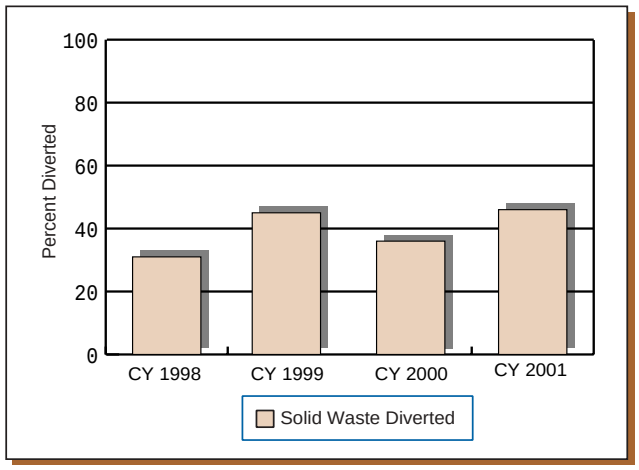
The Department is actively engaged with the Office of Federal Procurement Policy and the Office of the Federal Environmental Executive to begin using the FPDS data to improve green procurement across the Federal government. The DLA-based tool is currently in its third year of operation, but DLA is reworking it to accommodate Departmental needs for added interfaces and Internet access.

SOLID WASTE DIVERSION AND RECYCLING

DoD diverts materials from the waste stream through recycling whenever it is cost-effective and feasible. In 1998, DoD established a solid waste diversion rate measure of merit to calculate the rate at which installations divert nonhazardous solid waste from entering a disposal facility. DoD's goal is to attain a 40 percent diversion rate by the end of 2005.

In calendar year (CY) 2001, DoD diverted 46 percent of its solid waste (Figure 6). The percentage of solid waste diverted in a year varies depending on the amount and types of solid waste generated as well as location because recycling markets vary around the country. DoD's solid waste diversion also depends on the Department's schedule for demolishing buildings, which produces the most solid waste. As a whole, DoD avoided spending over $94.4 million by employing integrated solid waste management practices. This includes reducing the amount of solid wastes entering landfills or incinerators and thier associated costs.

Figure 6
Solid Waste Diversion



FOCUS ON THE FIELD

FORT RILEY WINS FIRST ANNUAL AMERICA RECYCLES DAY AWARD

Waste Management, Inc., acknowledges communities that promote America Recycles Day (ARD). In April 2002, Waste Management recognized Fort Riley with the First Annual America Recycles Day Award. Fort Riley, along with ten other organizations across the nation, received this award for outstanding ARD activities. The award money was used to support Fort Riley's Troop Incentive Program, which rewards military units for their recycling efforts.

The Directorate of Environment at Fort Riley sponsored 14 separate America Recycles Day events. Fort Riley officials, elementary school students, military personnel, and members of the surrounding communities were invited to participate in the events. These events promoted the benefits of recycling and buying recycled-content products. The events included the grand opening of a new recycling collection point, a "buy green" product identification initiative at the commissary and post exchange, and an elementary school poster contest.

FOCUS ON THE FIELD

ARMY NATIONAL GUARD TESTS NEW EFFICIENT VEHICLE BATTERY

The Texas Army National Guard is testing a vehicle battery that reduces waste while saving money. The Optima battery provides higher voltage than conventional batteries by using an innovative spiral construction. The Optima battery is expected to last for 12 years—nearly five times longer than a traditional battery. The Optima contains battery acid within a fiberglass casing, ensuring no "free-acid" spills or leaks into the environment or safety risk to personnel. This makes the battery able to perform in any position and requires less maintenance.

Additionally, the battery weighs only 40 pounds, which is approximately half the weight of a traditional battery, making it easier to handle. This battery also requires fewer manufacturing materials. The Optima costs about $100 per battery. Although this initial cost is more than a traditional battery, in the three years since the batteries were installed for testing, only a few have had to be changed out. All regular batteries would have already been replaced in this time frame. The Optima battery has saved an estimated $27,000, or $60 per battery.

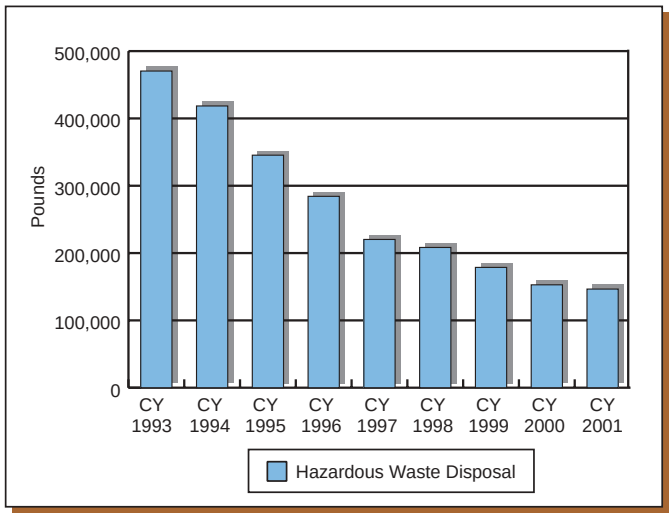
Hazardous Waste Reduction and Disposal

DoD is committed to reducing hazardous waste. From CY 1993 to CY 2001 (the last year for which data are available), the total amount of hazardous waste disposed of declined by 64 percent (Figure 7). DoD personnel continue to identify opportunities for reducing hazardous waste generation.

Innovative Painting Technologies

Painting aircraft is an important function within both the Navy and Air Force. Different paints can affect the speed of an aircraft, its fuel efficiency, and whether it is detectable by radar. Pneumatic paint guns are widely used at Naval Air Systems Command maintenance facilities. Each time a painter finishes a task or completes a shift, he or she must clean the paint gun to keep it in top working order. The paint gun is cleaned with paint thinning solvent to remove any paint remaining in the gun.

Figure 7
Hazardous Waste Disposal



Focus on the Field

Luke Air Force Base Wins Environmental Achievement Award

U.S. Environmental Protection Agency Region 9 recognized Luke Air Force Base, Arizona, for environmental excellence with a 2002 Environmental Achievement Award.

Other achievements include—

- Reclamation of more than 500,000 gallons of water per day for reuse to water the base golf course, parks, and athletic fields
- Reduction of the cost of Luke's solid waste program by more than a $1 million over the last two years through profits generated by selling recyclable materials and through cost avoidance resulting from alternatives to landfill disposal
- Expansion of its recycling and reuse program to include used motor oil, aircraft tires, plastics and glass. A contractor grinds the glass into material for reuse as substitute sand on golf courses, filter material in swimming pools, and landscaping materials on roadways.

"Getting this award is another great example of how Team Luke's dedication and care for the people and the environment lives on to make things better for the future of Luke and the surrounding community," said Brigadier General Steve Sargeant, 56th Fighter Wing commander.

Paint gun cleaning stations are often available to make the cleaning process easier and more efficient. Paint gun cleaning stations provide a location where new and recycled thinner is available for cleaning. Regardless of the methods used for paint gun cleaning, any maintenance activity that paints frequently uses a lot of thinner just to clean equipment. Estimates indicate that from one-half gallon to two gallons of thinner is used to clean a single paint gun one time. A large corrosion control shop can use hundreds or thousands of gallons of thinner over the course of a year, and can spend thousands of dollars on paint thinner to clean paint guns.

Some of the most common paint thinners used in aviation maintenance are a blend of high volatile organic compound (VOC) solvents, which are heavily regulated and costly to use. These solvents are Hazardous Air Pollutants (HAPs) under the Clean Air Act, and are subject to reporting under Toxic Release Inventory (TRI) provisions of the Emergency Planning and Community Right-to-Know Act.

In order to reduce the cost and regulatory compliance burden associated with paint gun cleaning, Naval Air Depot Cherry Point, North Carolina, has transitioned most of its paint gun cleaning operations to a low-VOC, non-HAP paint gun cleaning solvent and associated reclamation station.

The new solvent is called EP-921. The paint gun cleaning station provides a readily available supply of EP-921 solvent that is continuously recycled through a closed loop filtration system that extends the useful life of the solvent. Once it is fully implement at Cherry Point, the EP-921 solvent and the reclamation station combination is expected to pay for itself in less than one year and save almost $70,000 annually. In addition to the cost savings, the new technology and solvent will significantly reduce hazardous materials, hazardous waste, and TRI chemicals, as well as improve the safety and health of the painters.

Navy's Shipboard Hazardous Materials List

The Navy's Shipboard Hazardous Material List (SHML) is a list of hazardous materials authorized for shipboard use. The goal of the SHML Reduction Program is to reduce the number of hazardous materials the fleet uses through elimination of multiple hazardous materials used for the same purpose and, where possible, substitution of a non-hazardous material.

At the beginning of the SHML Reduction Program in FY 1999, the Navy catalogued a baseline of 7,000 authorized items on the SHML. The number of items on the SHML increased as new ships, shipboard equipment, and shipboard products came into service and as a greater number of hazardous material feedback reports from site visits by off-ship supply teams were submitted. Consequently, the baseline of authorized items on the SHML increased to 8,200.

The Navy has systematically reduced the number of authorized hazardous materials on the SHML to 3,730 by eliminating redundant materials and those materials not representing valid shipboard requirements, and substituting non-hazardous materials. The Navy will continue its hazardous materials reduction efforts and will be adding safety and health requirements to existing military specifications and commercial item descriptions to ensure only the safest products are used onboard.

Navy's Submarine Hazardous Material Inventory and Management System

The goal of the Submarine Hazardous Materials Inventory and Management System (SHIMS) is to provide a consolidated approach to improving control of hazardous materials on submarines, reduce overall hazardous materials requirements, reduce hazardous materials life-cycle costs, enhance crew health and safety, and improve operational readiness.

SHIMS is a comprehensive inventory and management software tool that aids in the effective management of hazardous materials. Based on successful shipboard test and evaluation, the Navy began implementing

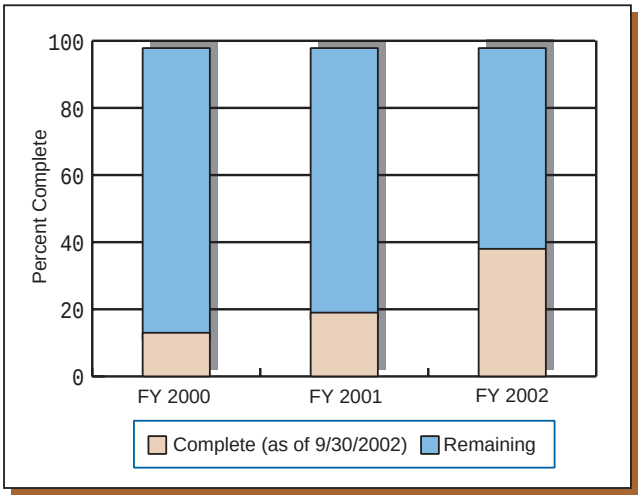
SHIMS fleet-wide in March 2001. As of September 30, 2002, SHIMS has been implemented onboard 52 of 73 submarines.

Pollution Prevention Afloat Program

The Pollution Prevention Afloat (P2A) Program applies commercial, off-the-shelf technologies to reduce hazardous material procurement, handling, storage, labor, and disposal costs and to improve the health and safety of personnel on Navy ships. Implementing the P2A Program will reduce the need for hazardous materials by 35 percent annually on large ships, such as aircraft carriers, and by 30 percent on surface combatants, such as destroyers.

As of September 30, 2002, 59 ships were outfitted with P2A equipment. The P2A Program is approximately 38 percent complete, an increase of 20 percent compared to FY 2001. The Navy expects to outfit all remaining ships and conclude the P2A Program by FY 2006.

Figure 8
Pollution Prevention Afloat Program



Through reductions in the use of hazardous materials, the Navy expects to annually reduce the removal of hazardous materials from a ship by an average of 11,000 pounds from large ships and by an average of 7,000 pounds from smaller ships. The Navy anticipates that the combined reductions will save 5,622 annual labor hours for large ships and 1,690 annual labor hours for smaller ships. Figure 8 illustrates the Navy's progress in meeting its P2A objectives.

Protecting the Ozone Layer

The stratospheric ozone layer protects the Earth from harmful ultraviolet radiation. In 1987, over 140 countries around the world agreed to limit and eventually ban the production of ozone-depleting substances. Under the Montreal Protocol, halon production was banned on December 31, 1993, and chlorofluorocarbon (CFC) production ceased on December 31, 1995. The requirements of the Montreal Protocol are promulgated in the Clean Air Act addressing the procurement requirements and policies for federal agencies.

Compliance with Annex V to the International Convention for the Prevention of Pollution from Ships

The Act to Prevent Pollution from Ships (APPS) implements Annex V to the International Convention for Prevention of Pollution from Ships (MARPOL 73/78). APPS permits the use of pulpers and shredders on Navy surface ships to discharge non-plastic solid waste, such as paper, cardboard, food waste, metal, and glass, in MARPOL Annex V Special Areas. The three currently designated Special Areas are the Baltic Sea, the North Sea, and the Antarctic Area.

The Navy has completed the installation of pulpers and shredders on all ships required to have this equipment to ensure compliance with APPS. Seven ships, which the Navy plans to decommission by December 31, 2005, will not receive pulpers or shredders. These ships operate under published standards which prohibit the discharge of solid waste in MARPOL Annex V Special Areas.

During the past year, all discharges from U.S. Navy ships operating within MARPOL Annex V Special Areas complied with APPS.

DoD has eliminated or found alternatives for a significant number of ODSs. However, DoD still relies on some types of ODSs in existing mission-critical systems, such as fire control and explosion suppression in weapon systems, rocket booster bonding, and cooling of electronics.

DoD has developed many environmentally preferable technologies to replace or make ODSs less harmful. Through proper equipment maintenance and implementation of the DoD-wide ODS recovery program, DoD reduces emissions from mission-critical equipment.

The Defense Logistics Agency manages DoD's ODS Reserve, which was the first major ODS bank established anywhere in the world. The ODSs from this reserve are available solely for the military's mission-critical needs when alternatives are not technically or economically feasible. DoD's ODS Reserve now serves as a model for other ODS reserve programs. DLA works with governments and militaries throughout the world to help them establish and operate their own ODS reserves.

Navy's CFC to HFC Conversion Program

Chlorofluorocarbons play critical roles in daily ship operations. They are used in chilled water air conditioning plants that cool mission-critical combat systems and personnel, as well as refrigeration plants on almost every Navy surface ship and submarine. Under the Hydrofluorocarbon (HFC) Conversion Program, the Navy is replacing the ODSs CFC-12 and CFC-114 with ozone-friendly HFC-134a and HFC-236fa, respectively.

Figure 9
HFC-134a Conversion Program

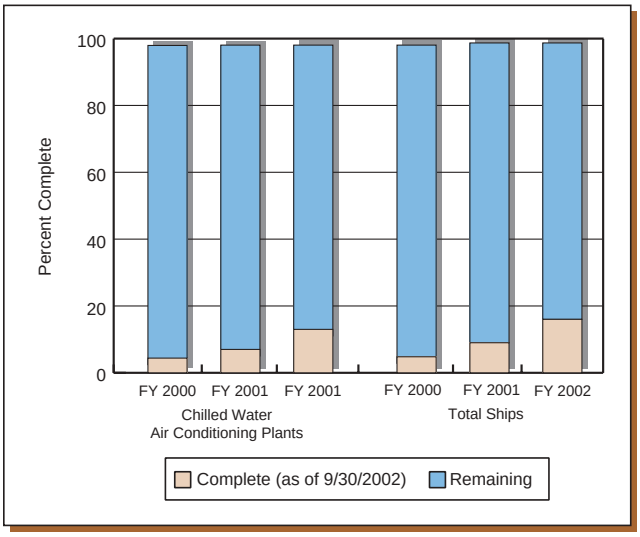
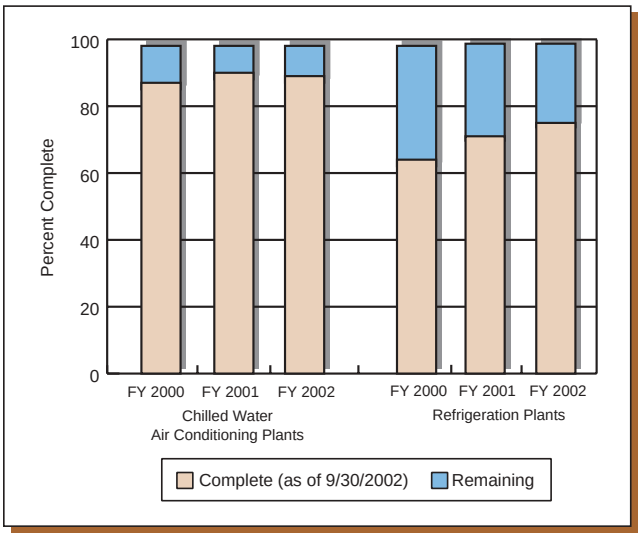


Figure 10
HFC-236fa Conversion Program



As of September 30, 2002, the Navy had converted CFC-12 to HFC-134a in 263 of 296 chilled water air conditioning plants and 482 of 639 refrigeration plants. These conversions make 207 ships CFC-12-free. In addition, the Navy has converted 62 chilled water air conditioning plants on 17 ships from CFC-114 to HFC-236fa. Submarine cooling systems will continue to use CFC-114 supplied from these surface ship conversions and from the ODS Reserve until they are retired from service.

The Navy is scheduled to complete CFC-12 conversions by 2005 and CFC-114 conversions by 2013. Figures 9 and 10 illustrate the Navy's progress in completing the CFC-12 and CFC-114 conversions, respectively.

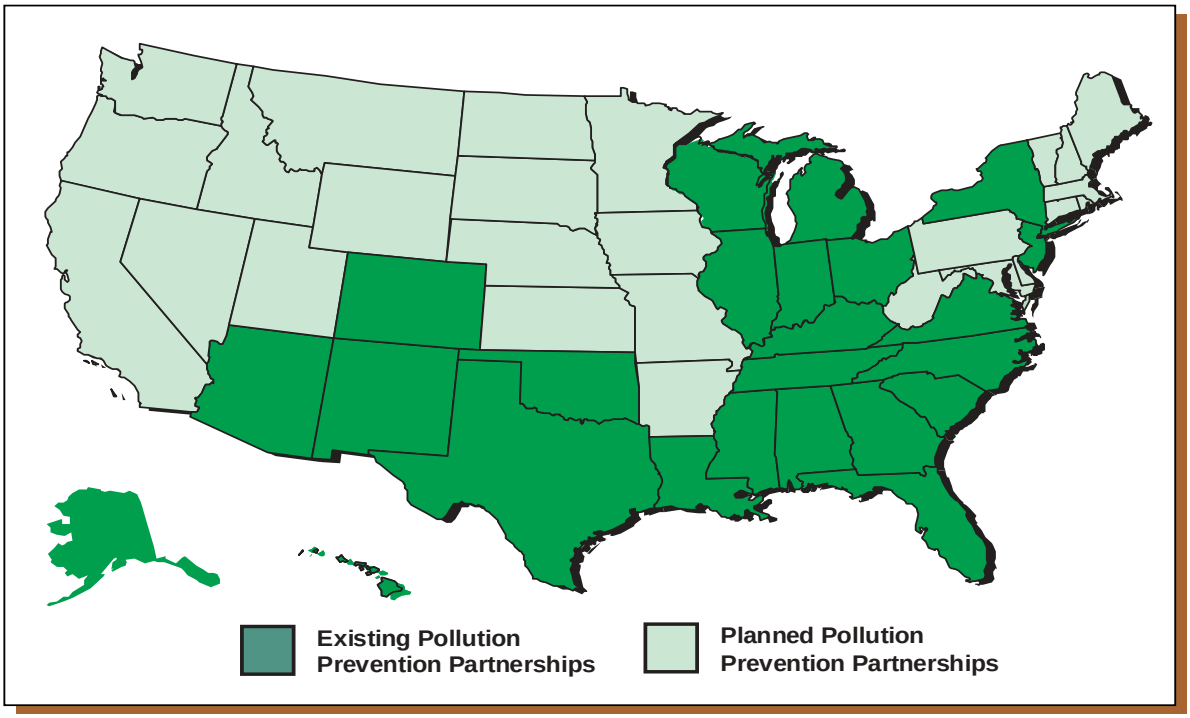
Pollution Prevention Partnering

Building pollution prevention partnerships with the states has become the standard way of doing business. Partnering creates opportunities for sharing experiences and solutions to environmental problems. By working with the states and other entities, DoD can improve the environment and enhance military readiness. Figure 11 illustrates DoD's commitment to developing pollution prevention partnerships with the states.

DoD establishes and maintains partnerships between state agencies and Federal facilities. Each partnership is different, designing a program that meets its unique requirements. DoD regional environmental coordinators are responsible for facilitating pollution prevention partnerships.

These pollution prevention partnerships have been so successful that state agencies and DoD installations are expanding them to cover other areas in Environmental Quality, such as environmental management systems (EMSs) and compliance.

Figure 11
Pollution Prevention Partnerships



Focus on the Field

C-130 Paint Shop Reduces the Use of Hazardous Materials

The C-130 Hercules system program office paint shop at Robins Air Force Base, Georgia, has developed an innovative approach to reducing the use of hazardous materials and encouraging employee participation in the process.

The paint shop began an initiative in October 2001 of ball system "de-painting." The installation conducted 24 instructional classes on the system and, from those, 44 new initiatives were suggested. As a way to keep all employees informed, bulletin boards with the current status of the items under way and those that were completed are posted around the buildings. Employee suggestion forms, as well as monthly newsletters featuring those workers whose suggestions have been implemented, are also available.

Changes in the C-130 Hercules system program office paint shop have reduced the amount of volatile organic compounds emitted, increased production and worker safety, and saved more than $373,800 annually in the process. The paint shop also reduced the number of needed tools, materials, and equipment by 39 percent; reduced the number of chemicals used from nine to three; and reduced storage space by 228 square feet.

2002 Closing the Circle Award Winners

The White House presents the Closing the Circle awards annually to recognize Federal facilities and employees for efforts that result in significant contributions to protecting the environment. E.O. 13101, "Greening the Government through Waste Prevention, Recycling, and Federal Acquisition," sets the criteria for the awards. The award categories include Affirmative Procurement, Environmental Outreach, Environmental Management Systems, Environmental Preferability, Model Facility, Recycling, and Sowing the Seeds for Change. DoD won 12 out of the 26 award categories.

The numerous awards that military individuals and installations have won are evidence of DoD's successes in pollution prevention. Figure 12 lists DoD award winners and describes the award-winning projects.

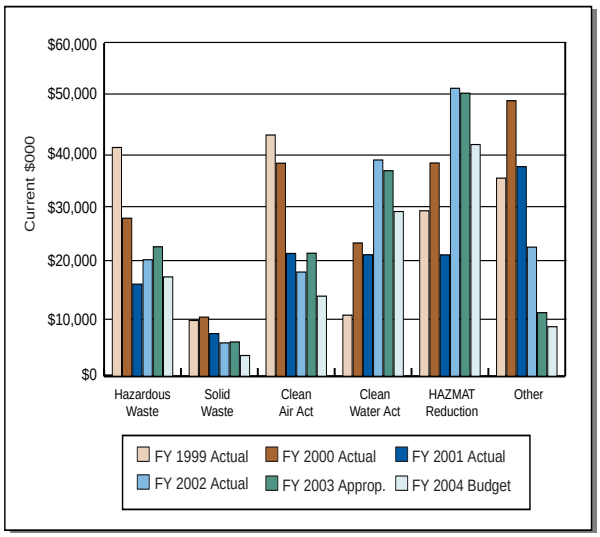
Figure 12
FY 2002 DoD Award Winners

AWARD CATEGORY	RECIPIENT	TITLE OF NOMINATION
Affirmative Procurement	Naval Air Engineering Station, Environmental Department	"Affirmative Procurement Program at Naval Air Station Lakehurst"
Education and Outreach	Fort Campbell, Environmental Division (Department of Defense, U.S. Army)	"Fort Campbell Education and Outreach, Where Knowledge Generates Action"
Environmental Management Systems	Ms. Mary L. Wenzel, Naval Surface Warfare Center, Carderock Division (Department of Defense, U.S. Navy)	"Developing and Implementing an Innovative Cradle to Grave ISO 14001 Certified EMS for a Navy Ship Acquisition Program"
	Naval Air Systems Command (NAVAIR) Depot North Island, Environmental Improvement Team (Department of Defense, U.S. Navy)	"Focusing on Continuous Environmental Improvement at the NAVAIR Depot, North Island"
Environmental Preferability	Hanscom Air Force Base, 66 Civil Engineering Environmental Flight (Department of Defense, U.S. Air Force)	"Environmental Preferability Initiatives at Hanscom Air Force Base"
Model Facility Demonstration	Fort Campbell, Public Works Environmental Division, Pollution Prevention Branch (Department of Defense, U.S. Army)	"The Pollution Prevention Operations Center, the Future of Environmental Management"
	Ship Intermediate Maintenance Activity (SIMA) Mayport, Environmental Division (Department of Defense, U.S. Navy)	"SIMA Mayport – A Model Facility Demonstration"
	Naval Undersea Warfare Center Division, Newport, Model Facility Demonstration Team (Department of Defense, U.S. Navy)	"Going Beyond Compliance"
Recycling	Naval Air Station Whidbey Island, Navy Whidbey Recycle (Department of Defense, U.S. Navy)	"Recycling and Composting is Our Way of Life"
	Mr. William R. Meinerding, 88th Air Base Wing/Environmental Management Office (Department of Defense, U.S. Air Force)	"Outstanding Leadership of Wright-Patterson Air Force Base's Solid Waste and Recycling Program"

FY 2002 Budget Execution

During FY 2002, DoD invested $226 million in pollution prevention activities. DoD invested about $66 million, or 29 percent, of its pollution prevention budget in recurring costs, including managing recycling programs and TRI reporting. DoD invested the remaining $160 million, or 71 percent, in one-time, nonrecurring projects, such as purchasing new pollution prevention equipment (Figure 13).

Figure 13
DoD Budget Summary
Pollution Prevention Nonrecurring



DoD's FY 2002 Pollution Prevention Program execution was 6 percent more than pollution prevention investments in FY 2001, allowing for inflation. Much of the increase is due to the investment in the Marine Corps programs to find pollution prevention solutions to compliance issues. DoD's Pollution Prevention Program continues to focus on hazardous waste material reduction, Clean Water Act (CWA) provisions, and hazardous waste requirements.

During FY 2002, DoD invested 33 percent of pollution prevention nonrecurring funds in reducing the use of hazardous materials, including releases reported under the TRI program; 13 percent in managing hazardous waste; 12 percent in reducing Clean Air Act pollutants, including the use of ODSs; 4 percent in managing municipal solid wastes and establishing recycling and composting programs; and 24 percent in reducing CWA pollutants. DoD invested the remaining 14 percent in other efforts, including preparing pollution prevention and source protection plans for drinking water resources.

FY 2004 Budget Request

DoD is requesting $173 million to fund the Pollution Prevention Program in FY 2004. The Pollution Prevention Program budget will decline because of the completion of many shipboard pollution prevention initiatives and one-time projects. Investments in pollution prevention over the long term reduce compliance costs and threats to DoD resources (Figure 14).

Figure 14
DoD Budget Summary
Pollution Prevention vs. Compliance