

INTRODUCTION

Pollution can interfere with the Department of Defense's (DoD) ability to manage its vital resources—people, land, and facilities. Pollution can adversely affect DoD's mission by harming military personnel and affected communities, property DoD holds in the public trust, and the facilities required to maintain readiness. Because cleaning up and reversing the effects of pollution is costly, DoD's goal is to prevent pollution at the source rather than to employ expensive cleanup and control technologies. A successful pollution prevention program can also avoid enforcement actions and reduce operating costs.

Through source reduction and recycling, pollution prevention programs assist DoD in—

- Enhancing operational readiness by minimizing environmental challenges
- Reducing health and safety risks to personnel and nearby communities
- Improving processes and increasing productivity and quality.

The pollution prevention approach reduces the use of hazardous materials, which reduces water pollution, air pollution, and hazardous waste. DoD uses pollution prevention as its preferred method to achieve compliance and is integrating the practices into all activities. Pollution prevention is critical to the success of DoD's mission.

GOALS

Executive Orders (E.O.s) 13101, 13148, and 13149 direct Federal agencies to prevent pollution; reduce waste generation; eliminate the use of ozone depleting substances; conserve energy and natural resources; reduce the use of toxic substances; and purchase recycled, energy-efficient, and environmentally preferable products. DoD's goals for meeting the requirements of these E.O.s include—

POLLUTION PREVENTION



- Promoting pollution prevention as the preferred means of achieving environmental compliance
- Protecting human health and the environment by reducing the use of hazardous materials
- Integrating cost-effective pollution prevention practices into all DoD operations and activities to reduce costs without impacting performance of DoD's mission.

DoD makes every effort to prevent pollution while maintaining mission readiness. These efforts include reducing the use of ozone depleting substances and participating in initiatives to use renewable fuels at DoD facilities and in its vehicles. DoD continues to make progress in meeting and exceeding these goals.

STRATEGY

By preventing pollution at the source, DoD can avoid possible compliance issues that can impact the mission. DoD recognizes that preventing pollution from impacting its facilities, ranges, natural resources, and local communities is the right thing to do.

HIGHLIGHTS OF ACTIVITIES IN FY 2001

DoD's Pollution Prevention Program concentrates on developing and implementing pollution prevention technologies and processes at the installation level. DoD is proud of its accomplishments in pollution prevention, as detailed below.

AFFIRMATIVE PROCUREMENT

DoD continues to meet the requirements of 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 focuses on purchasing these types of products. Affirmative procurement is important to DoD for several reasons. First, purchasing recycled products improves waste management practices. Second, as technology develops, revenues from recycling programs will increase and costs for recycled products

will decrease. This is because less waste is sent to landfills and fewer virgin materials are used to manufacture products. Military installations purchase products made from recycled content whenever possible. DoD ensures that personnel at all levels are committed to and trained in procuring and using these products.

The Defense Logistics Agency's (DLA's) re-refined motor oil program, which began in 1995 at Defense Supply Center Richmond (DSCR), Virginia, is an outstanding example of the effectiveness of affirmative procurement. The use of re-refined oil by the DoD Components and Federal civilian agencies continues to grow. In Fiscal Year (FY) 1999, DSCR's total sales for re-refined oil were approximately \$1.7 million. In FY 2001, sales exceeded \$3.6 million, a 110 percent increase in just 2 years. During the same period, sales of re-refined motor oil as a percent of DoD's total motor oil sales increased from 27 percent to 51 percent. Using re-refined oil also reduces DoD's dependence on foreign oil.

SOLID WASTE DIVERSION AND RECYCLING

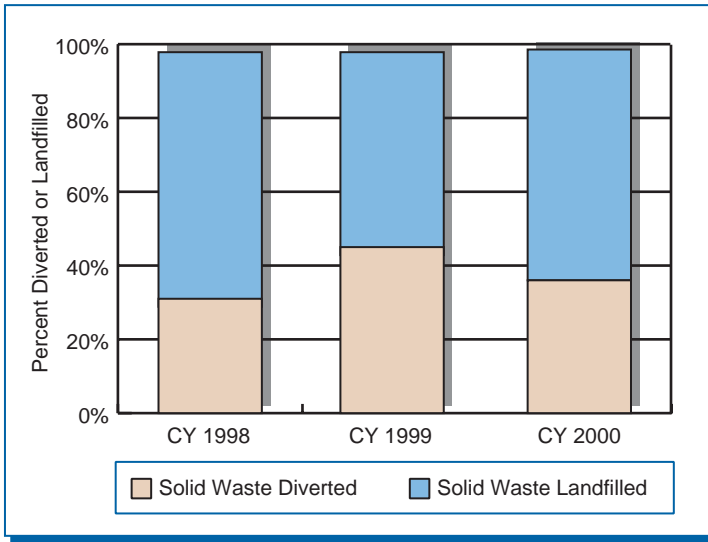
In 1998, DoD established a solid waste diversion rate measure of merit to measure the rate at which nonhazardous solid waste is diverted from entering a disposal facility. DoD's goal was to attain a greater than 40 percent diversion rate by the end of 2005. In calendar year (CY) 1999, DoD attained a 45 percent diversion rate, meeting the goal five years early.

TIRE RETREADING FOR FLEET VEHICLES—A PROCUREMENT SUCCESS

Every year more than 240 million tires are disposed of in the United States. Tire disposal is expensive because the tires must be ground into small pieces before being placed in a landfill. Purchasing retread tires reduces tire disposal and the need to manufacture new tires. Retreading tires at least twice can reduce the cost of tires by 50 percent. Retread tires are not only cost-effective, they are also reliable and safe. The U.S. Army Tank Automotive Command saves an average of \$100 per tire by using retread tires.

Using retread tires also reduces the quantity of solid waste disposed of in landfills and incinerators. One of the greatest environmental benefits of using retread tires is oil conservation. Manufacturing one new truck tire requires 22 gallons of oil. Most of the oil is in the casing, which is reused in the retreading process. As a result, only 7 gallons of oil are required to produce a retread tire—a reduction of nearly 70 percent.

**Figure 8
Solid Waste Diversion**



In CY 2000, DoD diverted 36 percent of its solid waste (Figure 8). The percentage of solid waste diverted varies from year to year depending on the amounts and types of solid waste generated. The solid waste diversion rate also depends on DoD’s schedule for demolishing buildings, which produces the most solid waste. DoD’s ability to divert solid waste depends on location because recycling markets vary around the country.

RECYCLING

DoD recognizes the unique opportunities and challenges that exist for recycling. DoD installations have developed innovative ways of recycling and reusing materials. The

Department focuses on recycling programs that are cost-efficient, often generating enough revenue to make the recycling program self-sufficient.

Efforts at Anniston Army Depot (ANAD) in Alabama are a prime example of how DoD works to reduce or eliminate solid waste. ANAD’s recycling operation is one of several components of an integrated solid waste management approach that includes reintroducing materials into operating processes; finding profitable and qualified markets for materials resale; collecting, processing, and transporting recyclable materials in an economical and safe manner; and reducing overhead operating expenses through cost-avoidance processes. ANAD’s recycling program annually collects—

- More than nine million pounds of aluminum, brass, copper, steel, and aluminum cans
- More than three million pounds of wood products, including pallets, boxes, telephone poles, cross ties, wood chips, and sawdust
- Approximately 1.1 million pounds of corrugated cardboard, mixed paper, newspapers, magazines, and other paper products
- Approximately 679,000 gallons of used oil; 17,500 pounds of compost; and 96,500 pounds of plastics and miscellaneous items.

ANAD annually generates nearly \$600,000 through waste reduction efforts and avoids nearly \$575,000 in solid waste disposal and management costs. In FY 2001, ANAD achieved a solid waste diversion rate of more than 56 percent. Proceeds from sales of recyclable materials are first used to pay program operating expenses. ANAD uses any remaining funds to support environmental health and safety programs, and other activities.

ASPHALT RECYCLING

Little Rock Air Force Base (AFB) in Arkansas recycled a 10-foot-high pile of more than 3,000 tons of excess asphalt. This resulted in a profit and cost-avoidance of more than \$100,000 for the base recycling program and eliminated an airfield obstruction. The buyer purchased the asphalt for \$7,500 to make parking lots. The base did not have to remove an estimated 122 dumpster loads of nearly 2,500 cubic yards of asphalt. This one reuse effort recycled more than six million pounds in two days. In addition, because the airfield obstruction was removed, the base is in complete compliance with airfield criteria.

BUILDING REUSE AND RECYCLING

As DoD's force structure is reduced and realigned, the Department has many excess buildings. Some of these buildings are still usable, while some contain materials that can be reused, such as structural wood, windows, and doors. Disposing of or demolishing these buildings is often expensive. The Assistant Secretary of the Army (Installations and Environment) (ASA(I&E)) initiated discussions with Habitat for Humanity and other agencies, such as the Department of Housing and Urban Development and the U.S. Environmental Protection Agency (EPA), to determine if it is possible to move houses scheduled for demolition off an installation or to deconstruct the buildings to salvage structural materials. These efforts will better support the housing needs of local communities instead of disposing of the buildings in landfills.

Building deconstruction and reuse of materials supports Habitat for Humanity's "RE-store" initiative, a program that raises funds by selling used construction materials. This is an opportunity to turn Army waste into community resources, and potentially save demolition and disposal costs.



Reclaimed southern pine lumber can be sold as flooring for \$3 to \$11 per board foot.



World War II-vintage barracks at Fort Chaffee, Arkansas, contain now-valuable timber.

The ASA(I&E) is also involved in building reuse and recycling demonstration projects at Redstone Arsenal, Alabama; Fort Hood, Texas; and Fort Chaffee, Arkansas. DoD relocated 88 excess duplexes at Redstone Arsenal to the community, which is more cost effective than traditional disposal methods. The Austin RE-store has proposed a pilot project at Fort Hood to evaluate deconstruction and reuse options, as opposed to disposal in landfills, and is partnering to remove more than 600 buildings at Fort Chaffee. While logistical issues still need to be resolved, these demonstration projects may form a template for a wider program.

MISSILE RECYCLING

The U.S. Army Aviation and Missile Command (AMCOM) is setting a national precedent by establishing a first-of-its-kind Missile Recycling Capability (MRC). The MRC is an alternative to traditional open burn and open detonation destruction processes, allowing the Army to safely dispose of obsolete and over-aged tactical missiles. The MRC is designed to be a total resource recovery and recycling technology. It can be used to recycle the vast majority of missiles in the Army, Navy, Air Force, and North Atlantic Treaty Organization inventories. The MRC will significantly reduce environmental impacts associated with demilitarizing more than 600,000 of the Army's tactical missiles over the next 10 to 15 years.

AMCOM has shown that recycling tactical missile components and energetic material is technically feasible, cost-effective, and environmentally friendly. The MRC technology is being transitioned from pilot projects to a prototype unit for use at Army missile storage depots. Recycling missiles makes missile hardware and energetics available for reuse in both commercial and military applications. The MRC will also minimize pollution, waste, and environmental damage at DoD facilities by avoiding incineration and water polluting processes.

COMPLIANCE WITH ANNEX V TO THE INTERNATIONAL CONVENTION FOR THE PREVENTION OF POLLUTION FROM SHIPS

Under the direction of the Chief of Naval Operations, the Navy has pursued a comprehensive program to comply with the Act to Prevent Pollution from Ships (APPS), which implements Annex V to the International Convention for

the Prevention of Pollution from Ships (MARPOL 73/78). MARPOL 73/78, as implemented by APPS, prohibits discharging plastics overboard from ships anywhere in the ocean. However, 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.

To comply with MARPOL Annex V, the Navy has equipped all required ships with plastic waste processors. APPS requires that the Navy install plastic waste processor on ships that are at sea for extended periods. The processors enable these ships to collect, process, and store plastic waste for long periods. APPS does not require the Navy to install the processors on smaller surface ships, such as minesweepers and patrol craft. These ships operate close to shore and are not usually underway for extended periods.

MARINE CORPS RECRUIT DEPOT, PARRIS ISLAND, RECEIVES POLLUTION PREVENTION AWARDS

The Carolina Recycling Association awarded Marine Corps Recruit Depot, Parris Island, South Carolina, the “Outstanding In-House Waste Reduction Program for Business and Government” award. In 2000, the Parris Island Recycle Center made a profit of \$170,000, and recycled, reused, or diverted from landfills over 1,600 tons of material, saving the Depot \$88,000 in disposal fees. EPA Region 4 also awarded Parris Island its Environmental Merit Award for excellence in pollution prevention and recycling programs.

Parris Island has successfully combined pollution prevention and recycling techniques to protect the environment and support DoD’s mission. Some of the installation’s successful endeavors included—

- Replacing the base’s aging dry cleaning machines with new dry-to-dry machines, which eliminates 9,000 pounds of hazardous waste annually
- Purchasing 7 new solvent tanks for the automotive and machine shops, recovering 100 percent of the cleaning solvent, recycling it internally, and continually delivering clean solvent
- Installing a medical waste treatment unit at the Branch Medical Clinic to eliminate the need for off-site disposal of infectious medical waste
- Expanding the textile recycling program by collecting 1.5 tons of textiles
- Adding a tub grinder to manage all of the landscape and land-clearing debris from the Depot—more than 125 tons of mulch have been reclaimed for productive use
- Recycling or reusing 141 tons of pallets.

POLLUTION PREVENTION THROUGH CLEANING SHIPBOARD EQUIPMENT AND SYSTEMS

Seawater heat exchangers onboard ships and submarines develop a thin layer or coating, called scale, which makes them less effective during normal ship operations. Descaling (removing the scale in thin layers) these exchangers using traditional methods was labor intensive and exposed the workers to hazardous materials. The process generated 80,000 pounds of hazardous waste from each cleaning, placed the workers at risk from handling hot acid, required considerable personal protective equipment, and generated significant waste disposal costs.

The Navy evaluated a descaling process that uses a chemical process to descale individual heat exchanger equipment and entire submarine cooling systems. The process uses commercially available products that are safer and less hazardous than traditional methods and is more cost-effective than mechanical cleaning.

When compared to the old mechanical cleaning process, this new process saves an average of \$521,000 for each submarine system and \$70,000 for each single heat exchanger cleaned and saves operations, maintenance, and life-cycle costs. These processes were incorporated into a Universal Industrial Process Instruction for use in Navy shipyards.

Pulpers grind paper, cardboard, and food waste into a biodegradable slurry that is safely discharged into the open ocean. Shredders break up metal and glass into small pieces. The shredded materials are then placed into burlap bags that are discharged overboard and rapidly sink. During the past year, all discharges from U.S. Navy ships operating within MARPOL Annex V Special Areas complied with APPS.

The Navy has completed installing pulpers and shredders on 99 percent of the required ships. Nine ships decommissioning by December 31, 2005 will not receive pulpers or shredders. The Navy plans to install a pulper and shredder on one additional ship in Calendar Year (CY) 2002. This ship as well as those ships being decommissioned by the end of CY2005 operate under published standards, which prohibit the discharge of solid waste in MARPOL Annex V Special Areas.

SOURCE REDUCTION

Source reduction means reducing or eliminating the use of hazardous materials. By reducing or eliminating the use of these materials from the beginning or at the source, DoD reduces water and air pollution and hazardous waste disposal.

NAVY'S SHIPBOARD HAZARDOUS MATERIALS LIST

In FY 1999, the Navy initiated a Shipboard Hazardous Materials List (SHML) Reduction Program to reduce the number of hazardous materials the fleet uses. The SHML is a list of hazardous materials that are authorized for use on ships. The Navy instituted the SHML Reduction Program to eliminate multiple hazardous materials used for the same purpose and, where possible, substitute a non-hazardous material.

The Navy reduced the allowable number of hazardous material items by 61 percent, from the original 7,000 items to 2,730 in the initial phase of work. This has resulted in a 66 percent reduction of items stocked in the Hazardous Material Centers onboard ships, which reduced waiting time and workload.

Under the second and final phase, which began in September 2000, the Navy expects to reduce the number of items by an additional 15 percent. During this phase, the Navy will eliminate overlapping requirements and associated materials. The Navy is also adding safety and health requirements to existing

ADUSD(E) VISITS THE NAVY'S CONSOLIDATED HAZARDOUS MATERIALS REUTILIZATION AND INVENTORY MANAGEMENT PROGRAM (CHRIMP)



Mr. John Paul Woodley, Jr., ADUSD(E) (right), and Ms. Jehdia Bottinelli (left), regional director for CHRIMP, stand in front of some of the hazardous materials stored at the facility.

Mr. John Paul Woodley, Jr., Assistant Deputy Under Secretary of Defense (Environment) (ADUSD(E)), recently visited the Consolidated Hazardous Material Reutilization and Inventory Management Program (CHRIMP) at Naval Submarine Base New London, Connecticut. Ms. Jehdia Bottinelli, regional director for CHRIMP, gave Mr. Woodley a tour of the facility.

After meeting with Ms. Bottinelli and her team, Mr. Woodley was intrigued with the environmentally friendly operation that saves the Navy millions of dollars each year. "I had heard lots about [CHRIMP], but it was really important for me to see it first hand. The level of commitment shown to this project is really impressive," he said.

Mr. Woodley said that CHRIMP's cost-efficiency and user-friendly service sets an excellent example for similar DoD facilities. "There is no question that we will continue to move in this direction. After years of careful study, it is obvious to all of us that good, sound business sense and environmental management are one in the same," said Woodley. In FY 2001, the CHRIMP facility saved Navy Region Northeast more than \$1 million through efficient purchasing and material consolidation.

military specifications and commercial item descriptions to ensure that only the safest products are used onboard.

NAVY'S SUBMARINE HAZARDOUS MATERIAL INVENTORY AND MANAGEMENT SYSTEM

The goal of the Submarine Hazardous Material Inventory and Management System (SHIMS) is to provide a consolidated approach to improve control of hazardous materials on submarines, reduce overall hazardous material requirements, reduce hazardous material life-cycle costs, enhance crew health and safety, and improve operational readiness. The effort began in FY 1999 when the Navy assessed the applicability of the Shipboard Hazardous Materials Control and Management Program to submarines. SHIMS is a comprehensive inventory and management software tool that the Navy installs on a ship's computer network so that multiple users can view and update hazardous materials inventories simultaneously. Based on successful shipboard tests and evaluations, the Navy began implementing SHIMS Fleet-wide in March 2001.

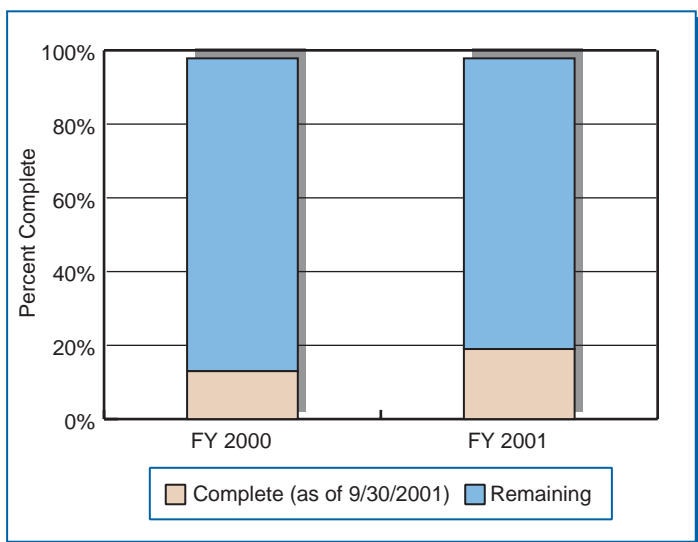
POLLUTION PREVENTION AFLOAT PROGRAM

In FY 1999, under the direction of the Chief of Naval Operations, the Navy began carrying out an intensive, accelerated Pollution Prevention Afloat (P2A) Program. The 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, 2001, 31 ships were outfitted with P2A equipment. The Navy expects to outfit all remaining ships and conclude the P2A Program in FY 2005. By reducing the use of hazardous materials, the Navy expects to reduce offloads (the removal of hazardous materials from a ship) by 31,000 pounds from large ships

**Figure 9
Pollution Prevention Afloat Program**



and by 19,000 pounds from smaller ships. Reducing offloads not only decreases the need to remove excess hazardous materials from a ship, but also the need to remove items that may contain those materials (such as rags soaked in a hazardous liquid) and the need to complete associated administrative paperwork. The Navy anticipates that the combined reductions will save 6,570 annual labor hours for large ships and 3,356 annual labor hours for smaller ships. Figure 9 illustrates the Navy's progress in meeting its P2A objectives.

PROTECTING THE OZONE LAYER

Chlorofluorocarbons (CFCs) have been implicated in the destruction of the Earth's protective stratospheric ozone layer. As a result of international treaty (Montreal Protocol on Ozone Depleting Substances) and U.S. legislation (1990 Clean Air Act (CAA) Amendments), domestic production of CFCs permanently ceased on December 31, 1995.

CFCs are part of a group of ozone depleting substances, or ODSs, called Class I ODSs. As defined by the CAA, Class I ODSs are chemicals with an ozone depleting potential of 0.2 or greater. Ozone depleting potential is the amount of ozone depletion a substance can cause. Class I ODSs have the highest potential to deplete the ozone layer. DoD relies on many types of Class I ODSs, including CFCs and halon, to control fires, suppress explosions, and cool weapon systems and electronics in mission-critical activities.

Because the United States no longer produces CFCs, DoD must find a substitute for or eliminate the use of ODSs. The primary focus of DoD's ODS Elimination Program is to eliminate the use of ODSs in new equipment. As a result, DoD successfully developed—

- The world's first aircraft with halon alternative systems
- The first halon alternative tactical vehicle crew explosion protection system
- ODS-free ships with high-efficiency non-ODS chillers and halon alternative fire suppression systems
- ODS-free weapon systems.

DoD is also using recovery, recycling, and other management practices to reduce ODS use in and emissions from existing equipment. These

management practices include modified maintenance, testing, and training procedures to reduce or eliminate ODS emissions. DoD has also identified and implemented ODS alternatives in existing equipment. However, retrofitting existing equipment is expensive, and can take up to ten years or longer.

As an alternative to developing expensive retrofit technologies to reduce or eliminate the use of ODSs, DoD banks or reserves Class I ODSs. DLA manages DoD's ODS Reserve, which was the first major ODS bank established anywhere in the world. DLA works with governments and militaries throughout the world to help them establish and operate their own ODS reserves. The ODSs from this reserve are available solely for the military's unique needs.

DoD's OZONE DEPLETING SUBSTANCE RESERVE RECEIVES POLLUTION PREVENTION AWARDS

The ODS Reserve, managed by Defense Supply Center Richmond (DSCR), Virginia, and operated by Defense Distribution Depot Richmond, has allowed DoD to recycle ODSs from less critical applications to be used only in mission-critical systems. The program has received widespread recognition during the last several years, receiving awards from DoD, EPA, and the White House. DSCR's Ozone Depleting Substance Reserve is also a semi-finalist in the 2001 Innovations in American Government Program Awards.

As a result of efforts to replace and conserve ODSs, DoD has reduced the use of Class I ODSs by 95 percent since 1992. In 1992, DoD used more than ten million pounds of ODS. In 2001, DoD's ODS Reserve issued about 550,000 pounds, much of which will eventually be returned to the Reserve as it is recycled or removed from service in future years. ODS reserves ensure uninterrupted military operations until all equipment is retired at the end of its useful life or converted during a long-term retrofit programs.

NAVY'S CFC TO HFC CONVERSION PROGRAM

CFCs 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 rapidly replacing the ozone depleting substances CFC-12 and CFC-114 with ozone friendly HFC-134a and HFC-236fa, respectively.

As of September 30, 2001, the Navy had converted CFC-12 to HFC-134a in 261 of 291 chilled water air conditioning plants and 451 of 634 refrigeration plants. In addition, the Navy has converted 35 chilled water air conditioning plants on 9 ships from CFC-114 to HFC-236fa. These conversions make 192 ships CFC-12-free. 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 10 and 11 illustrate the Navy's progress in completing the CFC-12 and CFC-114 conversions, respectively.

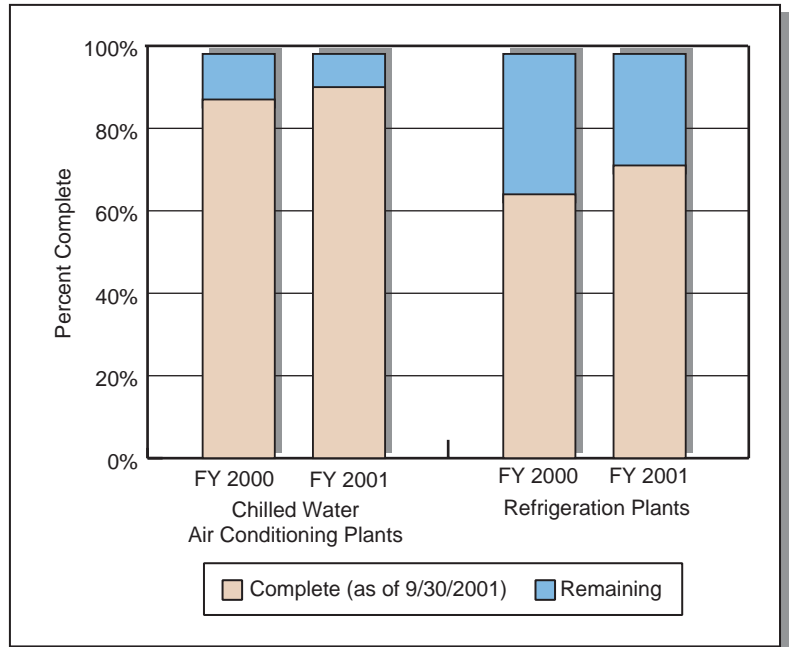
HAZARDOUS WASTE REDUCTION AND DISPOSAL

DoD is committed to reducing hazardous waste. From CY 1993 to CY 2000 (the last year for which data are available), the total amount of hazardous waste disposed of declined by 68 percent (Figure 12). DoD personnel continue to identify opportunities for reducing hazardous waste generation.

NEW COATING AND PAINTING TECHNIQUES REDUCE POLLUTANTS

DoD has developed several new coating and painting techniques to reduce pollution at its facilities. At Fort Riley, Kansas, the Directorate of Public Works purchased a new water-based paint for striping roads. The paint is safer to use

**Figure 10
HFC-134a Conversion Program**



**Figure 11
HFC-236fa Conversion Program**

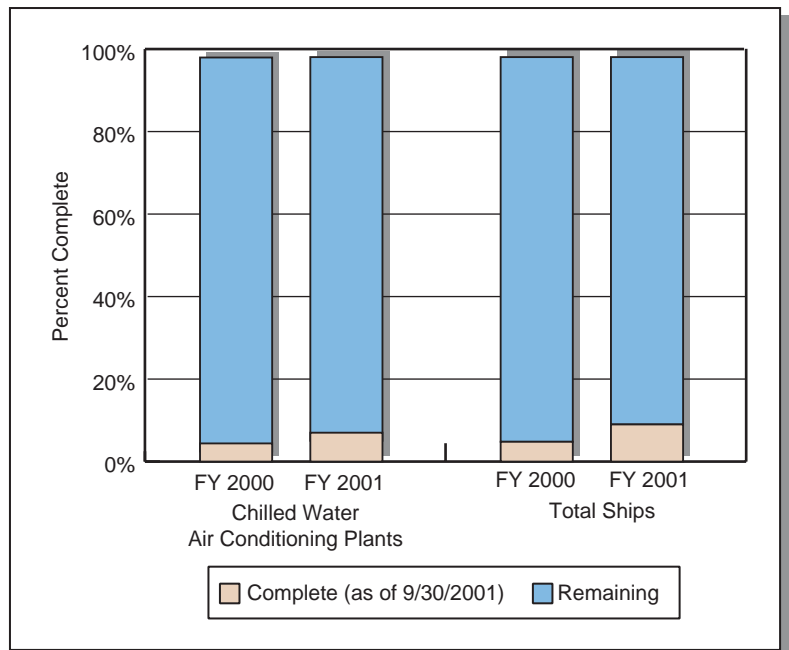
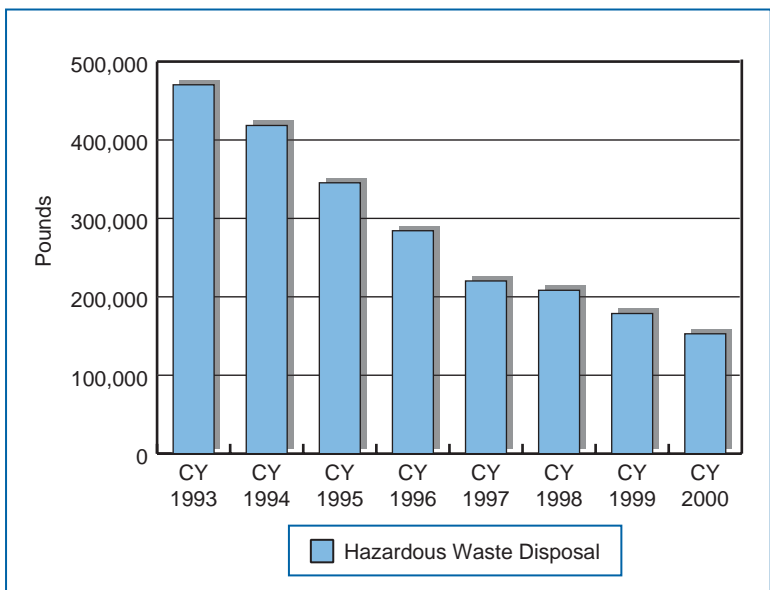


Figure 12
Hazardous Waste Disposal



because it contains no hazardous lead or chromium, thus protecting the environment and promoting a safe and healthy workplace for Fort Riley personnel. DoD’s use of water-based paint decreases volatile air emissions and worker exposure to hazardous materials. Cleaning up the paint requires only soap and water. Replacing oil-based paints with water-based paints also eliminates the use of flammable cleaning solvents and the need for a hazardous waste accumulation point. These factors reduce costs for purchase, storage, sampling and disposal of paint. The Kansas Department of Transportation has been using this water-based paint and has

determined it is as durable as oil-based paint.

The new powder paint facility at Hill AFB, Utah, saves time and reduces waste. Using a non-hazardous, fine paint powder and static electricity, technicians can paint aircraft parts in half the time it takes using conventional wet painting methods. Compared to conventional wet-painting methods, there is little

waste involved with the powder-paint process, and workers do not have to dispose of excess paint, solvents, and rags. An exhaust system installed in the paint booth sucks all the dust particles into a filter. If the collected powder is clean, it will be reused. If the powder is not usable, it is baked into a cube of plastic and is properly disposed of.



BEFORE (left): Typical shipboard paint locker reflects dispensing, storage, and cleanup issues.

AFTER (right): Prototype paint dispensers being evaluated on USS Arctic control paint quantities issued and significantly reduce cleanup requirements.

In the past, Fort Rucker, Alabama, used chemicals such as methylene chloride to remove paint

from helicopters prior to repainting, a method known as wet stripping. This process was effective but generated hazardous waste that had to be disposed of at a significant cost. The installation has since established a bead blasting facility. Instead of using chemicals, the post strips away old aircraft paint with

POLLUTION PREVENTION OPTIONS FOR FLAMELESS RATION HEATERS

The Army issues millions of flameless ration heaters (FRHs) every year but concerns arise when unused heaters are disposed of in the regular trash. EPA placed discarded, unused heaters in its “reactive” hazardous waste category since they contain compounds that heat up when activated by water. Therefore, installations where FRHs are used must establish procedures to ensure unused heaters are not thrown out with the regular trash. This is especially important during training exercises when a large number of unused heaters may be disposed of. Used heaters do not pose the same hazards. At the end of the heating cycle, all that remains are inert substances that have no adverse effects on human health or the environment.



Flameless ration heaters could be classified as hazardous waste if not used to heat food.

The Army’s Soldier Systems Center is working on a long-term solution to the FRH challenge by developing two new ration heaters that do not release a flammable gas. These are now going through rigorous health risk and regulatory assessments to ensure environmental safety and compliance. Both heaters performed well during field evaluations at Fort Wainwright, Alaska, and personnel found them as acceptable as current FRHs. The manufacturers and the Army continue to work on weight, cost, performance, and mass-production issues. The Center will report on its analysis of these issues, as well as compliance with environmental regulations, to a board of joint Military Service representatives in FY 2002. In the near term, an instruction label on new FRHs will advise personnel not to place unused heaters in the trash.

FIRST CFC-FREE DDG-51-CLASS SHIP



Mr. Joe DiDominic (left) and Mr. Dan DiVigense of NSWCCD-SSES Code 9153 look at the new microprocessor-control panel on AC plant #2 aboard the USS Laboon (DDG-58).

The USS *Laboon* (DDG-58) became the first DDG-51-Class ship free of CFCs in December 2000. DDG Class ships are guided missile destroyers that help safeguard larger ships in a fleet or battle group. Under the HFC Conversion Program, the *Laboon* converted from CFC-114 to HFC-236fa. In addition, the *Laboon’s* two refrigeration plants were converted from CFC-12 to HFC-134a and new refrigerant leak monitors were installed.

These conversions will eliminate the Navy’s dependence on CFC-114, which is no longer produced. The HFC-236fa conversions also improve the performance of the air conditioning plants by reducing noise, increasing efficiency (reducing operating costs and increasing range), increasing cooling capacity and reliability, simplifying maintenance and operation, and providing the ability to add future enhancements for reduced manning.



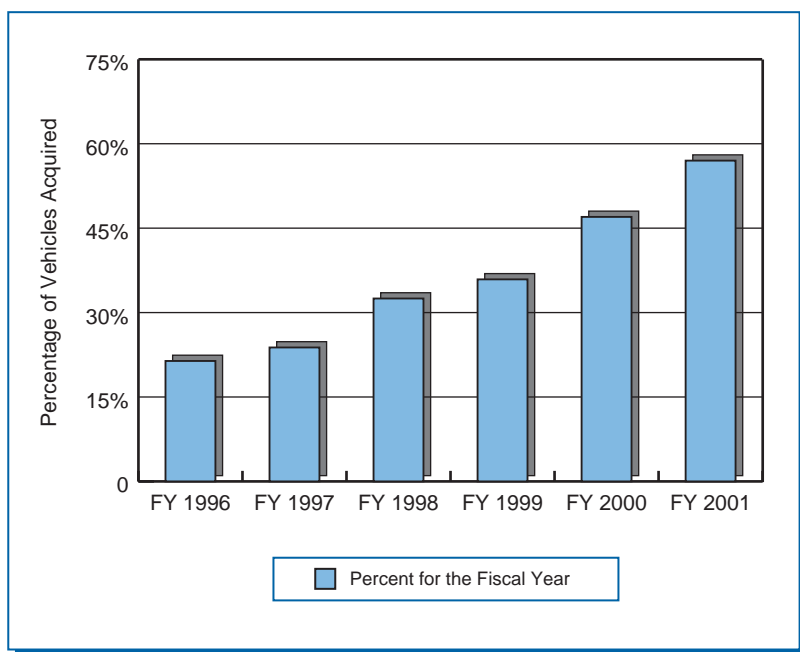
Naval Aviation Depot North Island, California, is using the Laser Touch paint gun to paint aircraft.

plastic beads the size of sand grains that are blasted out of a high pressure hose. The beads remove the paint on impact. Recovery tracks collect the used beads and run them through a system of separators. These separators remove paint particles, foreign objects, and beads too small for reuse and deposit them in drums that are later tested for the presence of hazardous materials. Beads that pass through the separators can be reused up to four times. Other applications for bead blasting include paint removal on tanks and artillery equipment. Since the program began, hazardous waste disposal from paint removal at Fort Rucker has decreased 90 percent.

Naval Aviation Depot North Island, California has been using the Laser Touch, a laser mounted on a manual paint gun, in order to increase the efficiency of painting aircraft. The Laser Touch increases paint transfer by 11 percent. The system makes painting more efficient by ensuring that the paint is applied at the correct distance from the surface and by making sure the spray gun is exactly perpendicular to the surface. By enabling more thorough paint application and increased accuracy, the Laser Touch reduces the amount of

paint used by 31 percent. This also reduces hazardous air emissions and solid waste generated.

Figure 13
Percent of Alternative Fueled Vehicles Acquired



ALTERNATIVE FUELS, ALTERNATIVE FUELED VEHICLES, AND FUEL EFFICIENCY

In response to the Energy Policy Act of 1992 and E.O. 13149, "Greening the Government Through Federal Fleet and Transportation Efficiency," and to reduce dependence on foreign oil, DoD continues to acquire (purchase, lease, or convert) alternative fueled vehicles (AFVs). The Energy Policy Act originally required that 25 percent of the vehicles that DoD acquires each year be AFVs. This percentage has increased since 1996.

Currently, the Energy Policy Act requires that 75 percent of the vehicles that DoD acquires each year be AFVs. In FY 2001, 57 percent of the vehicles that DoD acquired were AFVs (Figure 13). The greatest challenge in acquiring AFVs is the availability of the types of vehicles the military needs and alternative fuel refueling infrastructure.

BIODIESEL

Substitutes for traditional fossil fuels for vehicles include biodiesel, methanol, ethanol, natural gas, and fuel cells. DoD recently identified biodiesel as America's fastest-growing alternative fuel that can be used in place of traditional diesel and will operate in diesel engines without modifications or retrofitting. Compared with petroleum-based diesel fuel, biodiesel reduces up to 90 percent of air toxins, up to 30 percent of hydrocarbons, up to 20 percent of carbon monoxide, and up to 15 percent of particulate matter. Biodiesel has also passed CAA Health Effects testing and is a registered alternative fuel with EPA. The Department of Agriculture has also determined that increased use of biodiesel will have a positive impact on the U.S. farm economy.

Beginning in 2001, all diesel-powered government vehicles at Scott AFB, Illinois will test an alternative fuel, known as B20 biodiesel, made from 20 percent soybean oil and 80 percent diesel fuel. The Air Force and DoD are conducting

DSCR'S VEHICULAR BATTERY CONSIGNMENT PROGRAM

DSCR operates an innovative logistics program known as the Combat/Tactical Vehicular Battery Consignment Program. This program covers military bases nationwide and benefits the customer and the environment in three key ways—

- **Safety.** Customers receive wet, charged batteries delivered directly to their work site instead of separately ordering dry batteries and battery acid. The new process is safer for battery shop personnel who no longer risk exposure to acid spills and fumes.
- **Lower Cost.** The contractor consigns a 30-day inventory of wet, charged batteries at eligible customer sites. Users do not pay for these batteries until they are put into service. Customers therefore have no lag-time between ordering and receiving batteries. Readiness is improved, inventory costs are avoided, and personnel are able to devote more time to their core mission.
- **Recycling.** The new batteries are 99 percent recyclable and are made from 87 percent previously recycled materials. Military installations participating in the battery consignment program dispose of less hazardous waste in landfills than those outside the program.

DSCR's program saves money, reduces battery activation time, and results in a safer work environment. The amount of hazardous waste handled, stored, and disposed of is also greatly reduced.



Ray Clark, former Principal Deputy Assistant Secretary of the Army (Installations and Environment) (left), and Lt. Gen. Lawson W. Magruder III, former U.S. Army Forces Command Chief of Staff, review a commercially available AFV.

this one-year test to determine if using B20 will help reduce pollution and contribute to the national goal of cutting down the use of imported oil by 20 percent. Commercial use has shown that biodiesel fuel produces significantly lower exhaust emissions than other petroleum-based diesel and costs are comparable to petroleum-based fuels.

The Defense Energy Support Center (DESC) has awarded the government's first-ever long-term contract for B20. Although the DESC is a Defense Agency, it is the recognized expert in the procurement of fuels for both the civilian and military agencies of the Federal government.

Under the contract, DESC is making 1.5 million gallons of B20 available at 17 government sites throughout the United States.

The move streamlines the Federal procurement process and allows government fleets to obtain B20 just as easily as petroleum-based diesel. Both military and civilian fleets will be able to obtain B20 at various fueling sites throughout the country. Military bases taking part in the program include Marine Corps Base (MCB) Camp Lejeune, North Carolina, and Marine Corps Air Station Miramar, California. The Military Services will use biodiesel in commercial administrative vehicles.

"This is a landmark award and a milestone in the history of biodiesel," said Gene Gebolys, President and founder of World Energy Alternatives. "The government is leading by example, throwing its weight behind an

RECIPIENT OF ALTERNATIVE FUELS, CONSERVATION, AND AWARENESS AWARD

Clarence Boyd, Equipment Manager at the Defense Supply Center Columbus (DSCC), Ohio, received the Alternative Fuels, Conservation, and Awareness Award from the General Services Administration in FY 2001. The General Services Administration established this government-wide award in accordance with the Energy Policy Act of 1992 to recognize Federal employees who demonstrate the strongest commitment to the use of alternative fuels and fuel conservation in Federal motor vehicles. Mr. Boyd increased DSCC's fleet from no AFVs in 1999 to 44 in FY 2001, exceeding the 75 percent target acquisition. DSCC maintains 33 percent of their fleet as AFVs. Mr. Boyd's partnering efforts with Columbia Gas of Ohio also resulted in the construction of a compressed natural gas rapid fill station within five miles of DSCC.

SHARED USE VEHICLE MANAGEMENT SYSTEM LEADS TO SUCCESSFUL USE OF EVs

Although today's electric vehicle (EV) battery technology limits vehicle range, the technology can be used for applications beyond conventional passenger car use. For example, recent studies at Vandenberg AFB, California, suggest that a high percentage of base commute patterns are less than 20 miles per day. Recognizing that EVs could be used for these shorter commute distances and that additional AFV technology enhances fleet capabilities led Vandenberg to develop and implement a Shared Use Vehicle Management System (SUVMS).

The concept of the SUVMS is resource sharing—maintaining a variety of AFVs in the fleet allows users to choose a vehicle that is best suited for their commute. The SUVMS combines communication and information management technologies. The combination produces an automated vehicle reservation system, an accounting system to calculate cost per use, and an automated maintenance scheduling system. The key advantage of this system is that fewer vehicles are required to meet transportation demands, thus reducing the overall general-purpose fleet size. As a result, cost-effective, environmentally friendly modes of transportation are easily integrated into the general-purpose fleet without adverse impacts to mission readiness. The operations and maintenance cost savings alone for the EV fleet is estimated at \$177,000 over three years.

To date, nearly 300 base personnel have received EV-user training, and more than 150 personnel have test driven an EV. The results of evaluation surveys indicated that over 65 percent of the drivers preferred an EV to a conventional gasoline-fueled vehicle. Based on these results, Vandenberg chose sites for permanent infrastructure and EV assignments; infrastructure planning is currently underway. Vandenberg AFB currently has 29 charging stations to service 22 vehicles.

Vandenberg can share the lessons learned from the SUVMS throughout government and private fleet communities. The SUVMS is a showcase for implementing state-of-the-art technology at a reduced cost. The results and lessons learned will provide future projects with the basic program concept, design, and development; project schedule and ramp-up time; and recommended partnerships and co-funding sources.

American-made, renewable fuel. Surplus crops such as soybeans could immediately replace hundreds of millions of gallons of petroleum diesel per year. These contracts are a huge leap forward in re-establishing America's energy independence."

IMPROVING FUEL EFFICIENCY

In May 2001, the Defense Science Board issued the *Final Report of the Defense Science Board Task Force on Improving Fuel Efficiency of Weapons Platforms*. Military fuel consumption for aircraft, ships, ground vehicles, and facilities makes DoD the single largest consumer of petroleum in America. For example, more than 70 percent of the tonnage required to move today's Army into battle is fuel. The Air Force is DoD's largest fuel consumer. In-air refueling is so expensive that the Air Force spends 85 percent of its annual fuel budget to deliver just 6 percent of its jet fuel—in the air.

The Task Force carefully examined research that DoD had conducted on fuel efficiency and concluded that the Department already possesses many technologies to improve fuel efficiency for all platforms. While work still remains, DoD will ultimately reap significant benefits as forces can be more easily deployed and vehicles can travel farther. In addition, because of reduced costs, DoD will be able to free up funds and physical space to deploy more forces and equipment.

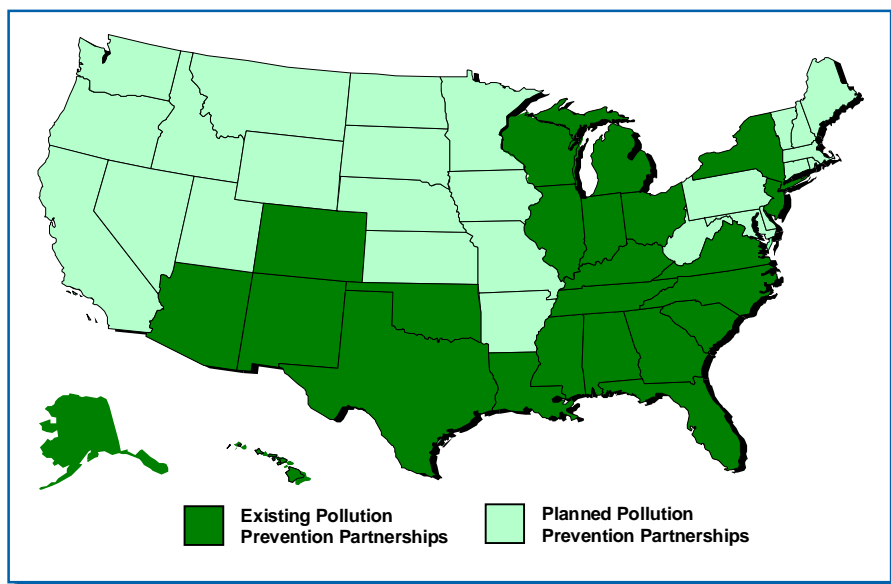


An example of a commercially available NEV.

ELECTRIC VEHICLES

DoD is also using electric vehicles (EVs) to reduce the use of fossil fuels. At Luke AFB, Arizona, the Air Force is using 380 neighborhood electric vehicles (NEVs) to reduce emissions and lower petroleum consumption. NEVs are low-speed EVs designed to meet specific standards for speed and safety for on-road use. NEVs reach speeds of 25 miles per hour (mph) and are legal to operate on roads with posted speed limits up to 35 mph. They come in a variety of configurations and can carry two or four passengers. At Luke AFB, NEVs have effectively replaced standard petroleum-burning sedans and pickup trucks normally used around the base.

Figure 14
Pollution Prevention Partnerships



POLLUTION PREVENTION PARTNERING

Building pollution prevention partnerships with the states has become the standard way to do business—partnering creates opportunities for sharing experiences and solutions to environmental problems. By working with the states, DoD can improve the environment and enhance military readiness. Figure 14 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. The partners design a program that meets its unique requirements. For example, as a result of partnering initiatives, Patrick AFB, Florida, was recognized for its outstanding pollution prevention successes, including—

- Converting batteries to a gel cell eliminated acid use
- Purchasing retread tires for light-duty vehicles saves \$10,000 per year
- Reusing 57,675 cubic yards of demolition debris to construct a landfill cap and converting 60 million pounds of concrete into road base aggregate saved \$265,000
- Developing a solvent recovery program, resulting in distillation of 1,200 gallons, saves \$20,000 per year
- Retrofitting 32 facilities to natural gas eliminated the need to store 67,000 gallons of heating fuel underground and reduced nitrous oxide and sulfur dioxide emissions
- Using an aggressive recycling program reduced the hazardous waste disposal of 2,600 pounds of soiled rags per year
- Recycling 60,000 pounds of steel saved \$46,000.

DoD, the Department of Energy, the National Aeronautics and Space Administration, and the New Mexico Environmental Department formed a pollution prevention partnership. This partnership focuses on sharing information on a wide range of pollution prevention issues, including clarifying interpretations of existing regulations and encouraging pollution prevention, reuse, and recycling. The group has also formed an alliance with the Southwest Public Recycling Association. The program has realized many successes, including revised interpretations of regulations, increased cooperation with the enforcement community to prevent pollution, and the exchange of technology.

The Wisconsin/DoD Pollution Prevention Alliance completed and distributed its charter in 2001, officially launching its initiative to make pollution prevention a top priority in dealing with environmental issues at military facilities in the state. The Alliance's goals include establishing a pollution prevention exchange and creating training programs to increase

TEXAS RECYCLING CO-OP INCREASES RECYCLING PROFITABILITY

The Air Force's Air Education and Training Command at Randolph AFB, Texas, had been searching for ways to help base solid waste programs reduce waste and increase recycling revenues. As a result, Randolph joined the Texas Co-op, a partnership of the Central Texas Recycling Association (a non-profit organization based on cooperative marketing); Laughlin and Lackland AFBs; Goodwill Industries; and Fort Sam Houston. The Texas Co-op has enabled recycling programs to increase materials collected and sold by almost 200 percent in 1 year, from 1,876 tons in 1999 to more than 5,300 tons in 2000. The revenue generated has also increased by—

- 625 percent at Randolph AFB
- 205 percent at Laughlin AFB
- 127 percent at Lackland AFB.

environmental awareness among military employees and personnel. DoD participants in the Alliance include Fort McCoy; the Army, Air Force, and Navy Reserves; the Wisconsin Army National Guard; and the Wisconsin Air Guard. Non-DoD participants include EPA Region 5, the Wisconsin Department of Natural Resources, and the Wisconsin Solid and Hazardous Waste Education Center.

2001 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 are Affirmative Procurement, Environmental Outreach, Environmental Management Systems, Environmental Preferability, Model Facility, Recycling, and Sowing the Seeds for Change.

The numerous awards that military individuals and installations have won are evidence of DoD's successes in these areas. Recognizing DoD's many accomplishments, the 2001 Closing the Circle award categories were separated into military and civilian achievements. Having its own category raised the bar for DoD and its future environmental innovations. Figure 15 lists DoD award winners and describes the award-winning projects.

Figure 15
FY 2001 DoD Closing the Circle Award Winners

AWARD CATEGORY	RECIPIENT	TITLE OF NOMINATION	DESCRIPTION
Affirmative Procurement	U.S. Army Transportation Center, Fort Eustis Environmental and Natural Resources Division	Affirmative Procurement at Fort Eustis	Fort Eustis was the first installation in Virginia to establish an affirmative procurement program policy as part of its integrated Solid Waste Management program. The Fort supports Federal affirmative procurement goals by purchasing re-refined oil and other products, buying recycled reminder, and green construction initiatives.
Environmental Outreach	U.S. Army Center for Health Promotion and Preventative Medicine, Aberdeen—Pat Rippey and Beth Martin	Pioneers for Affirmative Procurement	This team developed the Army's first affirmative procurement training program, which has educated more than 530 Army civilian and military personnel on the requirements E.O. 13101. Personnel from other Military Services and Federal agencies have also attended the training.
	Naval Undersea Warfare Center Division, Newport—Environmental Division	Education, The Key to Meeting the Goals of E.O.s 13101 and 13148	Division Newport promotes the importance of every employee's environmental responsibilities through an innovative environmental awareness program and a fully implemented EMS. The division has an active outreach program to cultivate relations within the surrounding community. These environmental awareness and community outreach programs promote the goals and objectives of E.O.s 13101 and 13148.
Environmental Management Systems (EMS)	Naval Air Engineering Station, Lakehurst, Environmental Branch	ISO 14001 Program at Naval Air Engineering Station, Lakehurst	Through implementation of an ISO 14001 EMS, Lakehurst formalized and improved environmental quality at the Station. Incorporating ISO 14001 was directly responsible for the Station's acceptance into the New Jersey Department of Environmental Protection (NJDEP) Silver Track Program, which benefits Lakehurst by generating recognition for the facility while also providing a single point of contact at NJDEP for permit processing and reporting.
	Naval Undersea Warfare Center Division, Newport—ISO 14001 Implementation Team	Environmental Management Systems	The ISO 14001 Implementation Team successfully implemented an innovative and effective EMS at Division Newport, the first DoD activity to register a complete site to the ISO 14001 standard. At the request of the ODUSD(I&E), the Division participated in a multi-lateral professional consultation with Argentina and Canada on implementing EMSs in military organizations.
	I Corps and Fort Lewis, U.S. Army Public Works, Fort Lewis—Public Works	"Greening the Government" through System Advances in Environmental Management Leadership	Fort Lewis is the first Army installation and largest active military facility to strategically enhance its existing programs by implementing a certified systems approach to environmental management. Benefits already realized include cost savings and avoidance in excess of \$1.0 million, reduction in air emissions of 155,510 pounds annually, and source reduction of 178,458 pounds of hazardous chemicals used each year.
Environmental Preferability	Radford Army Ammunition Plant Pollution Prevention Team	Pollution Prevention Pays: Hazardous Waste Reductions and Cost Savings	Through the efforts of the Pollution Prevention Team, quantities of hazardous materials and hazardous waste have been reduced by over 10 million pounds, while toxic release inventory emissions were decreased by 144,000 pounds, meeting the requirements of the Pollution Prevention Act, E.O. 12856, and Radford's own internal hazardous waste reduction objectives.
	Tobyhanna Army Depot	Conversion from Coal to Natural Gas at Tobyhanna Army Depot	Tobyhanna entered into an Energy Savings Performance Contract that safeguards the depot's mission by providing reliable heat and process steam, and efficient lighting. It reduced annual energy consumption by 42%, water usage by 20%, and air emissions by 60% to meet the requirements of E.O.s 13123 and 13148.

**Figure 15
FY 2001 DoD Closing the Circle Award Winners (continued)**

AWARD CATEGORY	RECIPIENT	TITLE OF NOMINATION	DESCRIPTION
Model Facility	Team Grand Forks AFB	Team Grand Forks AFB's "Environmental Showcase"	Grand Forks AFB maintains a proven track record of superb leadership, innovative technology application, and effective environmental accomplishments, which have exceeded Air Force goals in waste prevention, recycling, affirmative procurement, and innovative sustainable change.
Recycling	Barksdale AFB—Mr. Ralph Sterba	Recycle Non-Hazardous Waste at Barksdale AFB	Through diligence, leadership, management skills, and good customer relations as recycling coordinator, Mr. Sterba significantly enhanced the recycling program and improved participation at Barksdale AFB. He established a 59% diversion rate and recycled more materials than landfilled. He also established and led special projects, including one to crush and reuse over 54,000 tons of concrete from a new runway project, resulting in savings of more than \$1.5 million.
	Eglin AFB—Team Eglin Recycling Center	Recycling Today for the Future	For the second straight year, Eglin's Recycling Center and Pollution Prevention program were recognized as Best in Air Force Materiel Command, primarily due to all units and personnel participating in and purchasing recycling goods to help Close the Circle. All of the base's excess profits are returned to the Eglin community in the form of morale, wellness, and recreation projects, which gives an extra incentive to participate.
Sowing the Seeds for Change	MCB Camp Lejeune—Environmental Quality Assessment Division, Environmental Management Department	Environmental Sustainability Program at MCB Camp Lejeune	Camp Lejeune launched a comprehensive environmental sustainability initiative that began with a precedent-setting study to enable the installation to become a leader in environmental sustainability. The primary objective of the study is to develop an Environmental Sustainability Guidance Manual to aid department managers in planning, developing, and implementing sustainable operations over the next 20 to 50 years. EMD employees have participated in a training session to educate staff on how to include sustainability criteria in project planning. Incorporating environmental sustainability into installation's day-to-day operation will help to minimize impacts on the environment, reduce operational costs, and preserve quality of life.

FY 2001 BUDGET EXECUTION

During FY 2001, DoD invested \$212 million in pollution prevention activities. DoD invested about \$84 million, or 40 percent, of its pollution prevention budget in recurring costs, including managing recycling programs and Toxic Release Inventory (TRI) reporting. DoD invested the remaining \$128 million, or 60 percent, in one-time, nonrecurring projects, such as purchasing new pollution prevention equipment (Figure 16).

DoD's FY 2001 Pollution Prevention

Program execution was 26 percent less than pollution prevention investments in FY 2000, allowing for inflation. Much of the decrease is due to the fact that DoD has achieved many of its pollution prevention goals. The DoD Components are now looking forward to accomplishing new pollution prevention goals.

Hazardous waste, clean water, hazardous material reduction, and clean air requirements are the areas of greatest emphasis within the Pollution Prevention Program. In addition, DoD funds efforts to prevent pollution on ships and to prepare source reduction plans through the Pollution Prevention Program. During FY 2001, DoD invested 17 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; 17 percent in reducing CAA pollutants, including the use of ODSs; 6 percent in managing municipal solid wastes and establishing recycling and composting programs; and 17 percent in reducing CWA pollutants. DoD invested the remaining 30 percent in other efforts, primarily preparing pollution prevention and source protection plans for drinking water resources.

Figure 16
DoD Budget Summary:
Pollution Prevention Nonrecurring

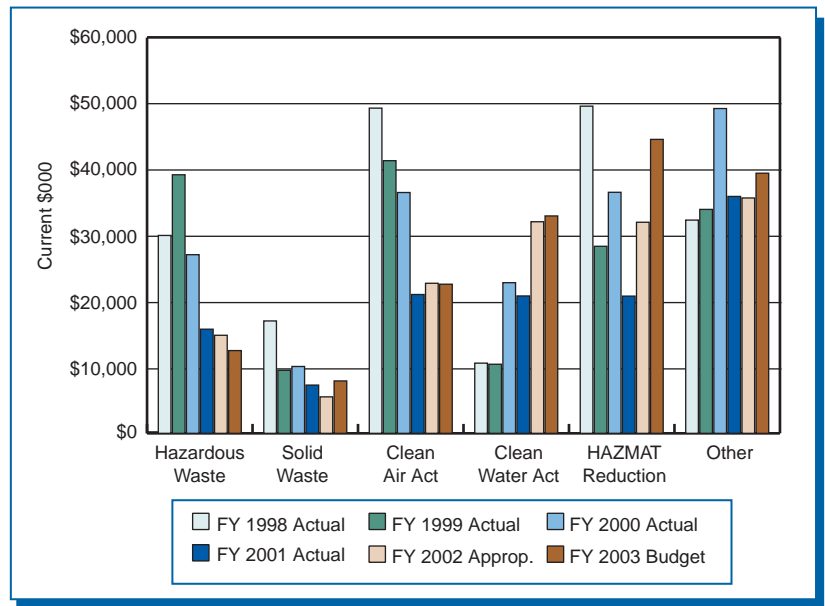
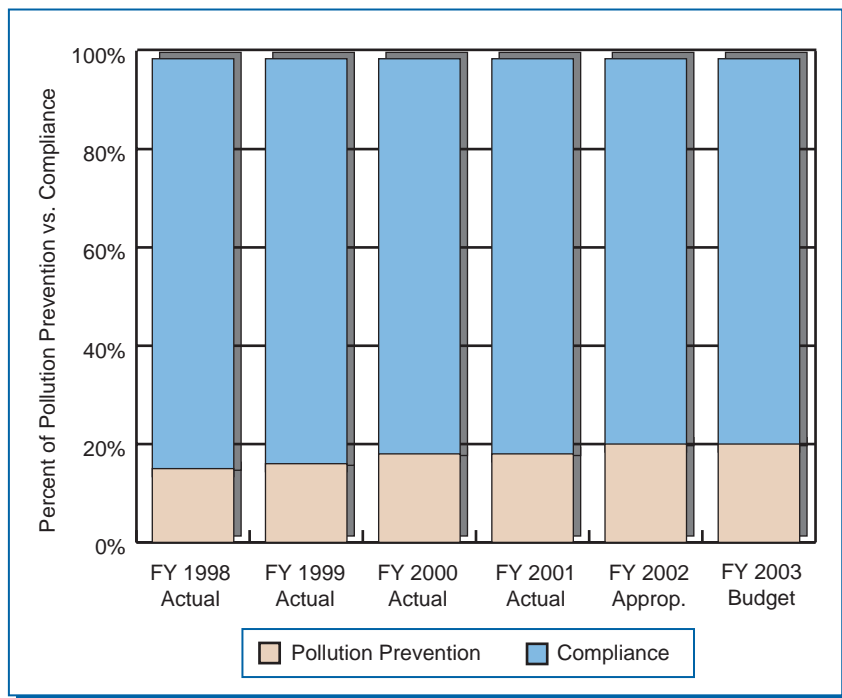


Figure 17
DoD Budget Summary:
Pollution Prevention vs. Compliance



FY 2003 BUDGET REQUEST

DoD is requesting \$247 million to fund the Pollution Prevention Program in FY 2003. The Pollution Prevention Program budget remains relatively stable because pollution prevention is the preferred means of achieving compliance. Investments in pollution prevention over the long term reduce compliance costs and threats to DoD resources (Figure 17).

ANNISTON ARMY DEPOT RECEIVES ENVIRONMENTAL AWARD

Anniston Army Depot (ANAD) received the Alabama Department of Environmental Management Director’s Award, which recognizes facilities that go the extra mile for environmental protection. ANAD’s mission involves a variety of industrial processes, such as plating, painting, degreasing, sand blasting, paint stripping, and steam cleaning. Preventing pollution is a top priority for ANAD to meet state and national prevention policy goals; reduce long-term liabilities of waste disposal; save money by reducing the installation’s raw material purchases, waste treatment, and disposal costs; enhance mission readiness; and protect human health and the environment.

The majority of the hazardous wastes generated at ANAD come from the industrial operations associated with its vehicle maintenance mission. From 1992 to 1997, ANAD reduced hazardous waste generation by 55 percent and reduced associated disposal costs by more than \$2.5 million.

ANAD has also eliminated a significant source of sulfur dioxide and nitrogen dioxide. The five remaining coal-fired heat and process steam boilers were replaced with two natural gas back-up fuel oil boilers, which are nearly emissions-free. In total, 423 tons per year of these pollutants are eliminated. The installation plans to continue improving its pollution prevention and recycling programs, and remains committed to environmental stewardship.

MARINE CORPS BASE QUANTICO RECEIVES ENVIRONMENTAL EXCELLENCE AWARD

Marine Corps Base (MCB) Quantico, Virginia, is actively protecting the Chesapeake Bay using pollution prevention strategies at the base and as a member of Businesses for the Bay. In recognition of MCB Quantico's efforts, the Alliance for the Chesapeake Bay awarded the base its 2001 Environmental Excellence Outstanding Achievement award for its pollution prevention program.

The focus of Quantico's environmental compliance program is pollution prevention, which has resulted in hazardous waste reductions, significant process changes, and implementation of extensive recycling and training programs. Quantico has decreased hazardous waste generation by more than 71 percent since 1992 and has decreased energy consumption by 30 percent. This program has also had a positive impact on the quality of water entering the Potomac River and the Chesapeake Bay. Some of MCB Quantico's pollution prevention successes include—

- Cleaning parts using a less hazardous solvent and a filter/cyclonic system to extend solvent life, and reducing the number of part-cleaning machines, have reduced volatile emissions by 90 percent
- Using plastic beads instead of hazardous strippers to remove paint
- Modifying printing processes to use soy-based inks, which eliminates the use of inks containing hazardous chemicals
- Using ultraviolet lamps instead of chlorine as a disinfectant prior to discharge at the base wastewater treatment plant
- Eliminating approximately 5,000 gallons of raw chemicals per year from photo processing
- Initiating a storm drain labeling system to ensure that base activities do not send polluted water down the drains.
- Phasing out Class I ODSs from large refrigerator equipment
- Converting the central heating plant from coal and residual oil to natural gas and distillate oil, reducing overall air emissions by 92 percent
- Purchasing 27 non-tactical AFVs.

MCB Quantico emphasizes educational programs, such as storm water pollution prevention training, by offering formal classes and customized training and by sponsoring a semi-annual pollution prevention working group. Quantico plans to continue an aggressive pollution prevention program, actively looking for areas of improvement and constantly reviewing its practices to ensure that the base performs at its utmost potential.

