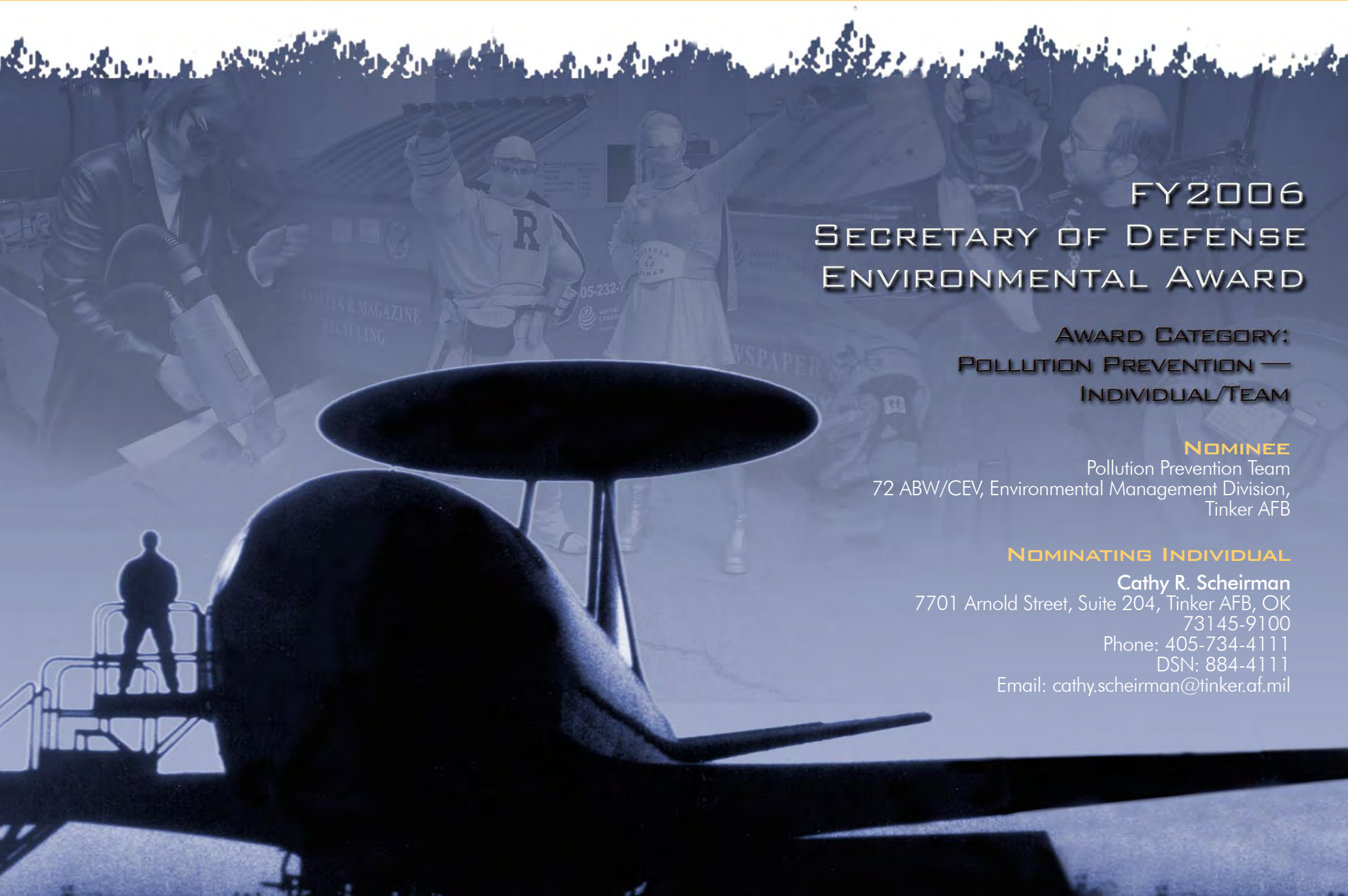
Tinker Air Force Base

Significant Contribution to Pollution Prevention and Operational Efficiency



FY2006 Secretary of Defense Environmental Award

Award Category: Pollution Prevention — Individual/Team

Nominee

Pollution Prevention Team
72 ABW/CEV, Environmental Management Division,
Tinker AFB

Nominating Individual

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Tinker AFB Pollution Prevention Team Summary

Demonstrating excellence in environmental stewardship, the Tinker Air Force Base (TAFB) Pollution Prevention (P2) Team has made significant contributions to the installation's environmental program and to base operation efficiencies. Recipient of the 2006 Most Valuable Pollution Prevention Program by the National P2 Roundtable, the TAFB P2 Team's efforts have resulted in the largest pollution reduction in DoD, and in the development of innovative processes to save the installation more than $2 million annually.

Summarizing the team's achievements, the TAFB P2 Team has helped the installation:

- Eliminate pollution by more than 4,000 tons.
- Divert more than 300 tons from landfill disposal.
- Reduce energy consumption by 25,000 MBtu.
- Operate more than 75% of the fleet using alternate fuels

These benefits will continue into the future, further protecting the environment from pollutants and saving the government tens of millions of dollars.

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"Over the past two years, CEV has remained focused on its mission - to serve as the TAFB focal point for all environmental issues by developing and implementing policies, programs, and procedures that ensure base-wide compliance with environmental requirements while fully supporting base missions."

National Pollution Prevention Roundtable

INTRODUCTION

Tinker Air Force Base (TAFB), home of the Oklahoma City Air Logistics Center (OC-ALC), provides worldwide technical logistics support to Air Force and Navy weapon systems. TAFB manages 2,261 aircraft, including the B-1, B-2, B-52, C/KC-135, and E-3, and an inventory of approximately 23,000 jet engines. TAFB is the largest industrial employer in Oklahoma, with more than 26,000 civilian and military employees and an economic impact of $3.1 billion on the six counties surrounding the installation.

Complementing TAFB's dynamic defense mission is its mission of environmental restoration and protection. Tinker's Environmental Management Division (CEV) is the active steward of the base's water, soil, plant, and animal resources, including three creek systems, 15 base ponds, more than 280 species of plants, and 220 species of fish and wildlife. CEV is responsible for ensuring environmental compliance is considered at each level of installation decision making and surrounding communities are properly notified of environmental activities taking place at TAFB.

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TAFB P2 Team

Background

As TAFB's support of Homeland Defense, Operation Enduring Freedom, and Operation Iraqi Freedom continues, striking a balance between national security and environmental stewardship has become progressively more difficult. Tinker's environmental aspects encompass 2,000 air emission sources, 14 regulated outfalls on three creek systems, 71 regulated storage tanks, 11 miles of industrial wastewater lines and associated treatment plant, two groundwater treatment facilities, and 40 restoration sites.

TAFB's complex industrial manufacturing processes, aging infrastructure, and ever-changing environmental regulations all pose significant environmental challenges to its dual mission of military readiness and environmental stewardship. A fundamental component of CEV in support of the environmental mission is Tinker's Pollution Prevention (P2) Program. The P2 Program focuses its efforts on addressing Tinker's significant environmental aspects: volatile organic compound (VOC) emissions, hazardous air pollutant (HAP) emissions, hazardous waste generation, and energy consumption.

Tinker's top leadership demonstrates commitment to the environment through their public environmental policy and management approach. Using a two-tiered tactic, the Environmental Safety and Occupational Health (ESOH) Council, chaired by the installation commander, integrates top-level involvement into the environmental program, while the media-specific working groups engage the workforce. In addition, TAFB maintains solid working relationships with more than 50 active partners including universities, government agencies, industry, Indian tribes, and the local community.

Tinker's innovative management approach has facilitated the local implementation of all phases of the Environmental Management System (EMS) — planning, implementation and operation, checking and corrective action, and management review. The EMS has undergone multiple assessments resulting in clear, written documentation and validation of our progress.

The TAFB P2 Team consists of the following core members:

- Bede Ley, Chief of the Environmental Depot Maintenance Support Section, 72 ABW/CEVPD
- Freddie Hall, PhD, Environmental Engineer, 72 ABW/CEVPD
- Van Nguyen, Environmental Engineer, 72 ABW/CEVPD
- Steve Potes, Environmental Engineer, 72 ABW/CEVPD
- Patti Shreve, Environmental Engineer, 72 ABW/CEVPD
- Jiby Varughese, Mechanical Engineer, 72 ABW/CEVPD

Position Description

Bede Ley serves as the P2 Program Manager. He is responsible for program planning, programming, and execution. He oversees execution of all P2 projects.

Freddie Hall, PhD, is an expert on water treatment technologies. He has been instrumental in optimizing processes at the industrial wastewater treatment plant (IWTP). As a water treatment expert, Dr. Hall has published numerous papers and has been an invited participant at conferences nationwide. Dr. Hall is an adjunct professor at the University of Oklahoma, the University of Central Oklahoma, and Rose State College.

The TAFB P2 Team continually strives for environmental excellence through significant progress in pollution prevention and proven results in base operational efficiency.

Van Nguyen is a chemical engineer supporting the Aircraft Maintenance Group and Propulsion Maintenance Group. She has been integral in efforts to replace alodine, qualify handheld laser paint stripping, and implement lean projects. She is also the environmental point of contact for the Aircraft Rapid Improvement Team.

Steve Potes provides environmental engineering support to the Commodities Maintenance Group by identifying and programming P2 projects. He has managed projects to implement powder coating, replace solvent cleaners, and replace ozone-depleting substances (ODS).

Patti Shreve is the base Environmental Management System (EMS) Coordinator. She has been instrumental in EMS implementation, including developing the base environmental policy statement and a list of aspects and impacts. She concurrently manages the Compliance through Pollution Prevention (CTP2) Program, the associated compliance site inventory (CSI), and process specific opportunity assessments (PSOAs).

Jiby Varughese is a mechanical engineer supporting the Aircraft Maintenance Group. He is currently managing projects to recycle blast media and upgrade the paint gun cleaning process.

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TAFB P2 Team

Awards and Services

TAFB received numerous, prestigious awards during the achievement period for developing and implementing an exceptional P2 Program. This program has been honored by the Air Force (AF), the Secretary of Defense, the State of Oklahoma, and the National Pollution Prevention Roundtable.

The 2005 Air Force Materiel Command (AFMC) P2 Award and the 2005 Air Force General Thomas D. White Pollution Prevention – Industrial Category Award are highly esteemed honors, but the penultimate honor was receiving the 2005 Secretary of Defense Award for Pollution Prevention. These awards recognize outstanding achievements in reducing or eliminating waste streams and pollution throughout base operations, including reducing ODS use and other hazardous chemicals, and fostering pollution prevention awareness.

Tinker received recognition as a Gold Star from the OKStar Program. The OKStar Program is administered by the Oklahoma Department of Environmental Quality. This program recognizes facilities that achieve compliance, maintain a high standard of environmental responsibility, and have implemented a comprehensive P2 program. This award demonstrates the base's commitment to both compliance and pollution prevention.

Finally, the base was recognized by the National Pollution Prevention Roundtable as one of nine Most Valuable Pollution Prevention (MVP2) Programs. The MVP2 Award recognizes outstanding and innovative P2 programs that can show innovation, measurable results, transferability, commitment, and optimization of resources.

Accomplishments

Material Substitution

The P2 Program has made significant contributions to the installation's environmental program and to depot maintenance efficiency. By supporting a myriad of P2 initiatives, Tinker's P2 Program has helped the installation achieve significant gains in material substitution. One major effort is in progress to eliminate chromium compounds from aircraft surface treatments and primers. Through extensive testing and evaluation, a non-chromated surface treatment (PreKote) was approved to replace Alodine on the B-1B Lancer, the B-52 Stratofortress, and the C-130 Hercules. This process was made possible through Tinker's development of a new application technique for large aircraft. A key to the success of these efforts is facilitating collaboration between the research laboratories, the vendors, the system engineers and the Maintenance Wing. Other surface treatments and primers are currently being tested with the ultimate goal to be a totally chrome-free paint system.

The TAFB P2 Team successfully implemented a non-chromated surface treatment (PreKote), which achieves better paint adhesion and saves $120,000 annually.

When fully implemented, these efforts will reduce chrome use by 28,000 gallons annually and save the base over $120,000 each year.

After much testing, high velocity oxygen fuel (HVOF) coating was used in production at TAFB for the first time in 2005. This system replaces hexavalent chrome electroplating for repair of jet engine components by using a blend of tungsten carbide and cobalt. Not only does the new process replace carcinogenic chrome, it also turns out to be a superior coating. The extremely dense coating is applied by spraying the coating at a velocity of Mach 2.5. This new process has been approved for parts on the TF33, F100, and F188, supporting some of the Air Force's most advanced weapon systems. Currently, three booths are in operation at TAFB. Full implementation will further reduce the base's dependence on hard chromium.

Tinker's high velocity oxygen fuel (HVOF) coating replaces hexavalent chrome electroplating for repair of jet engine components, and provides superior coating results.

Another material substitution initiative was the use of a synthetic fuel for jet engine testing. This alternative to jet fuel was made from natural gas using the Fischer-Tropsch process. After an initial 50-hour test run at Tinker using 23,000 gallons of the alternative fuel, a B-52 flight test was performed at Edwards Air Force Base (AFB) with two of the eight engines running on the Fischer-Tropsch fuel. This demonstration was a first in aviation and will lead to more flight testing. Replacement of jet fuel with a domestic, non-petro-

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A successful TF-33 engine test of Fischer-Tropsch fuel (a domestic, non-petroleum fuel) at Tinker led to a B-52 flight test at Edwards AFB.

leum alternative fuel will reduce dependence on petroleum fuels and increase energy security. In the future, all jet engine testing may be accomplished with alternative fuels or a blend containing alternative fuels.

PROCESS MODIFICATION OR IMPROVEMENT

TAFB implemented powder coating in three paint shops resulting in a 90-% VOC reduction and $1,800,000 in annual savings. The replacement of high VOC paints with powder coating reduces flow time by a factor of 5 to 1, improves durability, and decreases the compliance burden. Powder coatings are applied by spraying an electrostatic paint onto a part and then baking the paint in place. Implementation of this zero-VOC/zero-HAP coating was a cooperative effort between the TAFB P2 Team, the Maintenance Wing, system engineers, and the Air Force Research Laboratory. An additional powder coating booth for the Constant Speed Drive shop will be installed in 2007, and a fifth booth is in the planning stage for insertion into the Propulsion Maintenance Group in 2008.

Powder coating is an effective, environmentally friendly process at TAFB that drastically reduces hazardous compounds.

TAFB has also participated in a demonstration of a new innovative paint stripping process. Through a partnership with the Environmental Security Technology Certification Program (ESTCP), the Joint Group on Pollution Prevention, the National Aeronautics and Space Administration, and industry, a low-power, handheld laser was shown to be an effective and safe alternative to conventional paint stripping methods. Through the elimination of chemical methods, savings of $100,000 annually could be realized. Based upon the success of the handheld system, TAFB has initiated another ESTCP project to demonstrate laser paint stripping on large aircraft parts through the use of a gantry robot. Use of lasers on these large parts will dramatically reduce stripper use at TAFB.

IMPROVED MATERIAL MANAGEMENT

TAFB has made tremendous strides in the management of hazardous materials. Implementation of the Hazardous Material Management System (HMMS) has led to the elimination of non-hazardous items from the tracking system. Hazardous material initiatives have led to eliminating authorization requirements for 28% of all items. Over the past year, the hazardous material team has prepared the base for conversion to a Web-based version of the HMMS. This new version allows for increased user access wherever the World Wide Web is available. Increased availability to the system will result in better customer service and better hazardous material support.

Concurrent with these initiatives, the base has been preparing to enlist the services of a chemical management services (CMS) provider. The CMS provider will be responsible for forecasting material requirements, purchasing the materials, and distributing materials to the point of use. This process has been very successful at many facilities as the provider's profit is based on managing the materials, not on total sales. TAFB has been selected as the demonstration site for this effort and is working with the Defense Logistics Agency to implement this innovative effort.

COMPLIANCE WITH EXECUTIVE ORDER (EO) 13123, "GREENING THE GOVERNMENT THROUGH EFFICIENT ENERGY MANAGEMENT," JUNE 3, 1999

The energy management program at TAFB diligently pursued energy savings opportunities throughout the achievement period. More than $1.75 million was invested in Utility Energy Services Contracts (UESC) to upgrade Tinker facilities. One UESC project installed infrared heating in two base hangars. This project will reduce energy consumption by 25,000 million British thermal units per year (MBtu/yr) and save more than $145,000 each year. A major task at hand for the energy management program involves meeting the goal to conduct an energy audit on 10% of all facilities with more than 15 million square feet each year. Over the past two years, more than one-fifth of the installation has been surveyed for energy improvements; all facility projects are reviewed for compliance using requirements contained in the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) Addendum 90.1.

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COMPLIANCE WITH EXECUTIVE ORDER (EO) 13148, "GREENING THE GOVERNMENT THROUGH LEADERSHIP IN ENVIRONMENTAL MANAGEMENT," APRIL 26, 2000

TAFB has met all requirements with regard to EMS implementation. The initial environmental policy statement was issued in 2003. Using the compliance site inventory as a baseline, an Inventory of Activities and an Aspect Register were developed. The aspects were prioritized based upon their environmental impacts. This analysis led to the designation of four significant aspects:

1. VOC emissions
2. HAP emissions
3. Hazardous waste generation
4. Energy consumption

Objectives have been set to reduce the impact of all four significant aspects and to maintain compliance with all environmental laws. Specific goals have been set to reduce priority chemicals through the base's participation in the National Partnership for Environmental Priorities (NPEP). Capitalizing on our existing P2 Program, the aspect register is being used to systematically perform opportunity assessments, improve stakeholder awareness, and encourage involvement in reducing impacts to the environment. With over 3,000 compliance sites and 25,000 employees on base, this challenge is being met directly by focusing on continuous improvement.

TAFB has also met all toxic chemical reduction requirements. Through our aggressive P2 Program and support from the 76th Maintenance Wing, the base was able to achieve the 50% reduction goal in 2003, three years early. Since 1994, the base has reduced the release of toxics by over 1.4 million pounds, a 93% reduction. This reduction is the largest of any DoD facility. In addition, the TAFB P2 Team has simplified the Toxic Release Inventory reporting process through the development of a database and implementation of standardized calculations.

COMPLIANCE WITH EXECUTIVE ORDER (EO) 13149, "GREENING THE GOVERNMENT THROUGH FEDERAL FLEET AND TRANSPORTATION EFFICIENCY," APRIL 21, 2000

Tinker has long been a DoD leader in alternative fuel vehicles from implementing compressed natural gas (CNG) vehicles to being the first AFMC base to implement biodiesel in 2002! Over 75% of the fleet, approximately 900 vehicles, operates on alternative fuels including CNG, biodiesel, propane, and electricity. Each year over 200,000 gallons of alternative fuels are used, thereby reducing air emissions by 20 tons! This aggressive alternative fuels program has resulted in meeting the 20% reduction goal on schedule. The successful use of Fischer-Tropsch fuels for jet engine testing provides further opportunities for petroleum reduction.

THROUGH THE USE OF ALTERNATIVE FUELS, TAFB HAS REDUCED AIR TOXICS, GROUND LEVEL OZONE, AND CARBON DIOXIDE BY 20 TONS PER YEAR.

RECYCLING PROGRAM

TAFB uses a hard-hitting approach to increase the types and quantities of materials to be recycled. Highlights of TAFB's program include:

- Tinker implemented a system to recycle junk mail, magazines, and shredded paper at no cost to the government, diverting more than 100 tons of waste from landfill disposal each year.
- A pallet recycling program has also been initiated at no cost to the base, resulting in over 184 tons of pallets being diverted from landfills, an 84% increase since the program started.
- To improve the system for distribution and pick-up of recycled materials, TAFB procured recycling drop-off units for the collection of aluminum cans, glass, and plastics. Color-coded curbside bins for aluminum cans, newspaper, and glass for the military family housing area were also purchased. As a result, participation in curbside recycling has shown a ten-fold increase since October 2002.
- New containers for recycling in office areas were also purchased leading to an increase in white paper recycling by 120% and increased

TAFB IS RECOGNIZED AS A PRIME ADVOCATE FOR RECYCLING MATERIALS. FINISHED BALES PRODUCE ONE-TENTH THE SCRAP METAL VOLUME COMPARED TO LOOSE SCRAP.

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revenues of more than $3,000 per month. The solid waste diversion rate at TAFB has been increased by 17% since October 2002.

Green Procurement (Formerly Affirmative Procurement)

With the support of senior leadership, a cross-functional team worked to close the recycle loop by employing the TAFB Green Procurement Program. Tinker strongly encourages purchasing environmentally friendly products by posting a base-wide policy statement, a Green Procurement Plan, and the inclusion of specific requirements in various contracts enforcing purchasing guidelines. The specific legal requirements in regard to the U.S. Environmental Protection Agency (EPA's) purchase of recycled materials are assured through inclusion of Federal Acquisition Regulation clauses and boiler plate language in contracts. Tinker promotes the Green Procurement Program through training, promotional briefings, an informational Web site, and brochures. The well known program motto is "Everything deserves a second chance, buy recycled."

Education, Outreach, and Partnering

TAFB's programs and activities enhance environmental awareness and community involvement both on and off-site. Tinker maintains open communication with the public via the web and newsletters. This medium allows for the public to voice comments, questions, or concerns through email, phone calls, and open meetings. TAFB's visionary Outreach Program extends beyond the fence line, including a fishing clinic for special needs children and ScienceFest Oklahoma, interacting and educating 4,500+ students from around the state. Two annual public events held at TAFB are America Recycles Day and Pollution Prevention Awareness Day. These events educate the public on local initiatives to reduce pollution. Tinker's recycling super-duo, Recycloman and Recyclowoman, continually make a dull subject fun! These two use their "super powers" to spread the word about recycling both on-base and at events in the local communities. TAFB's outreach activities demonstrate Tinker's commitment to environmental stewardship and to being a good neighbor.

Base recycling super-duo, Recycloman and Recyclowoman (shown above), use their "super powers" to proactively spread the word about recycling and its environmental benefits.

The base has also entered into a partnership with the EPA to reduce the use of priority chemicals on base. These chemicals are either bioaccumulators or environmentally persistent. TAFB was recognized as the 100th partner to join NPEP and has voluntarily agreed to reduce five chemicals used on base. These reduction plans have been incorporated as environmental management plans under the EMS.

Green Buildings

Training has been accomplished with the U.S Green Building Council's Leadership in Energy and Environmental Design (LEED®). This training has resulted in LEED® philosophies being inserted into projects in the design phase. In the future, Tinker will continue to pursue LEED® certification on new construction.

Reductions Achieved

Industrial Water Treatment Plant Optimization	3,450 tons hazardous waste reduction
VOC Reduction from Powder Coating Process	Resulted in 90% VOC reduction and $1.8 million annual savings
Chromium Reduction	28,000 gallons annually, and $120,000 annual savings
Coolant Recycling	57,000 gallons per year
Energy Savings	25,000-MBtu/yr decrease for one project alone, and $145,000 annual savings
Solvent Substitution	Resulted in 16 tons of VOCs reduction
Composting	30 tons diverted from landfill
Alternative Fuel Use	200,000 gallons used, 20-ton air emissions decreased, Fischer-Tropsch fuel tested
Recycling	17% diversion increase, 120% increase in white paper
Pallet Recycling	184 tons diverted from landfill
Mixed Paper Recycling	100 tons diverted form landfill

MBtu - million British thermal unit, VOC - volatile organic compound

Summary

On an annual basis, the TAFB P2 Team has helped the installation:

- Eliminate pollution by more than 4,000 tons,
- Divert more than 300 tons from landfill disposal,
- Reduce energy consumption by 25,000 MBtu,
- Realize cost savings of over $2 million.

These benefits will continue into the future, further protecting the environment from pollutants and saving the government tens of millions of dollars. This team will continue to investigate cost-saving environmental initiatives to both preserve the environment and protect the nation's vital defense mission. The TAFB P2 Team is an exemplary model of environmental stewardship.