

TINKER AIR FORCE BASE

SIGNIFICANT CONTRIBUTION TO POLLUTION PREVENTION

"Serves as the Tinker Air Force Base focal point for all environmental issues. Develops and implements policies, programs and procedures which ensure base-wide compliance with environmental requirements."

MISSION STATEMENT OF
TINKER AIR FORCE BASE'S
ENVIRONMENTAL MANAGEMENT DIVISION

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 25,000 civilian and military employees and an economic impact of \$2.53 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.

FY2005
SECRETARY OF DEFENSE
ENVIRONMENTAL AWARD

AWARD CATEGORY:
POLLUTION PREVENTION—INDUSTRIAL INSTALLATION

FY 2005

SECRETARY OF DEFENSE ENVIRONMENTAL AWARD

TINKER AIR FORCE BASE

AWARD CATEGORY:

Pollution Prevention—Industrial Installation

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 significant 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 the Tinker Pollution Prevention (P2) Program. The P2 Program focuses its efforts on addressing Tinker's significant environmental aspects: hazardous material use, air emissions and hazardous waste.

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 underwent its first official Air Force assessment in the Spring of 2005.

PROGRAM SUMMARY

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. CEV has demonstrated continued commitment to its mission by implementation of its strategic vision:

- **Reach out to neighbors** – Partner with the community, be honest and fair, learn from mistakes, and provide clear and open communication.
- **Seek new ways to fulfill TAFB's environmental mission** – Explore industrial processes that are cheaper and faster, reduce flow time, reduce the use of chemicals, and meet or exceed all environmental compliance requirements.
- **Apply cutting-edge technologies to processes** – Locate, develop, and implement innovative technologies and methods to accomplish the base's environmental mission.
- **Provide state-of-the-art training** – Prepare training programs geared toward a new generation of workers, the base's greatest asset.

To accomplish this strategic vision, CEV has performed the following activities:

- Implemented the EMS
- "Closed the loop" through affirmative procurement (AP); program recognized as a model for AFMC
- Secured senior leadership support on environmental focus areas through the "Environmental Minute" - Top level visibility!
- Empowered personnel at all levels to sustain mission-readiness and exceed compliance
- Maintained good neighbor relationship with local communities and state regulators
- Provided comprehensive multimedia training to base procurement, maintenance, and base contractor personnel; increased awareness and improved compliance



TAFB COMPRISES 5,031 ACRES AND EMPLOYS MORE THAN 25,000 MILITARY AND CIVILIAN EMPLOYEES, THE LARGEST INDUSTRIAL EMPLOYER IN OKLAHOMA. THE PRIMARY AREA OF THE BASE'S INDUSTRIAL ACTIVITIES IS SHOWN ABOVE.

FY 2005

SECRETARY OF DEFENSE ENVIRONMENTAL AWARD

TINKER AIR FORCE BASE

AWARD CATEGORY:

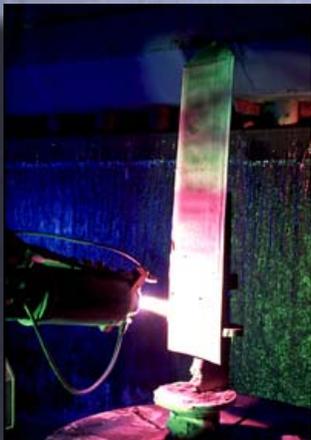
Pollution Prevention—Industrial Installation

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 pollution prevention initiatives, the P2 Program has helped the installation achieve significant gains in material substitution.

A major effort is in progress to eliminate chromium compounds from aircraft surface treatments and primers. TAFB has participated in demonstrations of both non-chromated surface treatments and non-chromated primers. A key to the success of these efforts is facilitating collaboration between the research laboratories, the vendors, the system



TINKER'S HIGH VELOCITY OXYGEN FUEL (HVOF) COATING REPLACES HEXAVALENT CHROME ELECTROPLATING FOR REPAIR OF JET ENGINE COMPONENTS.

engineers and the Maintenance Wing. Through extensive testing and evaluation, a non-chromated surface treatment (PreKote) was approved to replace Alodine on the B1-B Bomber and was added to the Technical Orders. Other surface treatments and primers are being tested with the ultimate goal being a totally chrome-free paint system. When fully implemented, these efforts will reduce chrome by 28,000 gallons and save the base over \$120,000 annually.

Another initiative underway is to identify environmentally friendly chemical strippers. A new generation aircraft stripper has been implemented that reduces waste and will save \$300,000 each year. In addition, the last tank of methylene chloride stripper has been replaced with a non-hazardous air pollutant (HAP) alternative. These new strippers are safer for the worker, safer for the environment and more effective.

TAFB reduced VOCs by 16 tons through incorporation of an alternative cleaner called Hurrifase 9065. This aqueous based cleaner is a drop-in replacement for PD-680, MEK, acetone, and isopropyl alcohol. By working with process and system engineers, the product was approved for use on air accessories, constant speed drives, and aircraft components. The improved process has produced cleaner parts, fewer rejects and benefited the environment.

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. Currently, three booths are in operation at TAFB. Full implementation will further reduce the base's dependence on hard chromium.

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 five to one, improves durability, and decreases the compliance burden. Implementation of this zero-VOC/zero-HAP coating was a cooperative effort between the P2 Team, the Maintenance Wing, system engineers, and the Air Force Research Laboratory. Two additional powder coating booths are being installed based on the success of this demonstration.



POWDER COATING AT TAFB DRASTICALLY REDUCES HAZARDOUS COMPOUNDS.

PROCESS IMPROVEMENTS AT IWTP RESULT IN GREATER COST SAVINGS FOR THE AIR FORCE.



TAFB has vastly improved operations at the base's industrial wastewater treatment plant (IWTP). Improved sludge dewatering operations have reduced hazardous waste disposal by 6.9 million pounds. This is Tinker's largest waste stream, and more than 90 percent of Tinker's hazardous waste volume was eliminated, resulting in \$1.3 million in annual savings. A new treatment process, the Air-Sparged Hydrocyclone (ASH), treats water at the source and further reduces sludge generation at the IWTP. The ASH technology has enabled implementation of material substitutions and maintenance process improvements allowing for greater operational flexibility.

FY 2005

SECRETARY OF DEFENSE ENVIRONMENTAL AWARD

TINKER AIR FORCE BASE

AWARD CATEGORY:

Pollution Prevention—Industrial Installation

IMPROVED MATERIAL MANAGEMENT

One hazardous material management initiative in place is to eliminate non-hazardous items from the tracking system to streamline user input and enhance system efficiency. Currently, TAFB has eliminated approximately 28% of the items that required authorization.

TAFB has developed outstanding methods to recycle hazardous chemicals/materials. These methods include accomplishing a major recycling effort of more than 57,000 gallons per year of machine coolant, saving \$107,000 annually. 200+ tons of hazardous chemicals and materials are now diverted each year.

TAFB also executed innovative methods to recycle plating wastewater treatment sludge by sending it to a metal recycler. This same process can be used for plasma spray and grinding dust. When fully implemented, more than 84,000 pounds of wastewater sludge will be diverted from landfills.

A collaborative effort between the P2 Team and the Installation Restoration Program resulted in an outstanding base-wide composting program. Grass and leaves are composted with fuel contaminated soils to speed remediation, reducing time and cost. Soils are then reused, resulting in the diversion of 30 tons of organic material. TAFB also partnered with nearby communities to obtain wood mulch at no cost for use on newly planted seedlings. Additionally, trees removed during



TWO NAVY PERSONNEL ASSIST WITH PROPER HAZARDOUS MATERIAL MANAGEMENT.

base construction projects are used to create fish habitats in base ponds. Now these ponds support “trophy” bass!

COMPLIANCE WITH EXECUTIVE ORDER 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.

COMPLIANCE WITH EXECUTIVE ORDER 13148, “GREENING THE GOVERNMENT THROUGH LEADERSHIP IN ENVIRONMENTAL MANAGEMENT,” APRIL 26, 2000

Tinker’s commander issued a base-wide Environmental Policy Statement stressing a commitment to preserving the environment. TAFB set goals consistent with the policy statement, performed a gap analysis, and hosted a local review by the U.S. Environmental Protection Agency (EPA). An implementation plan for developing an ISO-14001-like EMS prior to December 31, 2005 was developed, and this goal was achieved meeting the Executive Order 13148 requirement. CEV created an Aspect Register from the Inventory of Activities and worked in conjunction with base stakeholders to identify and prioritize all environmental impacts associated with the aspects. Capitalizing on the existing pollution prevention program, the prioritized aspects are being used to systematically perform opportunity assessments, improve stakeholder environmental awareness, and encourage their involvement in reducing their respective aspects’ impacts to the environment. With 3,000+ compliance sites and 25,000 personnel, CEV is meeting the challenge head-on.

Training is another element of EMS implementation. General EMS awareness training has been provided to a broad range of base personnel while practitioner training has been conducted with the core EMS team. Targeted awareness training is tailored to the specific aspects to which personnel are associated. Any findings of non-compliance in the annual assessments will initiate a review of training requirements. The first EMS management review also served as additional awareness training for the executive staff.

FY 2005

SECRETARY OF DEFENSE ENVIRONMENTAL AWARD

TINKER AIR FORCE BASE

AWARD CATEGORY:

Pollution Prevention—Industrial Installation



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

Tinker has complied with all requisite Federal Compliance "Right-To-Know" Laws and Pollution Prevention Requirements. A database was created and refined to increase the accuracy of Toxics Release Inventory reporting. TAFB met the associated Executive Order goal 3 years ahead of schedule with a 93% reduction of more than 1.4 million pounds; the largest reduction in the U.S. Department of Defense (DoD). TAFB takes a proactive role in the Local Emergency Planning Committee and participates in joint exercises with the surrounding community.

COMPLIANCE WITH EXECUTIVE ORDER 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. More than 75% of the fleet operates on alternative fuels such as CNG, biodiesel, propane, and electric. Each year more than 200,000 gallons of alternative fuels are used reducing air emissions by 20 tons! This aggressive alternative fuels program has led to a 17.5% reduction in petroleum usage since 1999, paving the way to the Executive Order goal of 20%.

RECYCLING PROGRAM

TAFB is recognized as a prime advocate for the recycle of various materials. This dedication resulted in winning a White House Closing the Circle Award for Recycling in 2004. Highlights of TAFB's award winning program include a hard-hitting approach to increase the types and quantities of materials to be recycled. Tinker implemented a system to recycle junk mail, magazines, and shredded paper at no cost to the government, diverting more than 80 tons of waste from landfill disposal the first year. A pallet recycling program has also been initiated at no cost to the base, resulting in over 100 tons of pallets being diverted from landfills. 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



TAFB WAS THE WINNER OF A 2004 WHITE HOUSE CLOSING THE CIRCLE AWARD FOR RECYCLING!

purchased leading to an increase in white paper recycling by 120% and increased 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

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.

Tinker promotes the Green Procurement Program through training, promotional briefings, an informational web page, and brochures. The well-known program motto is "Everything deserves a second chance, buy recycled."

The specific legal requirements in regard to the EPA's purchase of recycled materials are assured through inclusion of Federal Acquisition Regulation clauses and boiler plate language in contracts. Tinker monitors the Green Procurement

FY 2005

SECRETARY OF DEFENSE ENVIRONMENTAL AWARD

TINKER AIR FORCE BASE

AWARD CATEGORY:

Pollution Prevention—Industrial Installation



BASE RECYCLING SUPER-DUO, RECYCLOMAN (SHOWN ABOVE) AND RECYCLOWOMAN, USE THEIR SUPER POWERS TO PROACTIVELY “SPREAD THE WORD” ABOUT RECYCLING AND ITS ENVIRONMENTAL BENEFITS. THE DUO PARTICIPATE IN MANY ON AND OFF-BASE EVENTS INCLUDING SCHOOL EVENTS, THE OKLAHOMA GOVERNOR’S SEPTEMBERFEST, AND OKLAHOMA’S SCIENCEFEST.

Program through spot checks of credit card and contract purchases, annual review of the plan, and reviewing the status of Environmental Compliance Assessment and Management Program (ECAMP) findings.

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 and has an active Community Advisory Board that reviews the program and disseminates pertinent information 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 for good 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.

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

Significant reductions have been achieved at TAFB throughout the award period. Reductions are described below.

Optimizing the Industrial Water Treatment Plant	3,450 tons hazardous waste reduction
Reduction of VOCs by Use of Powder Coating	Resulted in a 1-ton VOC reduction
Coolant Recycling	200-ton decrease in disposal
Energy Savings	25,000 MBtu/yr decrease for one project alone
Solvent Substitution	Resulted in 16 tons of VOCs reduction
Metal Sludge Recycling	42 tons diverted from landfill
Composting	30 tons diverted from landfill
Use of Alternative Fuels	200,000 gallons used, 20 ton air emissions decreased
Recycling	17% diversion increase, 80 tons mixed paper, 100 tons pallets, 120% increase in white paper

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

SUMMARY

Over the past two years, the Tinker P2 Program has helped the installation eliminate pollution by more than 4,000 tons and realize cost savings of over \$2 million. The P2 Program will continue to investigate and coordinate cost saving pollution prevention initiatives to help preserve the environment for future generations while supporting TAFB’s military operations at home and abroad. TAFB is an exemplary model of environmental stewardship.