

Program Summary

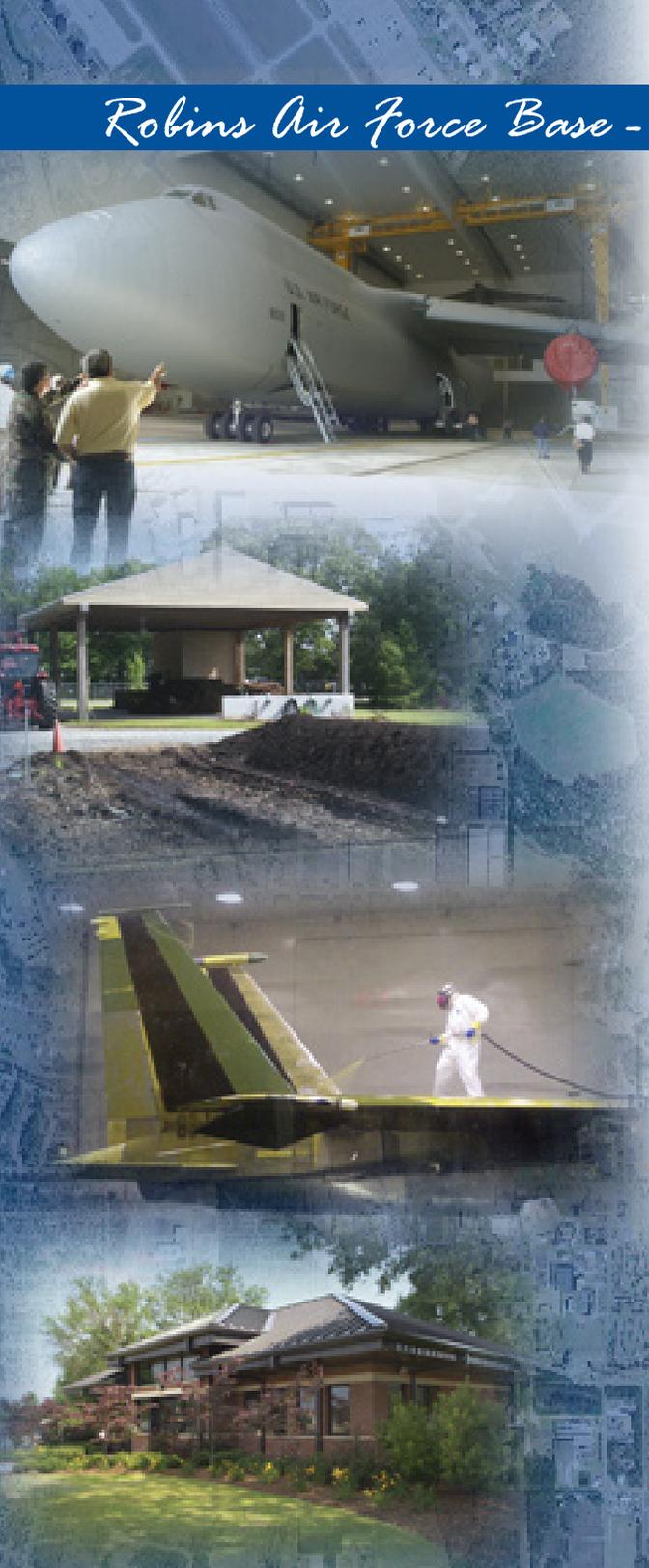
The Robins Air Force Base (AFB) Pollution Prevention (P2) Program aggressively targets both hazardous and non-hazardous waste reductions through material substitution and process changes. The P2 Program focuses on reductions in hazardous materials, hazardous waste, air emissions, Ozone Depleting Substances (ODS), and solid waste. These reduction efforts directly align with applicable objectives and targets of the Robins AFB Environmental Management System (EMS). The EMS integrates the P2 Program and Green Procurement Program (GPP) into all of Robins activities.

Robins is an AF leader in GPP implementation and training! Notably during this award period, the GPP plan was developed and approved by the Environment, Safety, and Occupational Health (ESOH) Board, which fully implements affirmative procurement actions under the EMS. Robins GPP training was administered to all personnel involved in the acquisition process ahead of formalized AF training requirements.

Outstanding achievements that demonstrate the integration of P2 into pollution – generating activities include:

- New Paint/Depaint Hangar with innovative air recirculation – saved \$2M per year in energy
- PreKote implemented on C-130 – saved \$444K per year; eliminates chromium VI usage
- Recycling – saved \$1.3M by diverting solid waste from landfill
- Composting 100% of yard waste – saved \$230K by diverting from landfill
- Air Assisted Airless paint guns – saved \$255K in material/waste costs; reduced volatile organic chemical emissions and solvent use
- Carpooling Initiative – Over 1,500 employees signed up to carpool or vanpool
- Purchases of items with recycled content increased from \$154K in 2002 to \$439K in 2007 due to increase of EMS and affirmative procurement actions (replaced by GPP)

The P2 Program continues to research and implement innovative technologies to reduce multi-media pollutants with the goal of protecting the environment as well as reducing the Base's environmental liability.



Introduction

Robins Air Force Base (AFB) is located on 8,435 acres in Central Georgia adjacent to the City of Warner Robins. Robins AFB neighbors thousands of acres of wetlands that create a natural buffer for the base, effectively eliminating encroachment. Over 25,000 employees (13,000 Civilians, 8,000 Military, and 4,000 contractors) work at Robins making it the largest industrial facility in the State of Georgia with an annual 4.3 billion dollar economic impact across the state.

Robins AFB is home to the Warner Robins Air Logistics Center, four Wings and 39 Associate Units that make up an integral part of the U.S. Air Force (AF) war fighting team. Robins AFB, along with the greater community of Middle Georgia, make up Team Robins Plus, which is dedicated to protecting the environment while providing affordable combat superiority, readiness and sustainability to the war fighter. Robins has enjoyed unprecedented support from the surrounding communities since its humble beginnings in 1941. Community members perpetually live their motto EDIMGIAFAD (Every Day in Middle Georgia is Armed Forces Appreciation Day).

The mission at Robins AFB is to be America's dominant air and space power sustainer and ultimately achieve the Air Force Materiel Command vision of providing war winning capabilities...on time, on cost.



EDIMGIAFAD is carved out in the hedges at the Houston Mall overlooking Watson Blvd

Background

Distinct capabilities at Robins include the worldwide management and engineering responsibilities for the F-15 Eagle fighter, C-130 Hercules transport, C-5 Galaxy transport, U-2 Dragon Lady surveillance, E-8 Joint STARS surveillance, and all AF helicopters. Robins is also responsible for the repair, overhaul, and modification of all AF special operations aircraft and related systems; logistical support for the C-17 Globemaster III transport; and AF tactical missiles, avionics, and electronic systems on most AF aircraft. Robins manages a worldwide ground fleet of more than 126,000 vehicles and supports hosted units, such as Headquarters Air Force Reserve Command, the 116th Air Control Wing, the 19th Air Refueling Group, the 5th Combat Communications Group, and the Defense Logistics Agency Regional Distribution Center.

The unique blend of environmental aspects is a challenge for the Pollution Prevention (P2) Program at Robins, which extends to everyone working on the base. Robins Environmental Management System (EMS) was first established in 1997 as a Department of Defense (DoD) pilot study and has matured to include all 25,000 people employed at the base and is ISO 14000 compliant. EMS training is required for everyone at Robins and ensures the entire workforce understands not just compliance and conservation but also P2.

Robins partners with stakeholders and the community to sustain a world class P2 Program. Regular P2 Integrated Program Team (IPT) meetings are held as well as GPP Team, Hazardous Material Management Process Team, and Qualified Recycling Program meetings. Robins is an active member of The Keep Warner Robins Beautiful Commission (electronics recycling, Wellston Trail Clean-Up, Earth Day Awareness Displays, Christmas Tree Round-Up), The Clean Air Coalition, The Clean Air Campaign (carpooling initiative), and The Clean Cities Coalition (E-85 Station, Waste to Energy).

IMPACT	ASPECT
Air	1,400 Air Emission Sources – Title V Major Source
Land	12,000 tons per yr Solid Waste Generated - > ½ Recycled
Water	1.4 billion gal per yr Water Consumed – 1 Permitted Drinking Water System, 7 Potable Wells
Water	2.5 MGD Wastewater Treated – 4 NPDES Permitted Treatment Plants
Land, Water	2,200 acres Wetlands
Air, Land, Water	1.7 trillion BTUs per yr Energy Consumed
Air, Land, Water	1 National Priority List Site, 79 Clean-Up Areas – 55 Closed, 24 w/Remedy in Place
Air, Land, Water	14M gal Fuel Storage – 142 ASTs, 29 USTs
Air, Land, Water	4,500 tons per yr Hazardous Material Consumed
Air, Land, Water	1,200 tons per yr Hazardous Waste Generated – ½ Recycled

Accomplishments

Since 1995, Robins has garnered six DoD level P2 awards, several state awards and most recently the Air Force 2007, General Thomas D. White Environmental Award for Pollution Prevention, Industrial Category.

Material Substitution

On January 1, 2003, EPA banned the production and import of virgin HCFC 141b, the first Class II Ozone Depleting Substance (ODS) and required it to be phased out. At the request of the process owner, the Toxic Release Inventory and Alternative Development (TRIAD) process was used to evaluate a number of non-ODS alternatives against engineering performance standards. Alternatives were implemented, resulting in a 90% reduction in the amount of HCFC 141b used at Robins. In an effort to reduce or eliminate the risk to the mission of continued use of a Class II ODS, Environmental Management and the 402 Maintenance Wing (MXW) partnered to validate a non-ODS solvent in the Low Altitude Navigation and Targeting Infrared for Night (LANTIRN) pod cleaning. HCFC 141b was targeted for early phase out because it had the highest ozone depleting potential of the Class II ODSs. This alternative is available as a potential replacement for other HCFC 141b cleaning applications at Robins and at other DoD installations.



Process Modification or Improvement

Alodine (Chromium VI) Reduction

In 1990, the Directorate of Maintenance approved an automated gantry system to spray a non-atomized Alodine solution on the exterior surfaces of the F-15 aircraft. The gantry system was installed, programmed, and maintained by a contractor. The application of Alodine by the gantry system took approximately 45 minutes and used 125 gallons of Alodine per aircraft. The gantry system was used between 1990 and 2000 before being discontinued due to inadequate contractor engineering support for programming the gantry computer and maintenance of the automated systems and hardware. At that time the shop changed to a manual spray, non-atomized application process that is currently in use today. The Alodine gantry system was subsequently removed in mid-2005.



Manual Alodine Application

The current manual application has substantially reduced Alodine usage from 125 gallons per aircraft to 18 gallons – an 85% reduction. In addition, the atomizing spray nozzles used with the gantry generated a serious health hazard that prohibited personnel from occupying the hangar maintenance bay during Alodine application. Use of a new non-atomizing, low pressure spray nozzle substantially reduced chromate aerosols and the associated personnel health/safety risks. The Alodine applicator still wears appropriate respiratory and protective gear, but other crew members can now occupy the bay to conduct other mission essential tasks. It is clearly apparent that the current manual process is superior to the previous partially automated operation with respect to overall cost; material consumption; time; labor; and environment, safety, and occupational health (ESOH) issues.

Air Assisted Airless Paint Gun System

Aircraft paint hangars previously utilized conventional spray guns, which had lower paint transfer efficiency. In March 2006, a continuous process improvement (CPI) team demonstrated, validated, and implemented the Air Assisted Airless (AAA) Spray Paint System in the C-130 paint facility. Immediately, the implementation of this



AAA Spray Paint System

system resulted in a 40 percent reduction in paint primer and topcoat usage with an additional 60 percent reduction in solvent usage. Overall, the system is estimated to save the government in excess of \$4K per aircraft - a total material savings in excess of \$200K annually for the C-130 Programmed Depot Maintenance (PDM) alone. The 402 MXW P2 Team is currently preparing to transition this equipment for use in the C-5 paint facility as well as in the F-15 paint facility. Additionally, environmental volatile organic compounds (VOC) reductions in excess of 9,000 pounds verify that the implementation of this system has been a tremendous success. Based on this success, supervisors with the F-15 and C-5 paint shops were invited to demo the equipment on their aircraft. A P2 project to purchase additional AAA Spray Paint Systems has been programmed.

Weapon Sytem	PDM Schedule (Days)	VOC Reduction (Pounds)	Waste Reduction Savings (\$)	Haz/Mat Usage Reduction Savings (\$)	Annual Savings (\$)
F-15 (projected)	110	6,336	\$4,032	\$145,315	\$149,347
C-5 (projected)	16	16,043	\$7,541	\$276,343	\$283,884
C-130 (actual)	51	9,453	\$2,822	\$251,933	\$254,755
Total Savings (projected)		31,832	\$14,395	\$673,591	\$687,986

Chrome Plating Process Improvements

Chrome plating process improvements were evaluated to reduce the environmental burden, improve productivity in daily metal finishing operations, and reduce employee exposure to hazardous materials. The option implemented was the replacement of obsolete anodes with new conforming anodes, which hug the part reducing overplating and energy use. The previous process equipment was poorly designed, outdated, and inefficient. Using historical data and the highly respected experience of shop personnel, Robins was able to justify the project and secure joint production and environmental funding for implementation. Conformal anodes were designed, prototyped, and process-tested on the hard chrome plating line. Replacement racks were

also developed to replace the older, less safe, more time-consuming equipment. The successful implementation of this project had positive benefits on air, land, water, production, and worker health and safety, while sustaining both the mission and the environment.

- Eliminated the very time-consuming wax masking step and perchloroethylene usage;
- Eliminated worker exposure with new fixtures/racks;
- Reduced plating time (in-tank time) for the propeller hub from 36 to only 8 hours; support sleeve is reduced from 120 to 8 hours;
- Dropped the reject rate on support sleeves from almost 90% to less than 5%;
- Reduced flow times for hub and sleeve work 79-43 hours (46% reduction) and 243-43 hours (82% reduction), respectively.

Improved Material Management

The institution of 70 point of use (POU) cabinets allowed materials to be broken down proportional to the workload in the area, eliminating excess material usage. These cabinets also provided quicker access to commonly used materials due to close proximity to the work areas. The saved travel time translated to increased worker productivity. As a companion to the POU cabinets, Robins successfully implemented the 4.0 version of the Hazardous Material Management System (HMMS). The utility of material management was improved through:

1. Reports and other outputs can be put into Adobe format which facilitates electronic transfer;
2. New enhancement releases are centrally managed which facilitates getting changes to the system quicker; and
3. Issues are quicker due to less keystrokes and screens.

Overall, pharmacy personnel find the web based version more efficient and user friendly. Also a Hazardous Material Management Process team was established to facilitate corrective action of any issues that arise.

Compliance with E.O. 13123, "Greening the Government Through Efficient Energy Management," June 3, 1999¹

The Robins AFB Aircraft Corrosion Control Paint/Depaint Hangar contains the first air recirculation system in the AF. Eighty percent of the conditioned air is re-circulated and reused, reducing peak electrical demand for cooling from 6 to 1.5 megawatts. It also reduces peak gas demand for heating and humidification from nearly 200,000 to less than 50,000 cubic feet per hour. Air recirculation is expected to save more than \$2M per year - equivalent to painting one C-5 aircraft for free. This unique recirculation system was featured as a "You Have the Power" poster during Energy Awareness Month sponsored by the Federal Energy Management Program.

In addition, the Base Utility Management Office recently signed a three-year contract with Georgia Power to provide the base with Green Energy. Three percent of the base's annual kilowatt-hour consumption was purchased. Robins has committed to purchase more than 40 percent of the Georgia Power's current renewable energy supply.

Compliance with E.O. 13148, "Greening the Government Through Leadership in Environmental Management," April 26, 2000¹

One of the objectives of the Robins EMS is to reduce or eliminate the use of toxic

chemicals, such as hexavalent chromium. To meet this objective the 402 MXW implemented a process using PreKote, a non-hazardous, non-toxic, chrome-free surface treatment in C-130 paint operations replacing chromated wash, etch, and Alodine. The new process reduces hazardous material purchases, hazardous waste disposal, provides a healthier environment and reduced process flow times by eliminating the complete C-130 prewash. The use of the PreKote Surface Pretreatment material reduced the environmental impact and personnel liabilities associated with use of chromates. Cost savings estimates are \$444K per year based on 37 aircraft.

Compliance with E.O. 13149, "Greening the Government Through Federal Fleet & Transportation Efficiency," April 21, 2000¹

Robins is decreasing dependence on foreign oil by fueling all diesel vehicles with biodiesel. To date, the base has purchased in excess of 217,175 gallons. The base has also established a fueling policy that ensures all Ethanol (E-85) rated Government Service Administration (GSA) vehicles use this alternative fuel. This fueling policy reduces the federal government's dependence on foreign oil.

New hydrogen powered vehicles, a 4,000 lb rated forklift and a multipurpose Toolcat, are being demonstrated on Robins AFB. These vehicles use Hydricity® Packs which are complete fuel cell systems that replace batteries in industrial vehicles. Vehicles will be fueled by the "HyHauler Trailer" which is a lightweight, trailer-mounted hydrogen fuel dispensing system until a permanent hydrogen fueling station can be constructed in about a year.

Recycling Program

Robins has a comprehensive recycling program which meets both DoD and AF P2 requirements. Materials recycled in an average fiscal year are listed in the table below.

Recycled Materials	Quantity
Stable/Yard Waste and Wood	2,100 tons composted
Petroleum, Tires, Batteries	213 tons
Cardboard, Paper, Plastic, Glass	1,440 tons
Metals (Aluminum, Copper, Steel, Lead, Magnesium, Titanium)	1,500 tons
Sanitary Sludge as Landfill Cover	195 tons
Printer/Toner Cartridges	10 tons
Electronic Equipment	3.5 tons
Construction & Demolition (C&D) Debris	15,000 tons
Activated Carbon	4 tons
Cooking Grease	32 tons

The total solid waste (SW) diversion rate was 50% resulting in savings of \$1.3M. All SW reductions were achieved through recycling initiatives. In 2007, Robins diverted 5,627 tons of non-C&D SW and 15,040 tons of C&D for a total of 20,667 tons from the landfill. One closed-loop project in which Robins actively participates is the recycled toner cartridge procurement and reuse program. Another project is the composting of the base's yard and stable waste. Once composted, this material is diverted from the landfill and reused for all base landscaping projects, resulting in a savings of \$230K per year. Where feasible, Robins has replaced 1-gallon paint kits with 55-gallon drums or

¹ Robins AFB meets the requirements of E.O. 13123, 13148, and 13149, but also the requirements of E.O. 13423 signed January 2007 which rescinded E.O. 13123, 13148, and 13149.

cont. from page 5

reusable paint totes, thus eliminating the need for thousands of steel paint cans. For those painting processes where larger paint containers are not feasible, steel paint can recycling has been implemented. Recently, Robins has initiated several new recycling techniques, such as steel paint can and electronic waste recycling. As a benefit to local communities, Robins recycling efforts diverted 20,498 tons of waste from the county landfill. In addition, Robins partners with Happy Hour, an organization that provides employment opportunities for disabled citizens in the local community.

Green Procurement

Robins Green Procurement Program (GPP) includes all base organizations, hosted units, and contractors. The Robins GPP plan, which was approved by the installation commander, includes the following procurement elements: recovered materials, biobased products, energy and water efficient products, ozone depleting substances, priority chemicals, and environmentally preferable products.

In order to make the GPP visible, a GPP website was developed, offering GPP guidance, training, and resources. Basewide Green Procurement briefings are available to ensure proper documentation of green purchases. The base partnered with The International Center for Leadership Development to convey an outstanding Green Procurement Training package for contractors to push the "Buy Green" philosophy to the Robins contractor population. Promoting recycled content items was enhanced through the incorporation of GPP mandates in all appropriated funded contracts.

Environmental Protection Agency guidelines items purchased include metal coatings, office supplies, sanitary tissue, engine coolants, packaging products, trash bags, lubricating oils, sorbents, cleaning materials, newsprint, playground equipment, toner cartridges, running track material, and recycling centers. Additionally, environmentally preferred tires, traffic paint, and environmental awareness items were also purchased.

Purchases of items with recycled content increased from \$154K in 2002 to \$439K in 2007. These gains were realized due to increased emphasis from Environment, Safety and Occupational Health Compliance Assessment and Management Program assessments; Government Procurement Card Audits; Contract Action Reports generated from the Federal Procurement Data Systems; the Defense Logistic Agency Environmental Reporting Logistic purchases; and GPP training.

Education, Outreach & Partnering

Earth Day Grocery Bag Contest



Every year, the Earth Day Grocery Bag Contest generates excitement and competition. Students display their knowledge and commitment to take care of the Earth through recycling and natural resource conservation. Bags are donated by the base Commissary, decorated by students at the base elementary school, judged by CEV, and returned to the Commissary for grocery bagging on Earth Day. An awards ceremony is given for the winning artists. Environmental Management employees, as well as, their support contractors participate in making this an enjoyable but educational event.

Wellston Trail Greenway Cleanup

The Wellston Trail Greenway Cleanup is organized by Headquarters, Air Force Reserve Command (AFRC). This annual event was attended by 25 people who typically collect 20 bags of trash. The units represented from on base were AFRC, 78 CEG, 78 CS, and the Med Group. There were volunteers to help with the clean up and provide the gloves, trash bags, and safety vests.



Other Education Outreach Activities

- Environmental Awareness Days
- Historic Forest Ceremony/Tree City Designation
- Bird Watching
- Computer Electronics Recycling
- Fishing Rodeo

Carpooling

Through a partnership with the Georgia Department of Transportation (DOT) and the Georgia Clean Air Campaign, personnel at Robins AFB answered the challenge to carpool or vanpool to work in a big way. As a response to public awareness efforts, more than 1,500 base personnel have filed ride match applications seeking carpool or vanpool partners. Campaign staff noted the response at Robins “has been among the most enthusiastic from any major employer.”

Carpools/vanpools have formed and nearly 1,100 trips have been logged to date. Campaign staff indicated program participants have already saved a collective \$17K by not driving their single occupancy vehicles a total of 34,958 miles which resulted in a reduction of over 500 lbs/year of carbon monoxide emissions. In addition to the cost savings realized by participants, carpooling reduces hydrocarbon, nitrogen oxide, and carbon dioxide emissions - smog and greenhouse gas contributors.

Reductions Achieved

During the award period, Robins’ activities achieved numerous material and waste reductions. Robins EMS is used to set goals, track progress, and determine reductions in all media areas using data from various databases, reports, and program/project manager engineering estimates. Baseline cost data established during project development is used to determine environmental savings. Overall life cycle cost analysis is an integral part of Robins’ reduction efforts. In addition to the cost of the process change, reducing ESOH costs and risk is considered before the change is approved by the stakeholders.

For example, hazardous material related reductions are derived from a combination of data from the Hazardous Material Management System and the program manager. Hazardous material related reductions reduce base activity cost through reduction in hazardous waste disposal and compliance cost. Additionally, more efficient process alternatives required less material. As reductions are achieved, worker exposure risks are substantially decreased.

Green Buildings

Robins Engineers and Designers received “Introduction to Sustainable Building, Specifications, and Waste Management Practices” training from the Georgia Institute of Technology. This training assisted engineers and designers to interject Leadership in Energy and Environment Design (LEED) credits in to the new Visitors Center project design. LEED credits targeted all categories: sustainable site, water efficiency, energy & atmosphere, materials & resources, indoor environmental quality, innovation & design for a total of 26 total credits. This project combines both force protection standards and green construction practices proving that a building can meet strict force protection requirements, be environmentally friendly, and aesthetically pleasing!

