
AIR FORCE RESTORATION STATUS AND PROGRESS



The Air Force continues to make considerable progress cleaning up past waste disposal sites at our active and BRAC installations. It is an obligation we take seriously and core to our responsibilities of protecting human health and environment of the surrounding communities and our own Air Force military and civilian employees. Through environmental restoration, we make formerly unusable contaminated property available for military or community reuse. As our military operations evolve, our installations have better flexibility to provide the necessary training and support facilities as restored property becomes available for reuse.

—Maureen T. Koetz, Deputy Assistant Secretary of the Air Force
(Environment, Safety and Occupational Health)

Demonstrating an enduring commitment to the environmental restoration of its contaminated areas allows the Air Force to maintain a high state of preparedness. Contamination from past practices can be an obstacle to the effective execution of the Air Force mission and hinder readiness to respond to crises. The Air Force strives to protect human health and the environment by increasing cleanup program efficiency and reducing management costs so that it can accelerate the program and return land to useful purposes.

In Fiscal Year 2001 (FY01), the Air Force continued to ensure readiness by making significant progress in the execution of its restoration program at 266 active installations and 30 installations in the Base Realignment and Closure (BRAC) program. The Air Force also helped ensure mission readiness by building on the foundation of its restoration and BRAC programs, whose cornerstones include teamwork and strong, effective partnerships with regulators, the community, and other stakeholders. The Air Force is committed to seeking and promoting innovative and cost-effective methods of remediating installations,

closing out restoration sites, and facilitating property reuse. As a result, by the end of FY01 approximately 50 percent of BRAC installation acreage had been deeded and more than 38 percent of BRAC installation acreage had been leased. Further, former Air Force bases are now providing more than 46,600 jobs. The Air Force is committed to providing the environmental leadership needed to address future environmental concerns.

Program Execution

The Air Force is focused on finding ways to accelerate the environmental restoration program, reduce management costs, improve contracting efficiency, and provide more vigilant oversight. The organizational chart on page 91 illustrates the hierarchical structure of the Air Force.

Level funding provides the maximum flexibility to effectively and efficiently execute the environmental restoration program and to make adjustments as new situations arise. Air Force's commitment to faster, more efficient environmental restoration will allow it to meet

Air Force Facts

In Fiscal Year 2001 (FY01)...

- ❑ Active Air Force had a net increase of 29 sites and 64 areas of concern in its restoration inventory, bringing the active-installation site total to 4,600 (including 1 Military Munitions Response program (MMRP) site) at 266 installations (see pie charts on page 89 for site status).
- ❑ Air Force BRAC had a net increase of 25 sites in its restoration inventory, bringing the site total to 1,671 at its 30 installations (see pie charts on following page for site status).
- ❑ Investigations were completed at 229 active-installation sites, and response complete (RC) was achieved at 223 active-installation sites.
- ❑ Investigations were completed at 45 BRAC sites, and RC was achieved at 73 BRAC sites.
- ❑ Nine active-installations achieved remedy in place (RIP) status.
- ❑ Three BRAC installations achieved RIP status.
- ❑ Interim actions were completed at twenty-two BRAC sites.

Through FY01...

- ❑ Eighty of the 266 active-installation sites have achieved RIP status.
- ❑ Nine of the 30 BRAC installations with Installation Restoration program (IRP) sites have achieved final RIP status for all sites.

- ❑ RC status has been achieved for 2,721 active-installation sites.
- ❑ RC status has been achieved for 813 BRAC sites, and 733 have reached a No Further Action (NFA) status. Long-term management (LTM) is currently planned at 64 of the 813 RC sites.
- ❑ One thousand, eight hundred and seventy-nine active-installation sites are either “in progress” (i.e., have work under way) or have future restoration actions planned.
- ❑ Eight hundred fifty-eight BRAC sites are either in progress or have future restoration actions planned.
- ❑ Remedial action cleanups are in progress at 79 active-installation sites, and 282 sites are undergoing remedial action-operations (RA-O).
- ❑ Eighteen BRAC sites have remedial action cleanups in progress or planned, and 104 sites are undergoing RA-O.
- ❑ Active Air Force has 1,006 sites in the investigation phase (including one MMRP site).
- ❑ Air Force BRAC has 456 sites in the investigation phase or awaiting the development or signing of appropriate decision documents. One or more interim actions have been taken at approximately 60 percent of the sites.
- ❑ Overall, Air Force BRAC has completed 735 interim actions at 598 sites; another 432 interim actions are under way.

Note: The Air Force has areas of concern locations that are under investigation and have not been designated as sites or validated relative-risk rankings.

its FY02 Defense Planning Guidance (DPG) goals ahead of schedule. The DPG goals are based on the concept of addressing the “worst first.” By the end of FY01, Air Force had reduced risk at 62 percent of its active high relative-risk sites. Air Force’s progress towards its goals is illustrated on page 90. Within the restoration program, the ability to execute available funds for site cleanup is a strong indicator of overall program progress.

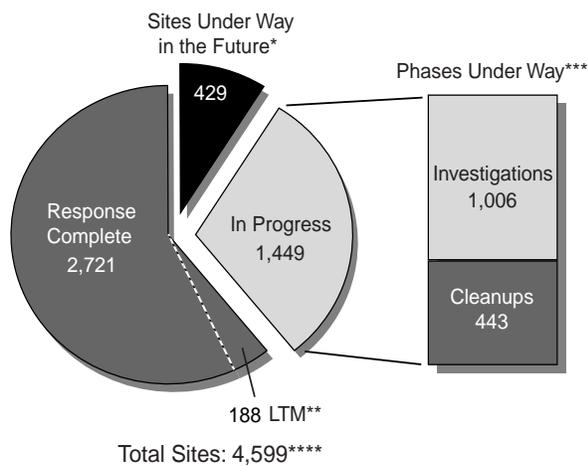
In FY01, AFBCA made significant progress in the BRAC program with the closure and realignment of McClellan Air Force Base, Texas and Kelly Air Force Base, California. The BRAC program successfully transferred 12,918 acres, excess to DoD, in FY01 (see Environmental Condition of BRAC Property pie chart on page 94).

Funding

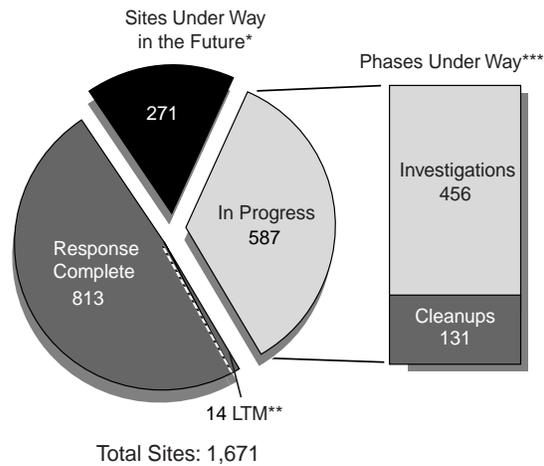
Level funding provides maximum flexibility when new, high-profile requirements arise. Because of several years of stable funding, the Air Force was able to meet its FY02 DPG goal ahead of schedule. Level funding is the minimum foundation requirement needed to meet the next DPG goal. Funding variations can disrupt restoration program progress. This has the potential to result in delays in attaining program goals.

In FY01, the Air Force’s active installations obligated \$375.5 million in environmental restoration funds (see funding profile figures on page 93). Investments will increase to \$382.8 million in FY02. In FY01, the Air Force spent approximately 56 percent of its restoration funds on design work, interim or final cleanup actions, and LTM. This percentage is expected to

Active Site Status
(as of September 30, 2001)



BRAC Site Status
(as of September 30, 2001)



*Includes sites with future preliminary assessment starts planned and cleanup projects that are between phases.

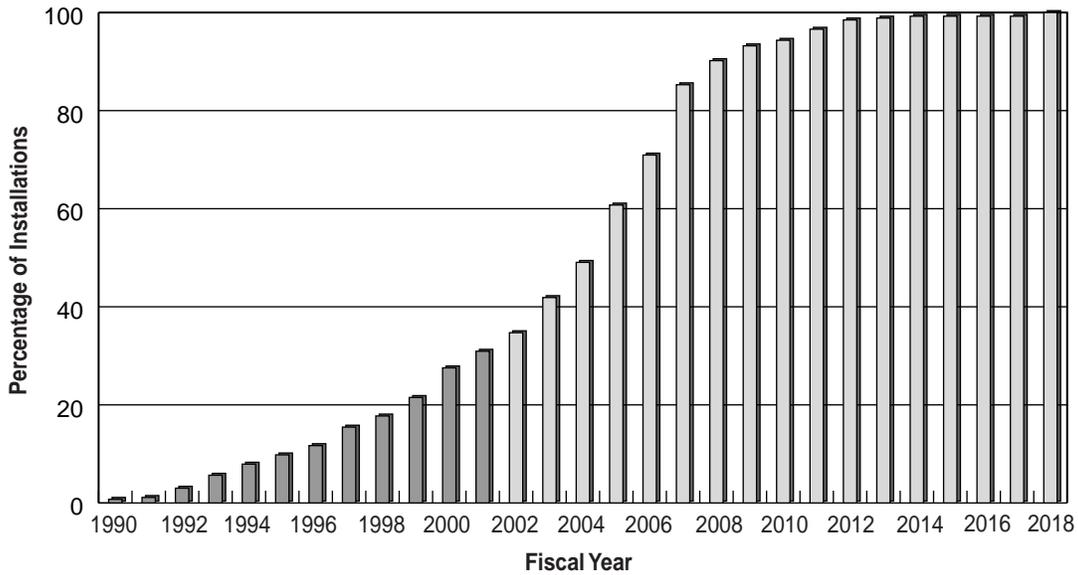
**LTM is a subset of Response Complete.

***Phases Under Way may not add up to Sites in Progress because some sites have multiple phases under way.

****Excludes one MMRP site that is in the investigation phase.

**Active Installations Achieving Final Remedy in Place or Response Complete
(cumulative and projected, FY90 through completion)**

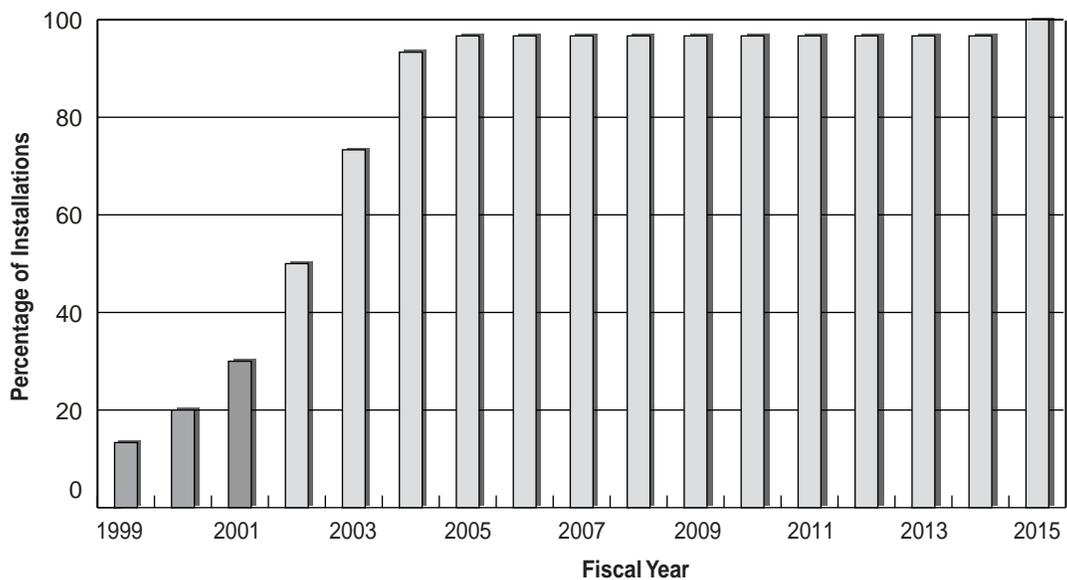
Total Installations = 265*



*Does not include MMRP sites or UXO sites incidental to IRP cleanup.

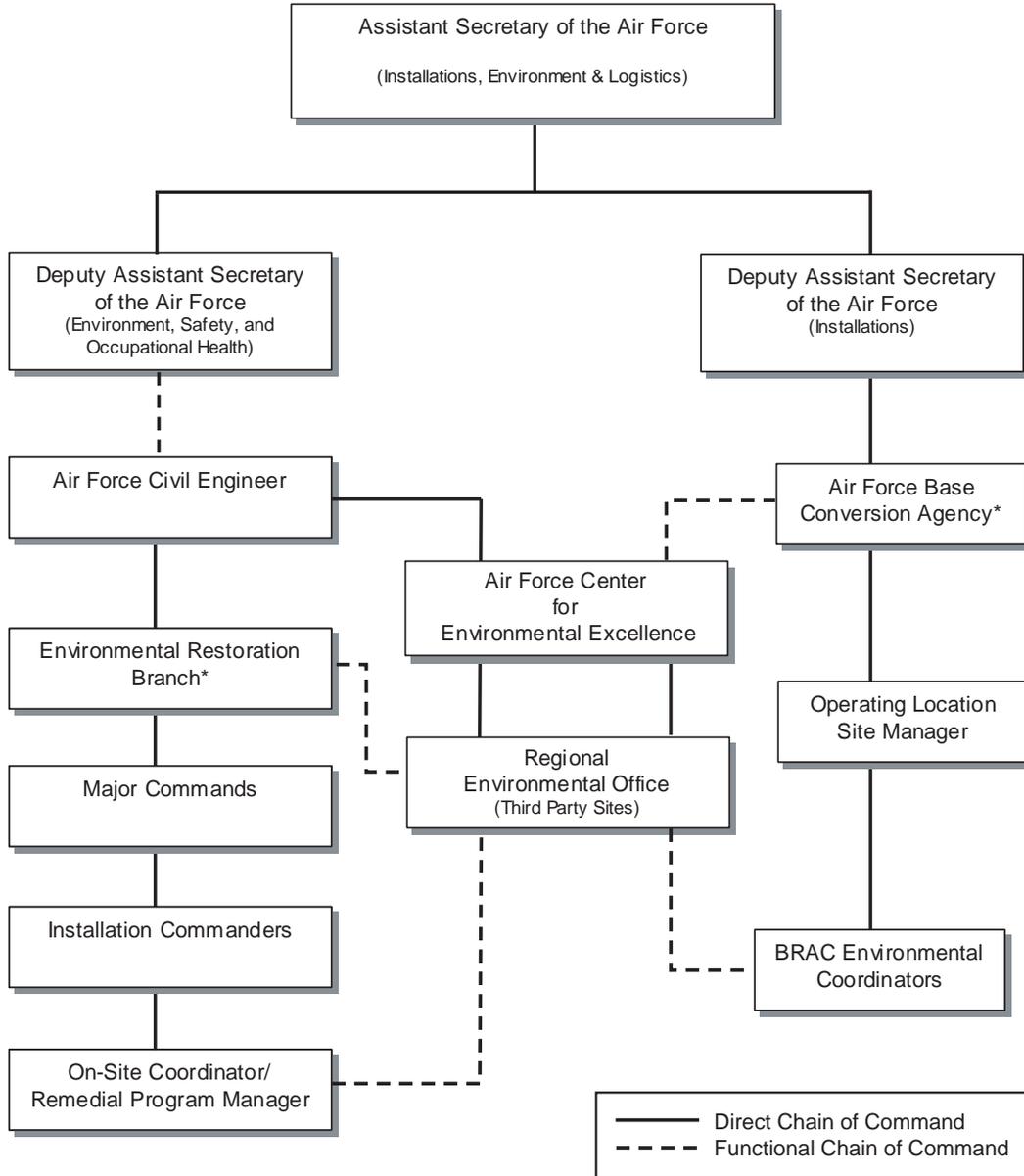
**BRAC Installations Achieving Final Remedy in Place or Response Complete
(cumulative and projected, FY99 through completion)**

Total Installations = 30*



*Excludes installations without environmental restoration sites

Department of the Air Force



* In this diagram, all branches above, and including, the Environmental Restoration Branch and Air Force Base Conversion Agency are responsible for policy, guidance, and oversight. All branches shown below these branches are responsible for program execution.

increase to 65 percent in FY02 and 72 percent in FY03.

Air Force BRAC invested \$146.7 million in environmental activities in FY01. The planned BRAC investment levels for FY02 and FY03 are \$222.0 million, and \$119.1 million, respectively.

Cost-to-complete trends for the Air Force are illustrated on the following page.

Program Accomplishments

During FY01, the Air Force continued its progress toward achieving program goals (see RC and interim action bar charts on page 95).



FOCUS ON THE FIELD:

Aggressive Cleanup Leads to Economic Revitalization

On July 13, 2001, military ceremonies at Kelly Air Force Base, Texas and McClellan Air Force Base, California marked the bases' closure with the final lowering of the American flag and the raising of a new one representing KellyUSA in San Antonio and McClellan Park in Sacramento. Both transitions were made possible by the work of dedicated environmental teams that have overseen very aggressive cleanup programs at these bases. Significant cleanups are still required at both Kelly and McClellan, with estimates to complete both reaching a combined total of \$1.4 billion.

Working closely with state and federal regulators, the Air Force Base Conversion Agency (AFBCA) team identified acres that were ready for immediate transfer. The teams ensured that all remedies for the transferred properties met the requirements for proposed reuse. Strong leadership and early involvement with the community enabled AFBCA to make the property ready and available for transfer.

Kelly is well on its way to becoming a business park with air, highway, and railroad access. Under long-term lease, more than 1,692 acres are being reused for commercial and military business. KellyUSA has already attracted 20 businesses, including Boeing, Lockheed Martin, and Pratt and Whitney, employing 4,500 people.

At McClellan, the base's transformation into a high-tech, aviation-related business park is also well under way. By the day of the base's deactivation, McClellan Park had leased almost 3 million square feet of space to 67 tenants, creating more than 3,000 jobs. AFBCA completed leases for a total of 2,630 acres of land and facilities scheduled for later transfer into the local redevelopment authority's possession. Ninety-five percent of all major buildings on base are now in the hands of the community for reuse.

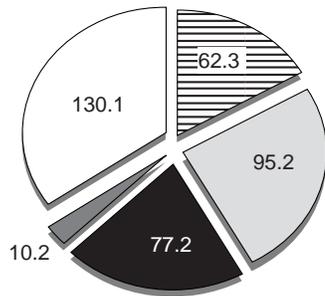
Achieved through committed leadership, hard work, and a clear vision, the economic successes of Kelly and McClellan are proof that base conversion works.



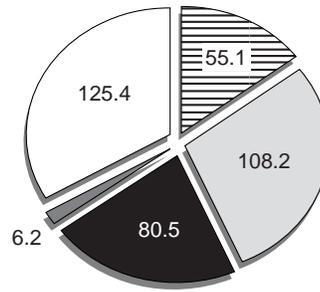
Signs show the entrances to the two business parks now residing at former Air Force installations.

Air Force Environmental Restoration Funding Profile
(in millions of dollars)

FY00 Air Force Funds Obligated
Total = \$374.9 million

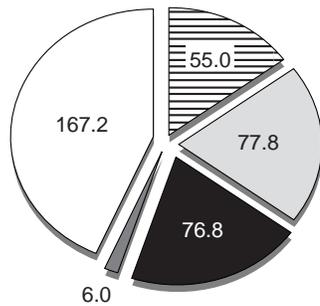


FY01 Air Force Funds Obligated
Total = \$375.5 million

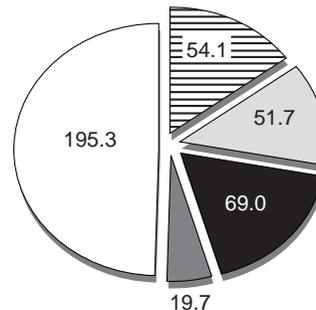


Management
Investigation
Cleanup Categories
Interim Action
Design
Cleanup*
*Includes estimated LTM costs

FY02 Air Force Execution Planned
Total = \$382.8 million

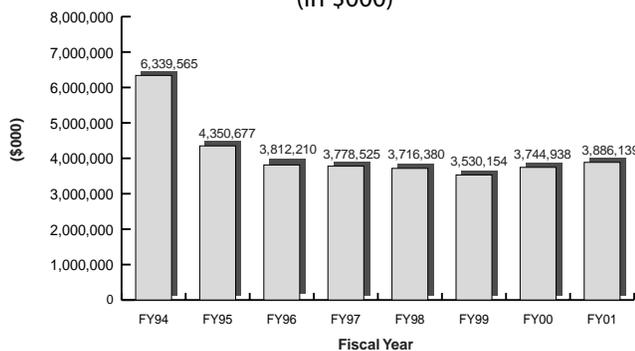


FY03 Air Force Planning Estimate
Total = \$389.8 million



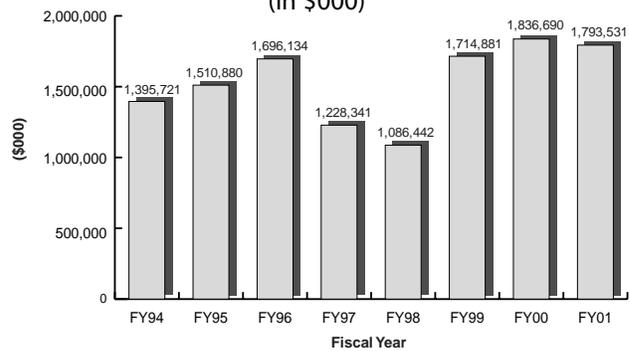
Due to rounding, category subtotals may not equal fiscal year totals.

Air Force ER Cost-to-Complete Trends
(in \$000)



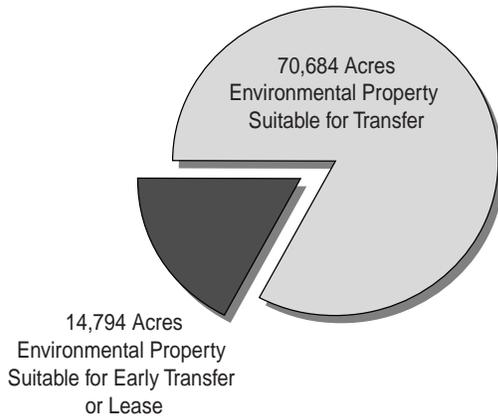
Note: Funding represents site level data and does not include management and support or other miscellaneous costs not directly attributable to specific sites.

Air Force BRAC Cost-to-Complete Trends
(in \$000)



Note: Funding represents site level data and does not include management and support or other miscellaneous costs not directly attributable to specific sites.

Environmental Condition of BRAC Property



Relative-risk ranking charts on page 96 summarize the progress made towards ranking both active and BRAC restoration sites. The Air Force concentrated on improving the long-term performance of its environmental restoration program in several key areas by—

- Identifying future requirements for range cleanup
- Continuing successful programs to return property to the community
- Employing innovative technologies
- Implementing proven treatment methods
- Increasing stakeholder partnerships
- Improving contracting methods.

Identifying Future Requirements for Range Cleanup

Ranges are a vital component of the Air Force's military training infrastructure and are needed to ensure that all personnel maintain the highest possible state of readiness. However, many

ranges contain unexploded ordnance (UXO) within their boundaries. In FY01, the Air Force initiated a comprehensive range inventory to characterize the presence of UXO. As part of this inventory, each installation is required to complete a detailed questionnaire that collects data on each range's environmental status, the types of munitions used, and the type and level of external stakeholder interest. The inventory is being performed in preparation for the substantial tasks of UXO clearance and subsequent environmental restoration.

Continuing Successful Programs to Return Property to the Community

The Clean Sweep program is an Air Force initiative that performs environmental cleanup and demolishes unsafe, abandoned facilities at 30 Air Force locations throughout Alaska. Air Force minimizes costs by combining these activities

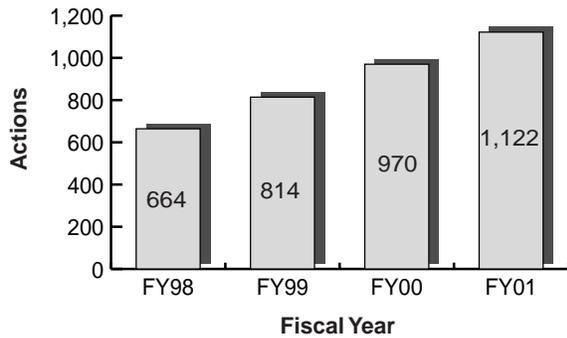


Workers demolish Murphy Dome as part of the Clean Sweep Program.

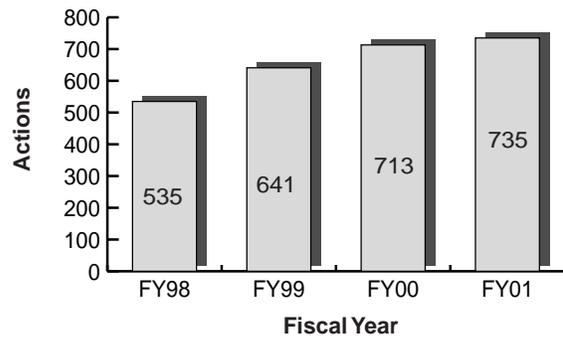
under one mobilization effort and one contract. In FY01, the Air Force spent approximately \$13 million on Clean Sweep initiatives at nine installations. The work conducted in FY01 involved surveys, building demolition and debris removal, and environmental soil and groundwater remediation. Overall, Clean Sweep work has been completed at eight installations (Anvil Mountain Radio Relay Station, Bear

Creek Radio Relay Station, Chena River, Fort Yukon Long Range Radar Site, Kotzebue Long Range Radar Site, Murphy Dome, Pillar Mountain Radio Relay Station, and Tin City Long Range Radar Site). The Air Force is aggressively pursuing cleanup at the remaining facilities to protect human health and the environment and return the property to useful service to the community.

Cumulative Interim Actions Completed at Active Sites*

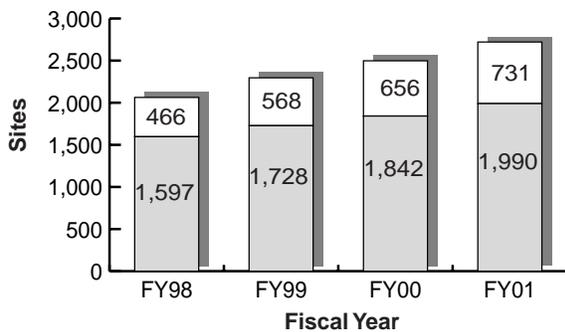


Cumulative Interim Actions Completed at BRAC Sites*

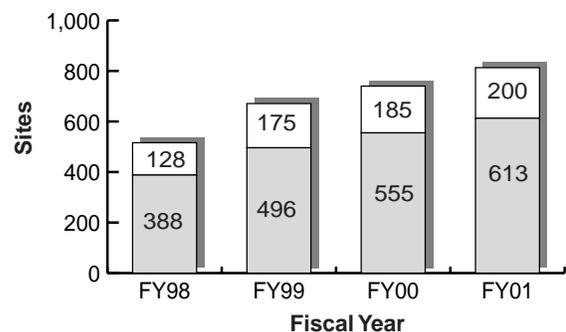


*FY98 through FY00 totals have been updated since the previous Annual Report to reflect new and revised data as of FY01.

Active Sites with Response Complete*



BRAC Sites with Response Complete*



Sites reaching Response Complete from Cleanup
 Sites reaching Response Complete directly from Investigation

*FY98 through FY00 totals have been updated since the previous Annual Report to reflect new and revised data as of FY01.

Employing Innovative Technologies

Several innovative technology initiatives took place in FY01. The New York Air National Guard employed an innovative material called hydrogen-releasing compound, which accelerates the natural biodegradation of trichloroethene (TCE) at its Site 5. This unique technology offers the advantages of low capital costs, no operation and maintenance costs, minimal site disturbance, and rapid cleanup. In less than 3 months, the concentration of TCE had decreased by as much as 75 percent in some wells within the site's groundwater contaminant plume.

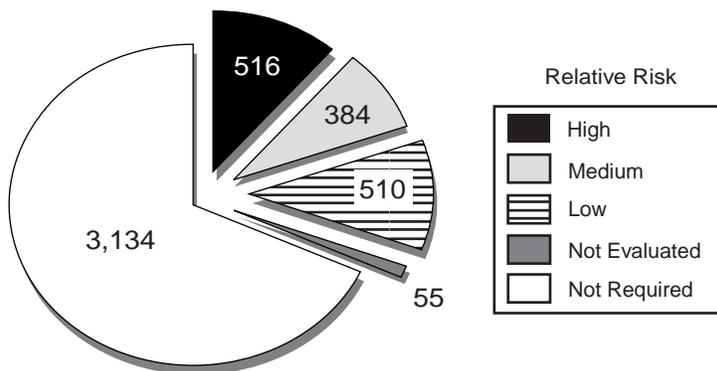
Another innovative technology allowed the Air Force to reuse existing remedies. Based on recent field tests at Edwards Air Force Base, California, microwave energy may provide a more cost-effective way of regenerating granular activated carbon (GAC) filters, which are used extensively in groundwater cleanup at the base. The study

showed that the microwave regeneration process removed more than 80 percent of organic compounds, and the GAC filters were effective through 6 cycles of regeneration. This process could result in significant cost savings by reducing the frequency with which GAC filters must be replaced.

Implementing Proven Treatment Methods

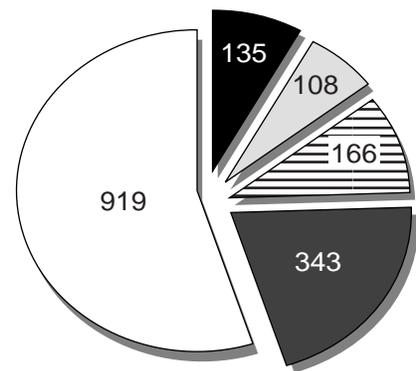
The Air Force strives to implement technologies as soon as they are proven to be effective. Based on a successful pilot study conducted in January 1999, Offutt Air Force Base, Nebraska, is now employing a full-scale "biowall" to address contamination at its Building 301 site. This biowall technology uses a natural organic matter treatment trench for the remediation of a groundwater plume contaminated with chlorinated hydrocarbons.

Relative-Risk Ranking for Active Sites in Progress



Total Sites = 4,599*

Relative-Risk Ranking for BRAC Sites in Progress



Total Sites = 1,671

*Excludes one MMRP site.

Once a remedy is in place at a BRAC installation, the deed to a property can be transferred before cleanup objectives have been met if the remedy is demonstrated to be operating properly and successfully (OP&S). OP&S involves two separate concepts. The selected remedial action is operating “properly” if it is functioning as designed. The same remedy is operating “successfully” if its operation will achieve the required cleanup levels or performance goals to be protective of human health and the environment. In FY01, AFBCA obtained OP&S status at one site at K.I. Sawyer Air Force Base, Michigan and two sites at Pease Air Force Base, New Hampshire bringing AFBCA’s total of OP&S designations to seven out of seventeen for all of DoD.

Increasing Stakeholder Partnerships

Three noteworthy partnering initiatives occurred in FY01. Vandenberg Air Force Base, California, continued its partnership with the University of Waterloo, Ontario, Canada, in the investigation of an innovative bioremediation technology to clean up a site contaminated with methyl tertiary-butyl ether (MTBE), a gasoline additive that reduces hazardous air emissions. The system stimulates naturally occurring bacteria to degrade MTBE in groundwater. This enhanced natural attenuation was determined to be successful, and the new technology is expected to be applied to site cleanup, targeted to begin operation in February 2002.



FOCUS ON THE FIELD:

Kirtland Exceeds Air Force Goals for Base Cleanup

Kirtland Air Force Base, New Mexico, is on track to have all of its Installation Restoration program (IRP) sites cleaned up nearly 10 years ahead of Air Force goals. Kirtland personnel attribute this rapid progress to the employment of innovative technologies in the cleanup process as well as the base’s successful implementation of interim corrective measures (ICMs). An ICM is a voluntary action that is implemented between investigation and the final remedy to immediately remove contamination that might be a threat to the environment or human health. Based on their success, and with regulatory approval, ICMs have become final remedies at 12 cleanup areas at Kirtland Air Force Base. The Kirtland Air Force Base Restoration Advisory Board has been actively involved in the base’s IRP, specifically with project and document review.

“We’re very proud of our environmental efforts here at Kirtland Air Force Base,” said Col. Robert Wright, former Vice Commander of the 377th Air Base Wing and Chairman of the Kirtland Air Force Base Environmental Protection Committee. “We have a very aggressive and proactive program which exemplifies the Air Force core value of excellence in all we do.”

In August 2001, the Air Force—along with the other Services and DoD—attended a meeting of the Association of State and Territorial Solid Waste Management Officials (ASTSWMO) in Tampa, Florida. ASTSWMO focuses on the needs of state programs related to hazardous and non-hazardous waste; recycling, waste minimization, and reduction; Superfund/state cleanup; and underground storage tanks. In addition, the Association assists states in learning from, and working with, other state peers.

Improving Contracting Methods

A major contracting initiative in FY01 involved performance-based cleanup (PBC). In PBC, the contractor owns the site cleanup until complete, and is paid for achieving well-defined milestones. Since the driving mechanism is profit, the process encourages the contractor to be innovative and to accelerate cleanup. The regulator must approve any selected cleanup remedy, thereby ensuring human health and the environment are protected. In FY01, the Air National Guard, with support from the Air Force Center for Environmental Excellence (AFCEE), set a goal of awarding PBC contracts for five installations in FY02. Using benchmarks, pilot efforts were tested, and PBC contracting will be another option for all Air Force installations.

Innovative Remediation Projects

The Air Force remains committed to the identification and implementation of technologies and more protective processes that can clean up contaminated sites smarter, faster, and cheaper and can demonstrate sound environmental stewardship. This is the mission of the AFCEE Technology Transfer Division (ERT).

The ERT division is continuing to build on successes from previous and ongoing demonstrations of remedial process optimization (RPO). RPO is the technical evaluation of a cleanup remedy, such as groundwater pump-and-treat systems, to optimize operation, accelerate contamination reduction, and reduce operating time and costs while providing increased protection of human health and the environment. Over the next decade DoD will spend more than \$1 billion per year on the operation, maintenance, and monitoring of remediation systems. During FY01, in an effort to improve protection of human health and the environment, ERT continued implementing the RPO protocol to minimize risk and improve the site closure process, which often includes lengthy and expensive long-term management. In addition to evaluating the technical aspects of the remediation process in relation to the latest scientific advances, RPO takes into account any regulatory changes.



Air Force Center for Environmental Excellence

<http://www.afcee.brooks.af.mil/> or www.afcee.brooks.af.mil/er/rpo.htm



FOCUS ON THE FIELD:

Purple Compound and Aggressive Technologies Reduce Contamination at Air Force Plant 44

This year, Air Force engineers witnessed a drop in contamination levels at two sites at Air Force Plant 44 in Tucson, Arizona, thanks to a compound called potassium permanganate. In a pilot test at the plant, 4,500 pounds of this purple-colored compound were injected into monitoring wells to determine whether the compound would degrade trichloroethylene (TCE) trapped in soil and groundwater. The test showed a decline in TCE concentrations in all the wells that the permanganate solution reached. Engineers consider the compound to be a good alternative to traditional cleanup methods because it quickly reduces TCE concentrations. The one remaining problem is getting the permanganate into the often-inaccessible compact clay layers where TCE resides and from which it leaches into groundwater. The team at Plant 44 is now developing a study to assess the methods best suited to injecting and distributing the permanganate solution on a wider scale.

A majority of the soil cleanup work at Plant 44 has now been accomplished through the cleanup team's use of hard-hitting technologies like potassium permanganate injection. Since 1996, engineers have removed more than 43,000 tons of metals-tainted soil from three cleanup sites and about 100,000 pounds of volatile organic compounds from subsurface soil. With a reduction in TCE at most remaining sites, Plant 44 could complete soil cleanup by 2005. Seven of the plant's twelve sites have been cleaned and closed out, with the concurrence of the U.S. Environmental Protection Agency.

In addition, the plant's vast pump-and-treat facility—one of the largest ever constructed on Air Force property—has restored 20 billion gallons of TCE-contaminated groundwater since it began operation in 1986. Removal of TCE from groundwater remains a challenge, however, because of the difficulties in penetrating the clay soil layers at the base. Plant 44 is meeting this and other remediation challenges with an aggressive cleanup program incorporating the best of existing and new technologies. The team is continuing to look for, and test, new methods to speed restoration at the plant and meet cleanup goals.

RPO has led to significant savings at many Air Force installations. For example, at Eielson Air Force Base, Alaska, RPO activities accelerated closure of three contaminated-soil sites, saving more than \$1 million in costs associated with the system's operations and maintenance. AFBCA is now planning RPO efforts at six closed Air Force bases in California to evaluate the effectiveness and protectiveness of the remediation systems in place and to identify opportunities for improvement. Demonstrating to the regulators

that these sites are OP&S will make additional property available for community reuse.

With support from the Defense Logistics Agency (DLA), the Air Force finalized the *Remedial Process Optimization Handbook* during FY01 and published it on the AFCEE Web site. In FY01, ERT also developed and published the *Guidance on Soil Vapor Extraction Optimization* and demonstrated tools to assist in optimizing soil vapor extraction systems. These guidance documents are used by remedial project managers

(RPMs) and contractors to ensure the most efficient system implementation possible; they are available on the AFCEE Web site.

During FY01 the Air Force continued to play a lead role in the demonstration of passive diffusion bag samplers (PDBSs). The PDBS eliminates or substantially reduces the amount of water purged associated with groundwater sampling. PDBSs are relatively inexpensive, disposable, and easy to deploy and recover, which translates into lower labor and waste disposal costs. ERT implemented the use of the PDBS at 16 installations, including Eielson Air Force Base, Alaska, and Hickam Air Force Base, Hawaii. Results show that PDBSs produce sampling results that are substantially similar to those produced with traditional sampling methods, while realizing savings of more than 50 percent.

Also in FY01, ERT, in conjunction with an interagency work group, published the PDBS User's Guide, which is now available on the ITRC Web site. For this effort, the group comprised representatives from the Air Force, EPA, U.S. Army Corps of Engineers, DLA, ITRC, US Geological Survey, and the U.S. Navy.

Though it may not sound innovative initially, the Air Force planted hundreds of trees at six Air Force installations as part of an ongoing demonstration of a concept that uses the trees' roots to take up and contain contaminated groundwater. Once the trees have matured and adequate data have been collected, ERT will use the data to update and finalize its Draft *Protocol for Controlling Groundwater by Phytostabilization*.

FY01 saw a continuing partnership between ERT and the Environmental Security Technology Certification Program. This year, ERT assisted on projects to demonstrate a newly developed test for evaluating in situ aerobic treatment of chlorinated solvents in groundwater.

Management Initiatives

In FY01, the Air Force took aggressive steps to promote program management awareness and improve its business processes. Significant strides were made in several key areas, including—

- ❑ Information management systems
- ❑ Increased Internet presence
- ❑ Policy documents
- ❑ Understanding and planning for potential future requirements
- ❑ Using technology to cut costs and improve efficiency
- ❑ Access to training.

Information Management Systems

The Air Force has worked to enhance existing information management systems to improve decision making at all levels. One major step taken during FY01 was the validation, verification, and accreditation (VV&A) of the Remedial Action Cost Engineering and Requirements (RACER) system, a computerized tool designed to assist in the estimation of costs associated with environmental cleanup. Per DoD policy, all computer models used for Defense Environmental Restoration Program (DERP) CTC estimates require VV&A certification.



FOCUS ON THE FIELD:

Six-Phase Heating Passes Pilot Test at Air Force Plant 4

Air Force Plant 4, in Texas, completed pilot testing a new environmental cleanup technology, called six-phase heating, and will put it to wider use cleaning up soil and groundwater contamination under Building 181, an active military manufacturing facility at the site.

The primary contaminant at the site, trichloroethylene (TCE), came from degreaser tanks removed from service after leaks were discovered in 1991. More than 20,000 gallons of TCE is thought to have leaked into the soil from the tanks.

Because the remediation system already in place at the site—soil vapor extraction—matched up favorably with six-phase soil heating, the latter technology was chosen to clean up the contaminated area. With this technology, contaminants are removed from soil and groundwater by passing an electrical current through the soil. The current generates heat as a result of the soil's electrical resistance, increasing the soil temperature to the boiling point of water. In turn, this generates steam, which is captured by vapor recovery wells. The soil contaminants are vaporized and captured for extraction and treatment.

This technology has been found to be extremely cost-effective in comparison with soil vapor extraction and pump and treat systems. In the pilot test, average TCE concentrations in the groundwater and soil fell by 95 percent. The enhanced technology now will be used to remediate the half-acre area under the manufacturing facility.

The validation, completed in June 2001, coupled with Air Force's efforts to integrate the RACER system with the Air Force Restoration Information Management System, will enable the Air Force to implement an automated, consistent, and replicable method for estimating and documenting costs for the environmental cleanup of contaminated sites. RACER will also provide reasonable cost estimates for program funding purposes, consistent with the information available at the time of estimate preparation.

Increased Internet Presence

The Headquarters Air Force Environmental Restoration Branch (ILEVR) recently unveiled an

enhanced version of its Web site. The Web site serves as an additional medium for communication with Major Commands, and has successfully centralized ILEVR's program efforts under a single information source umbrella. Additionally, because the Web site is evolutionary, it will be incrementally enhanced in the future.

Policy Documents

The primary policy document for the Air Force Environmental Restoration Program, after the DERP Management Guidance, is *Air Force Instruction (AFI) 32-7020, The Environmental Restoration Program*. This document provides guidance and procedures, and was revised and



FOCUS ON THE FIELD:

Edwards AFB Tests Promising New Cleanup Technology

At Edwards Air Force Base (AFB), California, a new technology is being tested that has the potential to become the environmental restoration industry standard in treating perchlorate-contaminated groundwater. This new technology centers on the use of a bi-functional resin that selectively removes perchlorate from groundwater and incorporates a chemical regeneration process to greatly reduce the cost of disposing of perchlorate waste.

The system, developed by Oak Ridge National Laboratory, is designed to work much like a common household water softener. Contaminated groundwater flows through a canister filled with the bi-functional resin. This resin is highly selective for perchlorate, which makes it effective in an area like Edwards AFB where the shallow groundwater is often naturally high in total dissolved solids. Typical resins not highly selective for perchlorate are quickly saturated with other dissolved solids and generate a perchlorate-contaminated brine, which renders the systems highly inefficient, costly, and impractical to use.

In laboratory tests using contaminated groundwater from Edwards AFB, the new perchlorate technology substantially outperformed competing technologies, removing nearly five times more perchlorate. The regeneration process, which uses tetrachloroferrate, then cleared the resins of nearly 100 percent of their residue. A recently completed pilot-scale field test showed similar positive results. Although the full laboratory analysis and report of this field test have not yet been finalized, the preliminary findings are positive enough to support the design of a full-scale system.

reissued on February 7, 2001. The reissue incorporates substantive revisions to all sections of the May 19, 1994 version of *AFI 32-7020*, including the incorporation of the International Organization for Standardization 14000 format for an environmental management system and the addition of an extensive section describing Air Force functional programmatic responsibilities. This, and other policy and guidance documents,

will be made available through the ILEVR Web site.

In another FY01 policy development, AFBCA established an Alternative Dispute Resolution (ADR) program and used it at McClellan Air Force Base, Texas, and March Air Force Base, California. The ADR was used to establish cleanup levels, and in both instances, its use prevented a lengthy legal action.



The ILEVR Web site

<http://www.il.hq.af.mil/ile/ilevr.html>

Understanding and Planning for Potential Future Requirements

The Air Force has recognized that the regulatory constraints associated with military-unique environmental contaminants such as perchlorate

have the potential to have a significant impact on operational readiness. Perchlorate is on the fast track for future EPA regulation as a drinking water contaminant, with the standard-setting process expected to begin in 2002. To better characterize the potential impact of perchlorate on human health and the environment, the Air Force initiated an aggressive partnering program with EPA, state regulatory agencies, tribes, and other stakeholders. This program is referred to as the Interagency Perchlorate Steering Committee.

The Air Force, designated as the DoD lead agency for perchlorate-related issues, coordinates with the other Components through the DoD Perchlorate Working Group. The DoD Perchlorate Treatment Technology Work Group coordinates DoD perchlorate treatment technology development initiatives. The efforts of the Air Force in FY01 include—

- ❑ Generating in 2 years more scientific data about perchlorate than are typically generated in 10 years under traditional regulatory processes
- ❑ Providing EPA's National Center for Environmental Assessment with data, requested by EPA, to characterize the human health and ecological risks from perchlorate
- ❑ Achieving accelerated development of cost-effective perchlorate treatment technologies. This will allow for the rapid transition and use of mature technologies after promulgation of standards
- ❑ Undertaking an initial survey of military installations that have used perchlorate in support of their missions to better understand the potential extent of contamination
- ❑ Posting a significant amount of research data on perchlorate toxicology, treatment technology development, and ecological impacts on the DoD Environmental Network Information Exchange Web site to ensure that interested stakeholders have access.

Using Technology to Cut Costs and Improve Efficiency

The Air Force is also using geographic information system (GIS) technology to cut costs and enhance its cleanup effort. In conducting the inventory of Air Force ranges, the GIS technologies operated by many installations have proved to be an invaluable resource. These systems allowed rapid determination of the location, boundaries, and extent of the ranges; provided information on target locations; and were a source of information on the terrain. The GIS systems provide the Air Force with the facts needed for managing the use of these ranges. These systems also contribute to the Air Force's ability to sustain these critical assets over time and can provide invaluable information should there ever be a need for a response action on the range.

GIS technology also has other applications and associated benefits—

- ❑ Public meetings benefit from the ability to produce customized maps showing site locations, contamination of concern, and other environmental information
- ❑ Project costs can be calculated more accurately and in less time, since base personnel can simulate site conditions electronically instead of using costly physical surveys

- ❑ GIS use reduces transition costs when project contractors change
- ❑ The IRP office can easily access environmental constraint data when processing a digging permit
- ❑ Air Force personnel and contractors can use GIS to identify cultural resources, ensuring that they are left undisturbed during placement of monitoring wells and performance of other restoration work.



FOCUS ON THE FIELD:

Lackland Air Force Base's Soil Reuse Plan Saves \$10 Million

Environmental engineers at Lackland Air Force Base, Texas, are chemically treating and reusing 70,000 cubic yards of lead-contaminated soil to cap an old landfill, saving the Air Force \$10 million.

By mixing contaminated soil with a blend of environmentally safe chemicals in a process called MAECTITE, engineers are able to lock the lead into the soil to keep it from migrating out or deeper into the ground.

Workers are applying the decontaminated soil as a foundation for the landfill cap, covering it with 25,000 cubic yards of clean soil and planting grass on top to prevent erosion. "Reusing



Lead-contaminated soil is placed in a pit and mixed with environmentally safe chemicals to stabilize the lead.

soil is a rare occurrence," said Ed Roberson, Environmental Flight Chief at Lackland. "Environmental regulators traditionally will not allow it because the treated soil is still considered a hazardous waste requiring disposal at a licensed landfill. But Texas regulators gave us the green light. Since the treated soil is contained, it doesn't pose any risks to humans or the environment, and its final destination is a landfill."

Roberson and other base environmental officials had evaluated several options for capping the old landfill but eventually concluded that the reuse plan was the most efficient and economical course of action.

"It's a very sensible approach benefiting the environment and taxpayers," Roberson said. "It keeps 3,500 truckloads of untreated soil off the highway and eliminates exorbitant transportation and disposal fees that generally run \$250 per cubic yard, and the need to purchase additional soil for the foundation." Since the soil will remain on base, this option also alleviates the fears of citizens who had expressed concern about hazardous waste traveling through their neighborhoods.

Plans for the restored range site include recreational and industrial uses.

Access to Training

The Air Force Institute of Technology offered two courses in FY01 to improve the program understanding of both new and experienced personnel. The first course, Introduction to the Environmental Restoration Program, was intended primarily for IRP attorneys, IRP public affairs specialists, and new IRP support personnel. This course concentrated on the objectives, principles, and mechanics of the IRP, and on the interrelationships between the technical, legal, and community relations aspects of the program.

The second course, Environmental Restoration Project Management, was intended primarily for RPMs and BRAC environmental coordinators. This course detailed the methods, processes, and techniques of environmental restoration projects and project management.

Training was another area in which the AFBCA's partnership with ITRC produced valuable benefits. The partnership has developed high-quality Internet-based training courses. Since 1999 when the training began, more than 7,600 persons from DoD, as well as state and federal regulators have taken the ITRC Internet courses, resulting in significant savings in time and travel costs.

Outreach and Partnering

The Air Force was also able to facilitate execution of the DERP through the partnering initiatives of its three Regional Environmental Offices (REOs), located in Atlanta, Dallas, and San Francisco. These REOs advocate Air Force and DoD interests before federal, state, and local regulators, facilitating DoD environmental compliance and improving management of the program throughout the country. The REOs

have provided restoration program support in the form of legislative and regulatory review, negotiation assistance, support for partnerships, regional restoration summits, and voluntary cleanup agreements.

In FY01, ILEVR and AFBCA co-sponsored three regulator summits to provide a forum for discussing issues and initiatives with state and federal partners. This effort illustrates Air Force's commitment to providing the environmental leadership needed to promote safe and cost-effective methods of remediating installation restoration sites and facilitating property reuse.

The first of these summits, an environmental restoration summit, was held April 17-18, 2001, in San Francisco, California. The second summit, the Air Force-Regulator Environmental Restoration Summit for the Eastern Region, was held May 30-31, 2001, in Atlanta, Georgia. The third summit, the Central Region Biennial Environmental Restoration Summit, was held August 8-9, 2001 in Dallas, Texas. In each case, the summits focused on sharing knowledge about the participants' respective programs; discussing goals, challenges, and successes; ensuring that the lines of communication between regulators and the Air Force remain open; developing a mutual understanding of regulator and DoD views and concerns; and beginning the process of reaching solutions to some of these concerns. Among the issues discussed were accelerated environmental cleanup,



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defense, and state memorandums of agreement (DSMOAs)/cooperative agreements, BRAC, the Government Performance and Results Act, DPG goals, and perchlorate contamination. Ultimately, the goal is to use this dialogue with the regulatory community to move cleanup programs toward closeout.

Tier I, II, and III joint service partnering meetings between Air Force installation RPMs, state regulators, and other military service RPMs were also held in FY01. North Carolina, South Carolina, Alabama, Mississippi, and Florida have Tier I (base level) teams that meet, usually, on a monthly basis. These states also have Tier II (statewide) teams that meet quarterly, and a Tier III (regional) team that meets twice a year. Almost all of these partnering meetings, other than the Tier III meetings, use facilitators. All of the state teams, except Florida, which is strictly an Air Force team, are joint service teams. Almost all of the installations in these states, including those of the Air National Guard installations, participate in this partnering process.

A formal partnering effort (i.e., partnering Tiers I, II, and III) also has been established for Andrews Air Force Base, Maryland, and partnering efforts for McGuire Air Force Base, New Jersey, are under way. All installations participating in the partnering process have identified an overall improvement in relationships with regulators, resulting in reduced regulator review time and comments, and ultimately in faster site remediation at lower cost.

In California, partnering meetings involving Air Force, other DoD Components within the state, and state regulators were held to coordinate DSMOA efforts. These quarterly meetings have proved to be highly successful for both the state

and DoD, with significant improvements in regulator cooperation and trust. In Alaska, multiservice events involving state regulators, the regional environmental coordinators, and the installations were held to discuss and resolve general non-site specific cleanup issues and DSMOA concerns.

Also in Alaska, the Alaska Statewide Restoration Advisory Board (RAB) 2001 Roundtable met in Anchorage in February 2001. This meeting provided an excellent way to bring together RAB members, regulators, military personnel, and other stakeholders from all over Alaska to address common issues associated with DoD's environmental cleanup program in Alaska. The roundtable attendees shared experiences, discussed a wide range of topics, and provided their individual perspectives on program priorities, goals, and objectives.

AFBCA worked with ITRC to establish a Technical Development Initiative team at Kelly Air Force Base, Texas. This team consisted of state and federal regulators that met with the local citizens to explain proposed treatment technologies and to report on their use. This concept was widely accepted within the community. AFBCA also worked with the U.S. Department of Energy on long-term stewardship. By combining their institutional knowledge, these two agencies were able to formulate a strategy for the site closeout. EPA was consulted throughout the development process to provide assistance in the creation of policy and guidance.

Regulator and technical issues have provided the biggest challenges in the execution of the Air Force environmental restoration program. Many of these hurdles have been overcome by encouraging increased cooperation between

AFCEE and installations. The result has been more effective communication between Air Force headquarters and its installations, as well as a more proactive program.

The Air Force has had great success in partnering with both regulators and the local community to resolve cleanup issues. Working closely with these groups has resulted in dramatic cost savings, an accelerated cleanup process, and improved public relations.