

ARMY RESTORATION STATUS AND PROGRESS

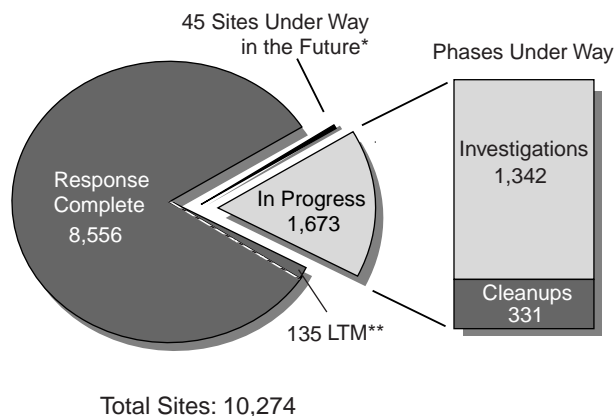
I am proud of the Army's restoration accomplishments over the past year. The removal of an installation from the National Priorities List, reaching cleanup goals at an unprecedented number of installations, and a reduction in the cost to complete by \$1 billion are major accomplishments for our cleanup program. Efficiencies such as improved coordination with regulatory agencies and affected communities, various program review workshops, and installation buy-outs were factors in this success. The Army is on track to meet its cleanup goals.



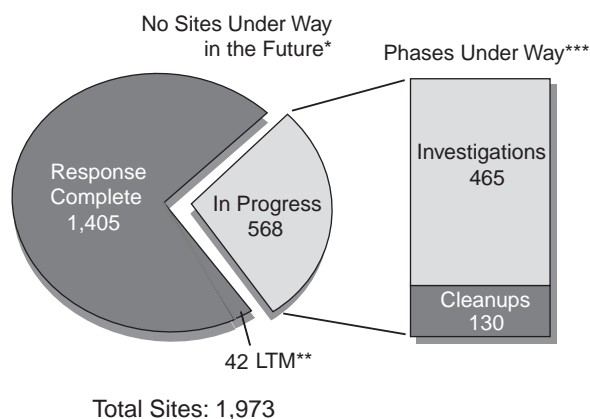
— Raymond J. Fatz
Deputy Assistant Secretary of the Army
(Environment, Safety, and Occupational Health)

In Fiscal Year 2000 (FY00), the Army continued its environmental restoration program mission of restoring contaminated sites to safe levels. Since the beginning of its environmental restoration program, the Army has tracked approximately 12,247 sites at over 1,176 active, realigning, and closing installations. The Army environmental restoration program spans all 50 states and U.S. territories. Like the programs of the other Components and private companies, the Army's cleanup program addresses landfills and past spills. It also confronts unique challenges related to Army ammunition plants and depots.

Active Site Status
(as of September 30, 2000)



BRAC Site Status
(as of September 30, 2000)



*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.

Army Facts

In FY00...

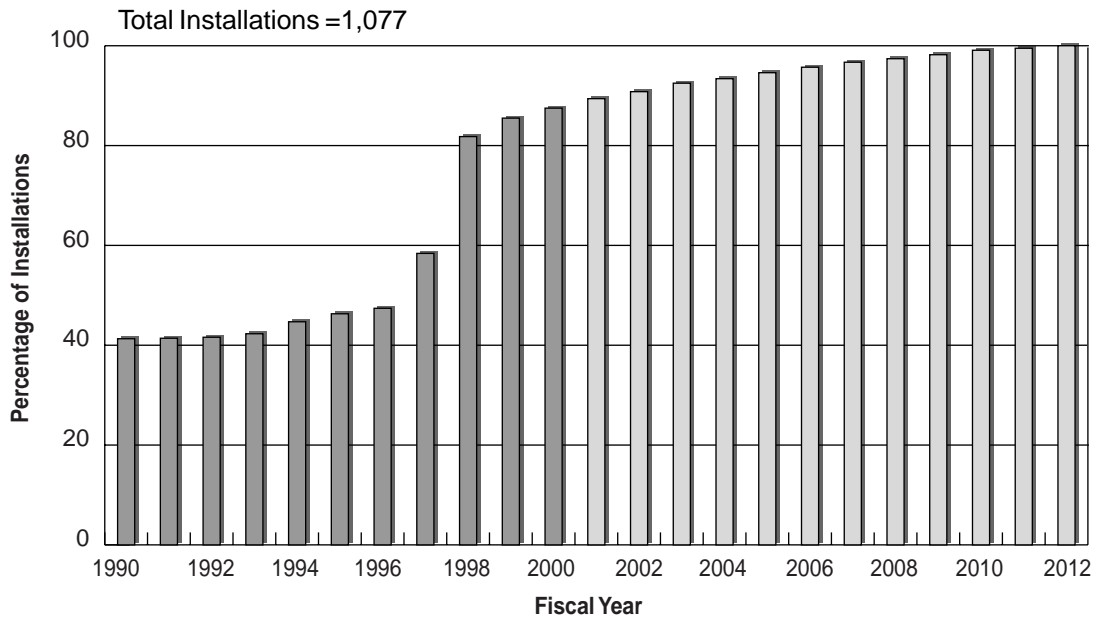
- ♦ Army designated 366 active-installation sites as Remedy in Place (RIP) or Response Complete (RC).
- ♦ The Army completed studies and cleanups at 147 Base Realignment and Closure (BRAC) restoration sites. These sites require no further remedial action.
- ♦ Twenty-seven active installations and 10 BRAC installations achieved RIP or RC status at all sites on the installation.
- ♦ The number of active-installation sites not evaluated for relative risk was reduced from 14 to 8. The number of BRAC sites not evaluated for relative risk was reduced from 59 to 14.

Through FY00...

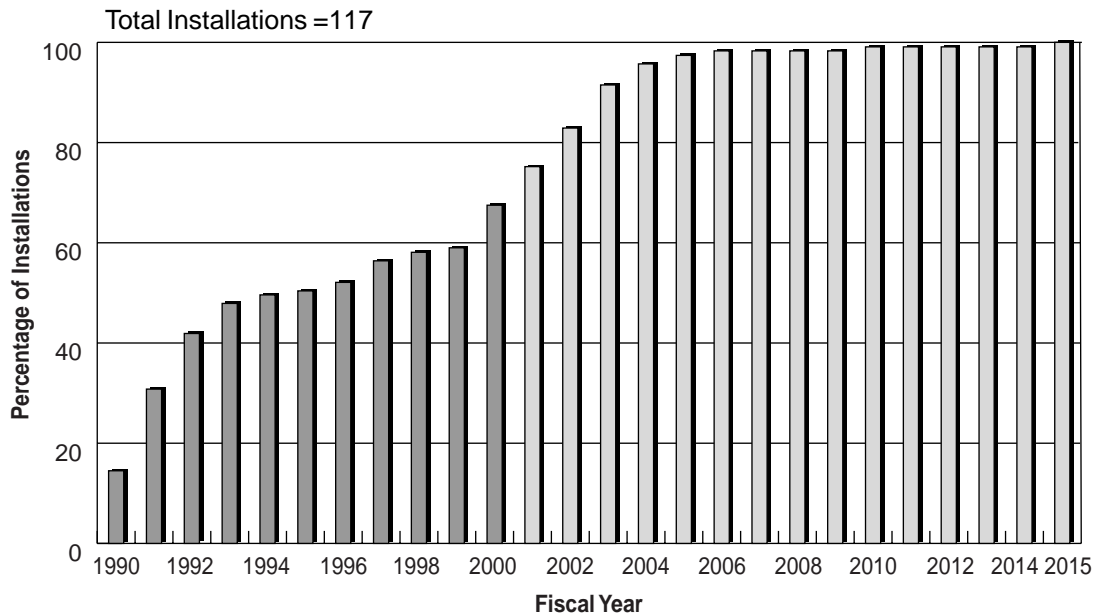
- ♦ The Army has identified 10,274 potentially contaminated sites at 1,077 active installations. Of these sites, 8,556 require no further remedial action, although some may require long-term monitoring (LTM).
- ♦ Restoration activities are planned or under way at 1,718 active-installation sites.
- ♦ The Army has identified 1,916 potentially contaminated restoration sites (not including sites with unexploded ordnance (UXO)) at 117 BRAC installations. Of these sites, 1,380 require no further action other than LTM. Restoration activities are planned or under way at 536 BRAC sites.
- ♦ Final remedy construction has been completed at 934 active-installation sites, 88 of which have remedial action operations (RA-O) under way. The Army has completed final remedy construction at 354 BRAC sites; 13 have RA-O under way.
- ♦ The Army has completed 1,014 interim actions at 661 active-installation sites, and 236 interim actions at 186 BRAC installation sites.
- ♦ The Army has 57 sites that potentially contain UXO (sites where UXO is addressed in support of reuse and property transfer), located at 23 BRAC installations. Twenty-five of these sites require no further action other than LTM.



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

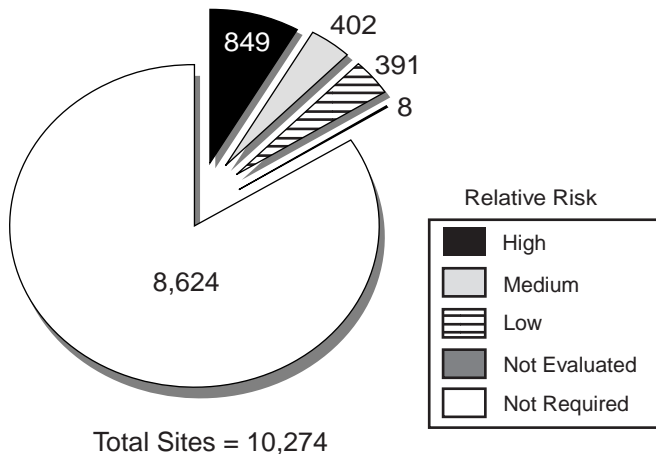


BRAC Installations Achieving Final Remedy in Place or Response Complete*
(cumulative and projected, FY90 through completion)

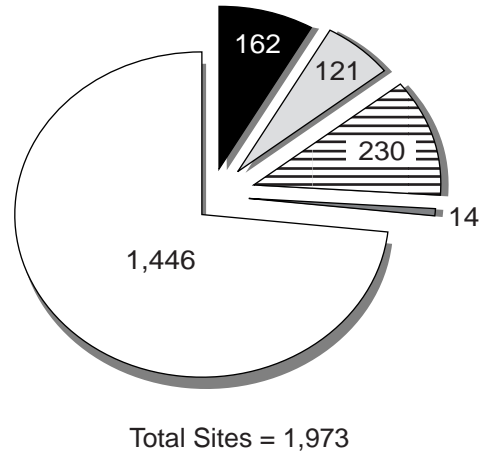


*Does not include Army installations that have only unexploded ordnance.

Relative-Risk Ranking for Active Sites in Progress



Relative-Risk Ranking for BRAC Sites in Progress



Goals and Priorities

In addition to working toward Department of Defense (DoD) program goals for reducing relative risk, the Army is focusing on attaining RIP or RC status for all the sites at individual installations. In FY00, 27 active installations and 10 BRAC installations achieved this goal. Completing the entire program at installations reduces the Army's administrative costs for managing the program. The Army is also emphasizing improvement of the accuracy of its scheduling projections by increasing leadership and stakeholder involvement in developing achievable milestones.

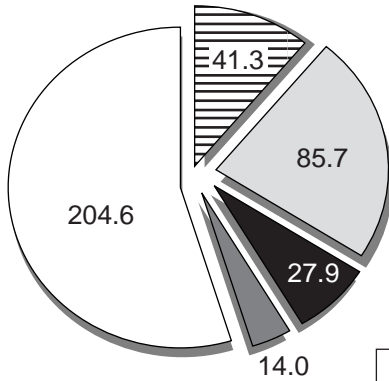
An ongoing goal of the Army is to achieve program efficiencies. Management and technical reviews have improved the Army's ability to reduce costs and meet program goals. The FY00 cost-to-complete estimate for the active Installation Restoration Program is \$3.8 billion, not including program management. Taking into account FY00 obligations, this amount represents a net reduction of approximately \$1 billion from the FY99 estimate. The cost-to-complete estimate for the BRAC environmental restoration program (including the potentially contaminated UXO site cost and closure-related compliance expenses) is \$1.1 billion (program management excluded).

In FY00, the Army obligated \$376.2 million for environmental restoration work at active installations and \$105.5 million for environmental restoration activities at BRAC installations.

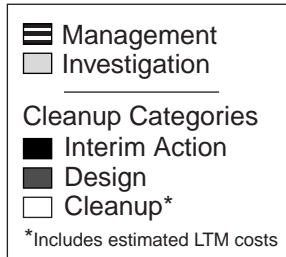
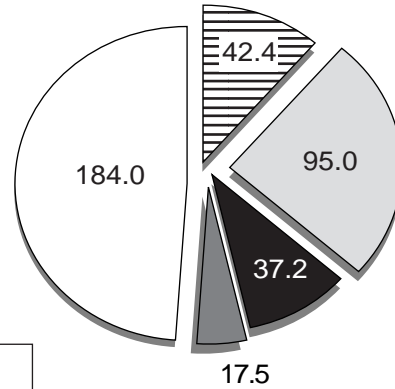


Army Environmental Restoration Funding Profile
(in millions of dollars)****

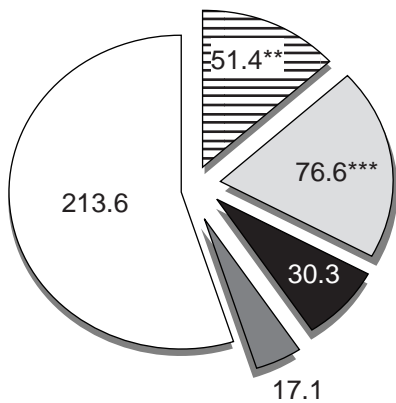
FY99 Army Funds Executed
Total = \$373.5 million



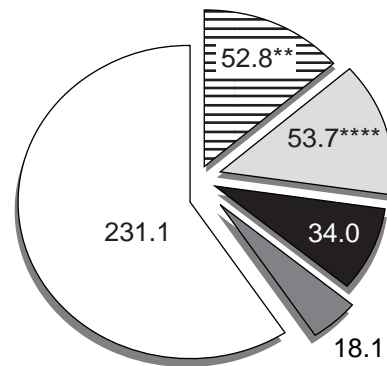
FY00 Army Funds Obligated
Total = \$376.2 million



FY01 Army Execution Planned
Total = \$389.1 million



FY02 Army Planning Estimate
Total = \$389.8 million



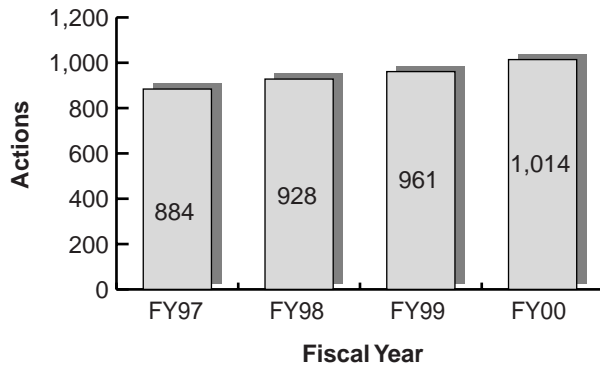
**Includes \$3.0 million in unexploded ordnance costs

***Includes \$7.042 million in unexploded ordnance costs

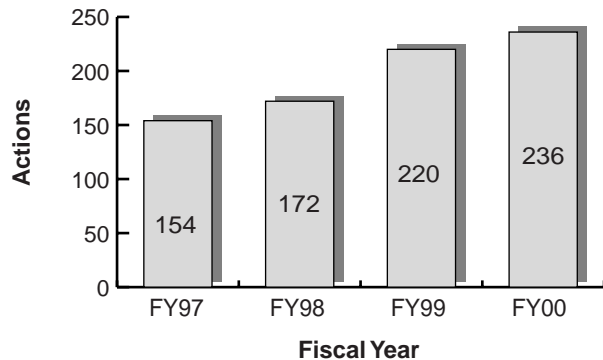
****Includes \$7.0 million in unexploded ordnance costs

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

Cumulative Interim Actions Completed at Active Sites*



Cumulative Interim Actions Completed at BRAC Sites*



*FY97 through FY99 totals have been updated since the previous Annual Report to reflect new and revised data as of FY00. BRAC totals include 57 UXO sites that were not included in previous Annual Reports.

Program Execution

In FY00, the Army focused on charting a clear path to completion of program requirements. This endeavor involved evaluating current program execution strategies, increasing consultation with regulators, and sharing information with local communities. More active installations held workshops and reviews with regulators to develop cleanup strategies, cost estimates, and sequencing of environmental restoration work. The BRAC program used an optimization model to sequence work based on threats to human health, anticipated property reuse, and other important factors. Army personnel explored and demonstrated innovative technologies at several installations.

The Army explored innovative contracting strategies to expedite cleanup. Projects using one strategy, guaranteed fixed-price remediation, are under way at two BRAC installations. The Army also prepared a contract solicitation for a pilot LTM program for active and BRAC Army installations and Formerly Used Defense Sites properties in U.S. Environmental Protection Agency (EPA) Region 7. This contract will minimize costs by consolidating work on similar activities.

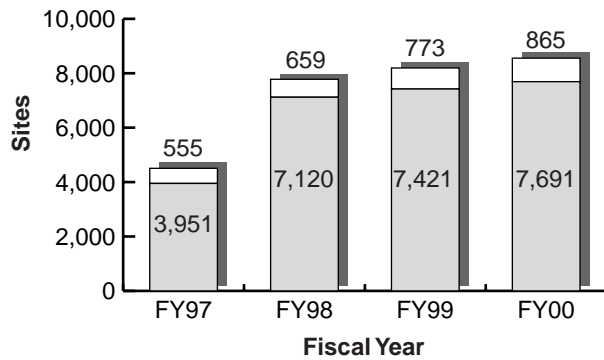


Program Accomplishments

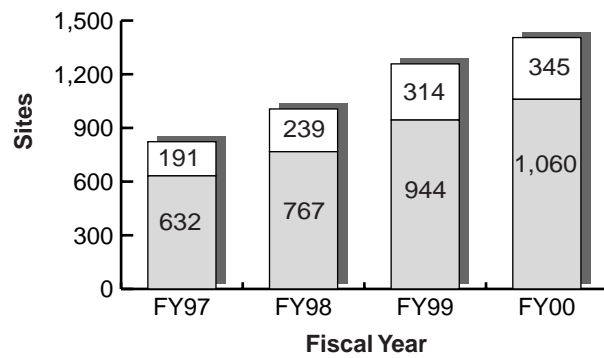
In August 2000, the Army attained an important milestone at Schofield Barracks in Oahu, Hawaii, when it became the first entire Army installation removed from EPA's National Priorities List (NPL). Schofield Barracks was originally placed on the NPL in September 1990 due to trichloroethene contamination in its drinking water supply source. Innovative approaches applied to this program included wellhead treatment of groundwater, use of a screening on-site laboratory, and use of EPA's presumptive remedy for landfills.

In FY00, the Army Research Laboratory – Watertown, Massachusetts (37 acres) and Fort Meade, Maryland (346 acres) were also partially deleted from the NPL.

Active Sites with Response Complete*



BRAC Sites with Response Complete*



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

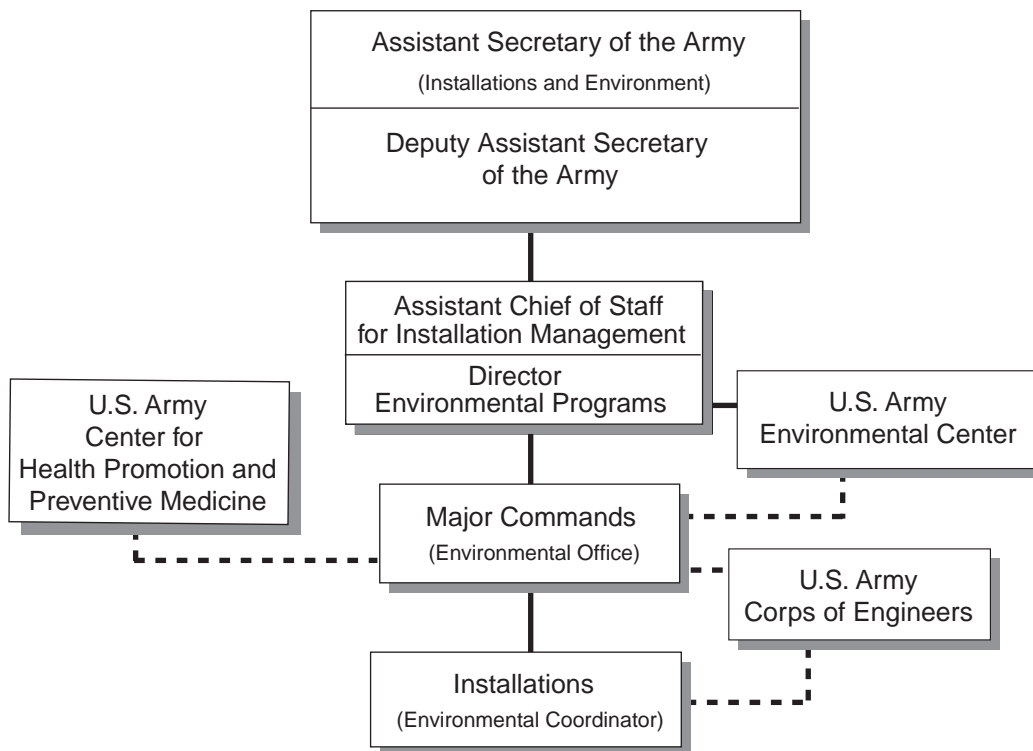
*FY97 through FY99 totals have been updated since the previous Annual Report to reflect new and revised data as of FY00. BRAC totals include 57 UXO sites that were not included in previous Annual Reports.

Organization and Management Initiatives

FY00 management initiatives involved improving Major Command (MACOM) management of the environmental restoration programs, building on the Army's established technical review (ITR) efforts, and continuing groundwater extraction and treatment effectiveness reviews (GWETERs) to close out systems.

The Army MACOMs were continually challenged in managing their environmental restoration programs. The restoration programs of individual installations across the nation within a command often have unique concerns and challenges to be addressed, with varying federal and state regulators and local stakeholders. MACOMs must be sensitive to each individual installation's concerns and challenges. In addition, because the installations within a command are located across the nation, each command must be familiar and well versed in working with various states

Department of the Army



and regionally structured EPA offices. To bridge the gaps between the states, EPA, and the Army, the Army is placing increasing reliance on DoD's Regional Environmental Offices.

The Army also shifted the focus of its ITR effort in FY00 to build on previous ITR work. The Army continued to perform reviews, conducting or continuing ITRs at eight installations, but also focused on providing training and technical assistance to follow up on prior ITR recommendations. Eight such technical assistance efforts took place in FY00.

Groundwater extraction and treatment effectiveness reviews continued to play a critical role in the Army's environmental restoration program in FY00, impacting schedule and cost estimates for project completion. These reviews have helped the Army optimize and close out existing systems, validate the needs of proposed systems, and ensure that new technologies are considered in all existing and proposed systems. In FY00, the Army conducted GWETERs at 10 active and BRAC installations. These reviews identified approximately \$69 million in potential lifecycle cost avoidances at these installations. The reviews focused not only on existing and proposed pump-and-treat systems, but also on the LTM schemes that are in place or proposed. The composition of the GWETER team for an installation depends on that installation's technical and regulatory situation. The GWETER teams often include experts experienced in the design, operation, and optimization of groundwater pump-and-treat systems. In addition, the teams are always well versed in the regulatory aspects of Record of Decision development and modification. The teams often use a combination of Army and outside experts.

PER Workshops Streamline Environmental Restoration

The Army introduced its Principles of Environmental Restoration (PER) Workshop as a mechanism for improving the performance of the installation restoration project teams. The PER Workshop provides practical instruction to the entire team on four main principles of environmental restoration—

- ◆ Communication and cooperation
- ◆ Problem identification
- ◆ Early identification of likely responses
- ◆ Management of uncertainties.

The PER Workshop uses conceptual site models and develops exit strategies and other tools to streamline environmental investigations and cleanups. The Army offers PER Workshops to its installation project teams, which include regulators and contractors as well as installation program managers. In FY00, the Army conducted these workshops at 12 active and BRAC installations.

Information and Technology Transfer

In FY00, the Army continued to assess and implement innovative technologies. Projects currently under way include—

- ✦ Pilot-testing an ozone-sparging treatment technology to remove volatile organic compounds in groundwater at Letterkenny Army Depot, Pennsylvania
- ✦ Evaluating natural attenuation at Operation Support Command sites
- ✦ Using enhanced bioremediation of petroleum hydrocarbon- or solvent-contaminated groundwater
- ✦ Employing phytoremediation to treat explosives in groundwater and lead in soil.

An innovative-technology effort is in progress at Sierra Army Depot. The Army employed a geo-referenced digital photograph with a mapped-global-positioning-data-points system to identify ordnance at the Honey Lake ordnance site. In executing this project, the installation teamed effectively with regulators and the community. The use of this technology reduced the area needing intensive study and delineation of UXO by approximately 2,000 acres.

Workshop Provides Forum for Technical Understanding

In August 2000, the Army conducted the first Workshop in Borehole Geophysics for Environmental and Geotechnical Applications. This two-and-a-half-day workshop provided an intermediate to advanced look into the field of borehole geophysics and the various survey and data analysis methods used to understand contaminant transport. The Army Environmental Center, the U.S. Geological Survey, and the Baltimore District Corps of Engineers collaborated to develop the workshop. This workshop was intended for installation project managers, project geologists at the Corps of Engineers Districts, and the support contractors who are responsible for characterizing site geologic and hydrogeologic conditions. The workshop involved both classroom instruction and field demonstrations.

The Army held the first workshop at Aberdeen Proving Ground, Maryland. Attendees represented nine Corps of Engineers Districts and five installations. The Army will offer additional workshops in FY01.



Borehole Geophysics Workshop participants view a demonstration.



Outreach

In FY00, two Restoration Advisory Boards (RABs) formed. In the same period, one RAB, for the Army Research Laboratory in Woodbridge, Virginia, adjourned with community agreement because the restoration program at the installation had been completed. The total number of operating Army RABs is now 67, and a total of 4 RABs have been adjourned. Three RABs received Technical Assistance for Public Participation grants in FY00.

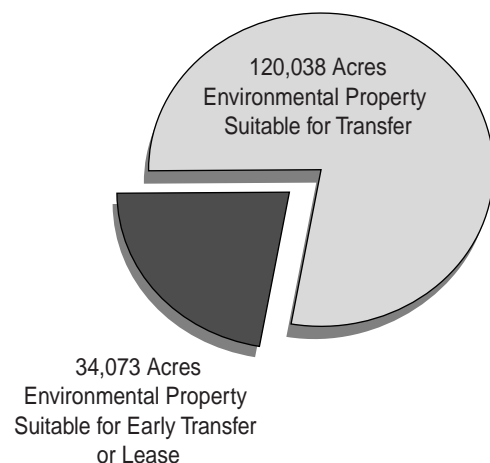
BRAC Highlights

In FY00, the Army BRAC environmental restoration program conducted program review crosswalks (PRXs) at six installations. These crosswalks are 1-day meetings held to gather information on each installation's plan for completing its environmental restoration program and achieving property transfer. Each PRX included reviews of schedule and cost information from environmental restoration reporting systems to ensure consistency among systems and the actual plan for completion. In addition to the PRXs, in-progress reviews (IPRs) were conducted at all other BRAC installations. These IPRs are a condensed version of the PRX and are usually conducted by conference calls.

The Army staff input the revised schedules and costs resulting from the program reviews into the Budget Allocation for the Environmental Cleanup Resource Optimization Model. This optimization model is developed for the Army BRAC Office to determine the optimum funding profile for each environmental restoration site based on property reuse potential, existing legal agreements, projected restoration completion date, site relative risk, and whether UXO is present. The optimization model has helped Army determine the budget distribution for FY01 through completion of the program.

Thirty-five BRAC installations with excess property have BRAC Cleanup Teams (BCTs) to support fast-track cleanup. The Army has designated a point of contact for fast-track cleanup at all other BRAC locations. In FY00, two BCTs (Army Research Laboratory – Woodbridge

Environmental Condition of BRAC Property



and Fort Benjamin Harrison, Indiana) adjourned because restoration work was completed. The Army has adjourned four BCTs to date.

In September 2000, the Army's BRAC Office held a MACOM exit strategy briefing to allow MACOM Chiefs of Staff to present their paths to program completion. This briefing elicited high-level attention and a renewed commitment to achieving restoration goals at each installation.

Unexploded Ordnance

The Army has been working for several years with the regulatory community and the public to develop a proposed Range Rule for addressing sites containing UXO and munitions constituent contamination at closed, transferred, or transferring ranges. When it became apparent that the Office of Management and Budget interagency review process would not be successful in forging an agreed upon rule, in November 2000, the Office of the Secretary of Defense, Cleanup withdrew the proposed rule. DoD may propose the rule again at some time in the future.

In the meantime, DoD is working on promulgating an internal regulation addressing military munitions response actions. DoD is currently preparing detailed guidance in the form of a DoD Directive and a DoD Instruction to assist installations in addressing munitions. The Army initiated a survey of its ranges in 2000. A more detailed range inventory is currently under way for all Army ranges; this is expected to take approximately 2 years to complete.

Cost Recovery Efforts

In FY00, the Army provided to Congress a report on the potential for recovering environmental restoration costs from the insurers of operating contractors at 24 government-owned, contractor-operated facilities. The report concluded that because of legal barriers to cost recovery presented by the statute of limitations; indemnification issues; and other insurance issues, such as pollution exclusion clauses, the likelihood of the Army prevailing in a cost recovery action against these insurance companies is very low. The Army is exploring other opportunities for cost recovery.



The Omaha District Corps of Engineers has awarded two indefinite-delivery type potentially responsible party support service contracts. These contracts are available for Army use in determining whether to pursue cost recovery actions at any of its installations.

Fort Carson Constructs Alternative Landfill Cap



Overview of the evapotranspiration cap after application of biosolids.

Fort Carson, Colorado, recently completed construction of an evapotranspiration (ET) landfill cap at the Fort's Landfill 5. The Colorado Department of Public Health and Environment concurred with this alternative landfill cap in March 2000. The design of this landfill cap was the first Resource Conservation and Recovery Act Subtitle C (hazardous waste) alternative cap to be approved in the State of Colorado. The process of gaining approval for the cap design has helped clear the way for the design's potential use at other landfill sites on the installation.

The decision to construct the alternative landfill cap was based on the substantial cost savings it provided over a conventional landfill cap and its superior technical appropriateness.

Landfill caps are designed to prevent water from seeping through the landfill waste material and carrying contaminants from the waste into the groundwater. A conventional cap is often made of several layers of clay, soil, and plastic liners that are sloped to allow precipitation to drain off the top; however, there are barriers to building such a cap in Colorado. First, the type of clay needed for a traditional cap is not readily available in the area, making transportation expensive. In addition, clay tends to dry, shrink, and crack in arid climates such as Colorado's, creating potential pathways within the clay layers for water to migrate into the landfill.

In contrast, the ET cap is made up of local soils and native vegetation. When rain or snow falls, the soil layer acts like a sponge, holding all the moisture. The moisture then evaporates from the soil layer's surface or is pulled out of the soil and up through the shallow root systems of the vegetation to its leaves, where it is released into the atmosphere.

The ET cap for Landfill 5 was custom-designed for 15 acres of the 20-acre landfill, at the northeastern end of the installation. It is made up of a 4-foot-thick layer of clay loam texture soil that is vegetated with a combination of warm and cool season native grasses. The performance of the cap depends on many variables, including climatic conditions, soil and vegetation characteristics, and cap thickness. The Army determined that the conditions at Fort Carson were appropriate for the proposed ET cap design.

An added advantage of the ET cover is that it costs approximately 75 percent less to install and maintain than a conventional multilayer cap because it requires only two layers, a grading layer and a natural materials layer (the ET layer). Fort Carson thus saved approximately \$100,000 per acre, compared with the cost of a conventional landfill cap, by using the ET design. Another source of cost savings relates to the ET cap's use of approximately 250 tons of biosolids (sewage sludge) as a "soil amendment." This is added to the cap material to add organic matter, aid in water retention and revegetation of the cap, and provide a good plant community above the cap. The biosolids used for the ET cap were generated at the Fort Carson wastewater treatment plant as a by-product of the treatment process. Such material would normally have to be disposed of at another landfill at additional cost.

DEFENSE ENVIRONMENTAL RESTORATION PROGRAM

