



THE DEFENSE ENVIRONMENTAL RESTORATION PROGRAM

“If the Department of Defense is to prepare for the security challenges of the 21st century, we must transform not just our defense strategies, our military capabilities, and the way we deter and defend, but also the way we conduct our daily business. Transformation is not an event—it is a process.”

Donald Rumsfeld, Secretary of Defense

May 14, 2003

In fulfilling our mission to protect and defend the United States and the American people, the Department of Defense (DoD) manages over 30 million acres of land and hundreds of installations and facilities essential to military operations and training. As a responsible steward of public lands, DoD, through the Defense Environmental Response Program (DERP), restores property that has been environmentally impacted by past defense activities. The DERP addresses environmental restoration at over 30,000 sites at active and closing military installations, as well as formerly used defense sites (FUDS), across the nation and the U.S. territories.

As the Department transforms its structure and practices to face new defense mission challenges, so too must DoD's environmental restoration program. Sound stewardship remains the primary program driver and a focus on improved environmental restoration methods affects increased cleanup success. Cleaning up contamination from past activities protects both military personnel and the public from environmental health and safety hazards, and sustaining the land DoD holds in the public trust preserves our ability to train our forces effectively. DoD demonstrates its commitment to environmental restoration by supporting and maintaining a risk-based environmental restoration program, which consistently demonstrates measurable progress, is increasingly transparent to stakeholders and the public, and evolves to accurately address current and future risks posed by contamination. To remain successful, the DERP must continually transform in response to emerging environmental challenges, while maximizing the use of limited resources to address contamination most efficiently.





DERP History

Prior to the mid-1970s the environmental impacts of common manufacturing and disposal practices were not well known or understood. The government and private industry historically managed and disposed of hazardous substances and wastes using practices later found to be detrimental to the environment.

Before the adoption of any Federal requirements or programs, DoD recognized the impacts of its activities on the environment and began identifying, characterizing, and addressing environmental contamination at its installations in 1975. Growing public concern and increased knowledge about the environment led Congress to pass the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) in 1980. CERCLA, also known as Superfund, established a requirement and a framework for the identification, investigation, and cleanup of hazardous substances resulting from past practices. Congress amended CERCLA in 1986, creating the DERP and its budgetary funding mechanism, the Defense Environmental Restoration Account (DERA).

Beginning in the late 1980s, Congress acted to eliminate excess military infrastructure by authorizing four rounds of base realignment and closure (BRAC) in 1988, 1991, 1993, and 1995. Congress approved a new round of BRAC in 2005 to further streamline and modernize DoD's infrastructure. Of the almost 500 installations that closed or were realigned since 1988, 208 installations required some type of environmental remediation. Through the DERP, DoD addresses contamination at BRAC installations to ensure that property being transferred is safe for reuse.

Program Overview

Today, the ecological and health concerns associated with environmental contamination are much better understood than when the program began in 1975. The DERP is now a robust program addressing a wide range of environmental issues at thousands of diverse sites. To most effectively address the different kinds of contaminants likely to impact DoD installations and former properties, the Department organized the DERP into three program categories:

- ▶ Installation Restoration Program (IRP)—The IRP category addresses releases of hazardous substances, pollutants, or contaminants that pose toxicological risks. Used at installations for 18 years, this program category operates using well-established procedures to fulfill environmental restoration requirements.
- ▶ Military Munitions Response Program (MMRP)—The MMRP category addresses environmental health and safety hazards from unexploded ordnance (UXO), discarded military munitions, and munitions constituents. Incidental to hazardous waste remediation, a limited number of hazards associated with military munitions were addressed under the IRP. DoD created the MMRP category in Fiscal Year 2001 (FY2001) to more completely address potential hazards remaining from its past use of military munitions.
- ▶ Building Demolition/Debris Removal (BD/DR)—The BD/DR category provides for the demolition and removal of unsafe buildings or structures. DoD conducts a small number of activities in this program category, primarily at FUDS properties.



Under these program categories, DoD addresses contamination at three types of property: active installations; BRAC installations; and FUDS, which are properties DoD formerly owned, leased, or operated. The Military Components—the Army, Navy, Air Force, Defense Logistics Agency (DLA), and Defense Threat Reduction Agency (DTRA)—implement the DERP, with the Office of the Secretary of Defense (OSD) providing program oversight. Within OSD, the Environmental Management Office of the Deputy Under Secretary of Defense for Installations and Environment has responsibility for overseeing and reporting on the DERP.

DoD built and maintains a successful program by focusing on reducing the health and safety risks posed by historical contamination. The Department employs a risk-based management strategy and cleanup approach for the DERP with three main elements: implementing a systematic process for prioritizing sites and executing restoration activity based on the relative risk posed to human health and the environment; developing program goals and performance metrics to drive restoration activities, secure funding, and track overall program progress in reducing risk; and working with regulators and communities to address stakeholder concerns. These key elements are discussed throughout this chapter.

The Environmental Restoration Process

DoD conducts environmental restoration activities through a well-planned, carefully implemented, outcome-driven process. Since DoD installations and properties vary greatly in size and function, and generally contain relatively small areas of localized contamination, DoD defines discrete parcels of contaminated property to provide the Department with a more effective approach to cleanup. These specific areas of contamination are called “sites.” DoD tracks and manages the DERP on a site-by-site basis and uses site-level data to identify and conduct response action requirements, maintain a complete site-level inventory, implement a risk-based management strategy, and track overall program progress in reducing risk. Building the program on a site basis increases the accuracy of DoD’s environmental restoration information and enables more specific long-term planning and budgeting to meet site requirements.

CERCLA Cleanup Process

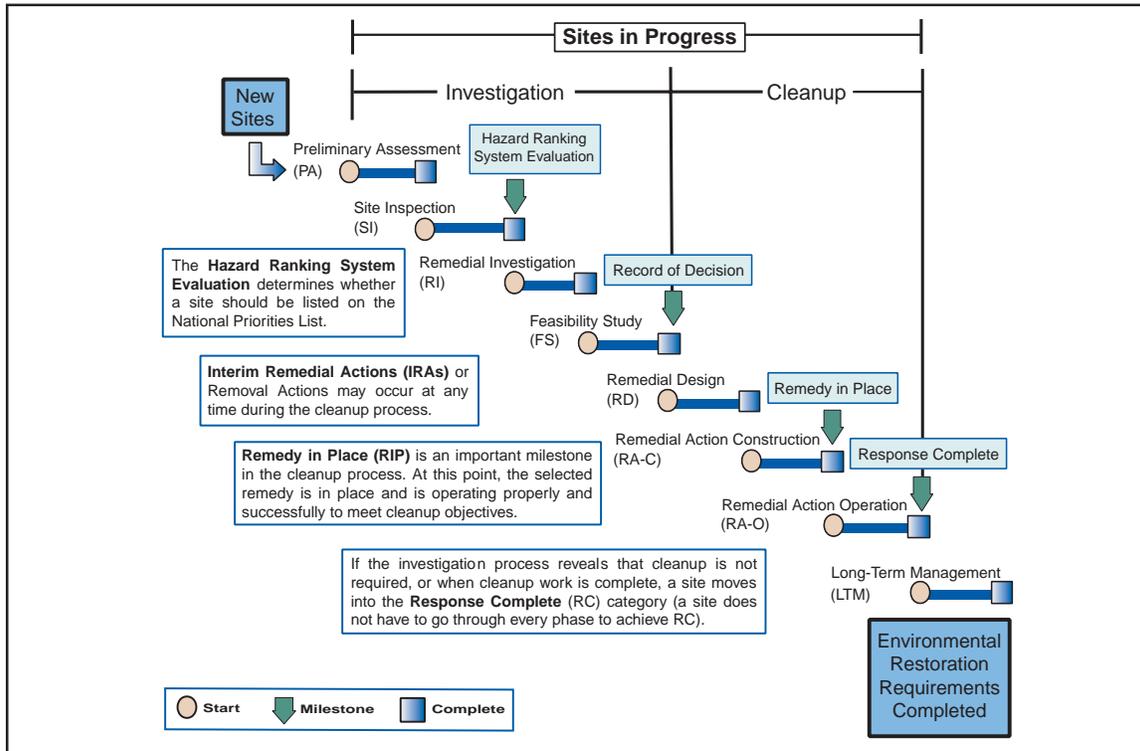
While only required for sites on the National Priorities List (NPL), the Department chose to follow the environmental restoration process set by CERCLA and its implementing regulation, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), for all restoration sites, including those under its MMRP, regardless of their NPL status. This process consists of several phases, illustrated in Figure 1 and described below. While some phases may overlap or occur concurrently, environmental response activities at DoD sites are generally conducted in the order shown. DoD demonstrates program progress as sites move from investigation through the cleanup phases to complete all restoration requirements. DoD’s outcome-driven process focuses on meeting environmental restoration requirements and protecting human health and the environment at every site.

Investigation

When contamination is suspected at a site, DoD begins the investigation process by conducting a preliminary assessment, a limited investigation involving document reviews, visual site



FIGURE 1: ENVIRONMENTAL RESTORATION PROCESS PHASES AND MILESTONES



inspections, and interviews to assess whether or not a contaminant release may have occurred at the site. DoD collects additional information during the next phase, the site inspection, to determine whether further environmental restoration activities are required. If preliminary assessment and site inspection findings indicate that the site needs further investigation, DoD performs a remedial investigation, which involves more comprehensive data collection, such as analyzing soil and groundwater samples. Using the investigation results from the remedial investigation phase, DoD conducts a feasibility study to examine the merits of various cleanup options and determine the best practical strategy for remediation.

The major milestone in the investigation portion of the environmental restoration process, which marks the end of investigation activity, is the Record of Decision (ROD) or equivalent decision document. In the ROD, DoD documents the results of DoD’s investigation at the site, the selected remediation strategy, and planned objectives for the site. If DoD determines that the site poses no risk to human health or the environment, the ROD documents that no further action will be taken and all environmental restoration requirements are fulfilled.

Cleanup

If investigation indicates that remediation is required, then the site progresses to the cleanup phases of the environmental restoration process, during which the specific remedy, or cleanup method, chosen for the site and documented in the ROD, is implemented. Cleanup actions may include designing, constructing, or operating a remedy, which are addressed in the cleanup process during the remedial design, remedial action construction, and remedial action operation phases, respectively. Remedial activities continue until the cleanup objectives stated in the ROD are met. For sites where the selected remedy allows contamination to remain on

**FOCUS ON THE FIELD****AIR FORCE**

Innovative Cleanup Strategy Saves Hangar Project at McGuire Air Force Base

DoD promotes the use of more effective strategies for addressing environmental contamination. One strategy is a new cleanup paradigm based on the use of an integrated triad of systematic planning, dynamic work plans, and real-time measurement for data collection and technical decision-making at sites. This approach emphasizes overall decision quality and more efficient and effective cleanup in accordance with the planned property reuse.

When groundwater contamination threatened to derail construction of an aircraft hangar crucial to the deployment of C-17 Globemaster cargo planes, the Air Force faced a formidable task: keep the \$28 million C-17 MILCON project on schedule and still meet environmental cleanup requirements.

The chlorinated solvent PCE (tetrachloroethylene) was found in shallow groundwater under the hangar site at concentrations high enough to require an immediate stop-work order. This situation typically takes several years of site analysis and regulatory processes to resolve, but the C-17 Globemasters would arrive at their new home on McGuire Air Force Base in less than one year. There was not enough time to follow traditional environmental restoration processes, but there was a solution.

McGuire environmental restoration leaders turned to a new, EPA-approved approach to cleanup. Called the Triad approach for its three-fold process in evaluating cleanup sites, this method has won accolades from environmental restoration experts as a faster and better way of doing business. Key elements that give the Triad approach its edge:

- Emphasizing up-front planning to concentrate on likely areas of contamination
- Trading the standard off-site analysis for a much faster “in-the-field” analysis
- Using data generated in the field to determine testing hot spots, and what and where to test for next.

The approach works in part because new technologies enable a higher sampling rate over a greater area during a shorter period of time. When environmental restoration teams use the Triad approach, site evaluation takes place over the course of a few days instead of several months.

At McGuire Air Force Base, the site analysis team sampled soil and groundwater in 108 locations and conducted more than 600 lab tests in just 14 days. They mapped the PCE groundwater plume, determined the source of the contamination, and confirmed that over time, natural ecological processes were neutralizing and diluting the PCE. The core technical team developed a plan for addressing contamination at the site, centering on removing 500 cubic yards of soil and installing 12 wells to ensure that PCE levels continued to drop.

Within six months of the PCE detection, construction of the C-17 hangar was back on schedule. Using the TRIAD approach, McGuire officials estimate they saved more than \$37 million on environmental restoration activity, and nearly \$1.34 million on the construction of the hangar.



the site, DoD must review the remedial action at least every five years to ensure that any necessary operation and maintenance activities are taking place.

There are two important milestones during the cleanup phases of the restoration process, both of which indicate site progress. The remedy-in-place (RIP) milestone marks the point at which DoD has implemented the chosen remedy, and the remedy is operating properly and successfully. When all cleanup objectives for a site are met, the second milestone, response complete (RC), is reached. After reaching the RC milestone, the site may require long-term management (LTM) activities, such as five-year reviews, monitoring, and maintenance of a remedial action, to ensure the established remedy continues to meet the objectives prescribed in the ROD.

Site Prioritization

The DERP is a complex environmental program with more than 30,000 sites. Although DoD will address all sites, DoD is not able to remediate every site simultaneously. This means that careful consideration and planning are required to prioritize sites so that resources are utilized efficiently to maximize reduction in risk and progress toward environmental restoration goals. As a risk-based program, the DERP goals are designed to help DoD reduce risk and complete restoration requirements on a worst-first basis, meaning that sites that pose the greatest risk to human health and the environment take precedence. DoD uses prioritization tools to determine the risk posed by each site relative to other sites in the inventory so that funding can be allocated to achieve the greatest risk reduction. DoD uses the Relative-Risk Site Evaluation (RRSE) framework to prioritize sites in the IRP and is developing a site prioritization protocol for MMRP sites.

IRP Site Prioritization

DoD developed the RRSE to systematically prioritize IRP sites based on each site's potential risk relative to all other sites in the IRP. Using the RRSE, DoD ranks sites as high, medium, or low relative-risk based on the nature and extent of contamination at a site, the potential for contaminants to migrate, and the populations and ecosystems that could be impacted. The Department also considers other factors in sequencing sites for cleanup, such as installation cleanup strategy, progress toward program goals, and stakeholder concerns. The IRP's environmental restoration goals are directly linked to the RRSE framework, focusing on addressing sites in higher risk categories first.

In the RRSE, sites can also be designated as Not Evaluated or Not Required. The Not Evaluated designation is for sites that have not been investigated thoroughly enough to determine a relative-risk ranking. The Not Required category includes sites that have already achieved RIP or RC, as well as IRP sites requiring only military munitions response, building demolition and debris removal, or actions where a party other than DoD is responsible for cleanup.

The RRSE is a consideration in the prioritization of BRAC sites as well; however, an important objective at BRAC installations is to support reuse by making property environmentally suitable for transfer in accordance with CERCLA requirements. This means reuse needs and priorities, as well as property transfer and redevelopment plans, are major drivers in sequencing cleanup activity at BRAC installations, along with relative risk.

**FOCUS ON THE FIELD****NAVY****Early Transfer in California
Makes Good Business Sense**

Early transfer authority offers DoD the option of transferring property by deed while environmental restoration work is in progress. This statutory waiver of property transfer restrictions provides economic and environmental benefits to communities and DoD by integrating cleanup and redevelopment, remediating to levels based on consideration of future land use, increasing opportunities for investment, expediting property reuse, and relieving DoD's property management responsibilities.

The Navy had almost 500 acres of land it no longer needed on Rough and Ready Island at the Naval Computer and Telecommunications Installation, Stockton and the Port of Stockton, California, wanted it as soon as possible. Before a land transfer could take place, however, the Navy had to ensure the cleanup of chemical contamination at the installation.



An aerial view of the Port of Stockton development area.

The property, contaminated with waste oils, pesticides, and solvents, required environmental cleanup that could potentially take 15 years to complete. This was too long to wait for the Port of Stockton, which was currently pushing forward with a massive business expansion.

The Port's planned commercial development would position it as the third largest port in California and maintain its status as the largest inland port west of the Mississippi River. Economists projected that the expansion would bring more than 550 new jobs, \$50 million in economic output, and nearly \$20 million in new income to the area, but the plan depended on the full acquisition of Rough and Ready Island.

The Navy, wanting to support the local community and shed the costly excess property, decided to pursue an early transfer. An early transfer enables the Navy to transfer ownership of the land to the Port of Stockton prior to completion of cleanup, with the assurance that the cleanup process would continue and appropriate safeguards are in place to ensure public health and safety. Until now, the early transfer authority had only been used at base realignment and closure installations, making this the first-ever early transfer at an active installation.

To ensure the timely transfer of the land, the Navy and the Port worked collaboratively to agree on details of the cleanup, which the Port would complete. The Navy and the Port also coordinated closely with federal and state regulators, as well as the governor, to gain approval of the plan.

It was a deal that benefited everyone—the Navy could complete the property transfer to the local community and save time and money, and the Port of Stockton could obtain the land it needed, finalize the cleanup, and pursue its business expansion. The parties sealed the deal in September 2003, approximately two years after initial discussions began.



MMRP Site Prioritization

When DoD established the MMRP in September 2001 to address hazards remaining from past use of military munitions, it adopted the Risk Assessment Code as an interim DoD-wide tool to prioritize MMRP sites. The Risk Assessment Code evaluates the risk posed by UXO and discarded military munitions at a site based on the potential explosive safety hazards present. The U.S. Army Corps of Engineers adopted the Risk Assessment Code's procedure as the interim approach because of its longstanding use in prioritizing UXO cleanup at FUDS sites. The Munitions Response Site Prioritization Protocol, which is currently under development, will soon replace the Risk Assessment Code as the standard for assigning relative priorities to MMRP sites.

In an effort to fulfill statutory requirements established by the National Defense Authorization Act for Fiscal Year 2002, DoD began developing a proposed protocol for assigning a relative priority to each site in the MMRP. The proposed Munitions Response Site Prioritization Protocol assigns a relative priority to each site based primarily on an evaluation of three types of hazards:

- ▶ Explosive hazards posed by UXO and discarded military munitions
- ▶ Hazards associated with the effects of chemical warfare materiel
- ▶ Chronic health and environmental hazards posed by munitions constituents or other chemical constituents.

In addition, other factors such as economic, programmatic, and stakeholder concerns may impact sequencing decisions.

DoD published the Munitions Response Site Prioritization Protocol as a proposed rule in the *Federal Register* on August 22, 2003, with a 90-day public comment period. DoD will consider all comments submitted in finalizing the prioritization protocol. Upon completion, the prioritization protocol will be applied to all sites listed in DoD's MMRP site inventory and will be used as the basis for DoD's MMRP risk management strategy. As DoD finalizes the Munitions Response Site Prioritization Protocol and applies it to the MMRP inventory, the Department will continue to build MMRP goals and metrics to ensure continued progress.

Program Performance Goals

To keep the DERP on track and measure progress, DoD developed program goals and performance metrics that measure progress toward the goals. These program goals are results-oriented, focusing on moving sites through the environmental restoration process. DoD's risk-based program goals guide the Components' investment decisions and set targets for the Components in planning and executing environmental restoration activities. The Department endeavors to achieve these goals by leveraging regulatory partnerships and planning, managing, and budgeting to ensure sufficient funding is available to support environmental restoration plans and projections.

IRP Performance Goals

DoD's IRP program goals at active installations and FUDS properties set milestones for putting remedies in place and completing cleanup requirements so that risks to human health and the environment are reduced. At active installations with sites in the IRP, the remaining goals are to have remedies in place or achieve response complete at:



- ▶ All high relative-risk sites by the end of FY2007
- ▶ All medium relative-risk sites by the end of FY2011
- ▶ All remaining sites by the end of FY2014.

Properties in the FUDS program have the same goals for high and medium relative-risk sites, but with FY2020 as the goal for all remaining sites. DoD achieved its FY2002 goal of reaching RIP or RC at 50 percent of its high relative-risk sites.

BRAC installation IRP goals differ from those for active installations or FUDS. BRAC IRP site cleanup focuses on putting remedies in place and completing all response action so that property is ready for transfer and reuse. To this end, DoD is working to achieve RIP or RC at 100 percent of its BRAC sites and installations by the end of FY2005. In addition, by FY2005 DoD aims to have 100 percent of BRAC acreage ready for transfer as defined by CERCLA requirements.

MMRP Performance Goals

Since DoD is still building the MMRP, the Department first developed near-term goals focused on completing initial investigation activities at MMRP sites. The completion of the initial investigation phases of the restoration process will allow DoD to more accurately characterize each MMRP site and facilitate the prioritization of sites. After the prioritization protocol is finalized and applied to MMRP sites, DoD will further develop and implement program goals and performance metrics to move MMRP cleanup forward. In the interim, DoD has developed the following near-term MMRP goals:

- ▶ For all MMRP sites at active installations and FUDS properties, complete a preliminary assessment by the end of FY2007 and complete site inspection by the end of FY2010.
- ▶ For all MMRP sites at installations currently in the BRAC program, achieve RIP or RC at all MMRP sites by the end of FY2009.

DoD is using its MMRP goals to plan and budget for its munitions response requirements. DoD continues to build on the MMRP framework already in place by refining the inventory of MMRP sites and finalizing the Munitions Response Site Prioritization Protocol. In the coming years, DoD will use experience gained in the IRP to ensure the MMRP meets all munitions response challenges.

FY2003 Program Progress

The Department uses an electronic database of site inventories to track program progress by environmental restoration phase (e.g., investigation, cleanup, long-term management) and risk category. DoD uses this phase information to evaluate the status and progress of the program toward DERP goals. DoD uses several well-established metrics to monitor the progress of IRP sites as they advance through the environmental restoration process and is working to develop metrics for the MMRP.



FOCUS ON THE FIELD

ARMY

Creative “Farming” Cleans Up Contamination and Reduces Project Costs

Innovation in restoration practices means more effective and efficient cleanup. DoD investigates emerging technologies and their applications for improving the cleanup process and meeting cleanup standards, as well as accelerating project schedules and reducing overall cleanup costs. Field-testing new technologies and cleanup methods paves the way for broader implementation of these practices.

When cleanup technology experts at Watervliet Arsenal in New York mention land farming they aren't referring to crops or livestock. They're talking about a soil cleanup technology that uses naturally occurring microorganisms to chemically break down contaminants. The technique



An Eliminator mixes contaminated soil and microbe-containing soil to facilitate soil cleanup.

involves mixing contaminated soil with soil containing specific microbes. Regular tilling aerates the soil, creating a favorable environment for the bacteria, which then adsorb and process the chemicals.

Historical activities at Watervliet, the nation's oldest continuously operating cannon manufacturing plant, included storage of spent solvents and waste oils. Site investigations in the 1990s revealed polycyclic aromatic hydrocarbons (PAHs) and heavy metals in arsenal soil.

The impressive results from a successful 2001 pilot study conducted under the direction of the US Army Corps of Engineers quickly made land farming the approach of choice for remediating soil contamination at a 15-acre site at the Watervliet Arsenal.

Regulators approved a full-scale design to treat 20,000 cubic yards of soil at the Siberia Area in late FY2002. This land farming pilot study, which began in early FY03, focused on a 16,000-square-foot plot containing 4,000 cubic yards of mixed soil, applied 7 feet deep. The depth of the treated soil—normally only 1 to 2 feet deep in land farming applications—is one of the factors that made the pilot's success so noteworthy. By regularly tilling the land farming area and bringing the lower-depth soil to the surface, a greater amount of contaminated soil was able to be remediated in a smaller amount of space.

The results: total PAH levels dropped by 76 percent.

And the price wasn't bad either. Compared to traditional methods for remediating contaminated soil, such as overexcavation for off-site disposal, land farming cost a third less, resulting in nearly \$500,000 in savings during the pilot study.

Land farming allowed the Army to expedite the treatment of contaminated soil at the lowest cost and with the least disruption to base activities. It is a strategy that would be extremely valuable for other DoD sites facing similar environmental challenges.



IRP Site Status and Progress

DoD uses performance metrics, called measures of merit, to assess progress toward IRP goals. These performance metrics include phase progress at the site level, progress toward achieving RIP and RC at the installation level, and progress in overall relative-risk reduction. DoD examines both status to date and the projection of future progress.

IRP Site Progress by Phase

The majority of sites in the IRP have moved from the investigation phases toward completion of the response action. Figures 2 and 3 display this trend at active and BRAC installations, respectively, by illustrating a decline in the number of sites in investigation and an increase in the number of sites that have progressed through the cleanup phases to achieve RC. The advancement of sites through the environmental restoration process is evidence that the program is progressing.

FIGURE 2: ACTIVE INSTALLATION IRP SITE PROGRESS OVER TIME

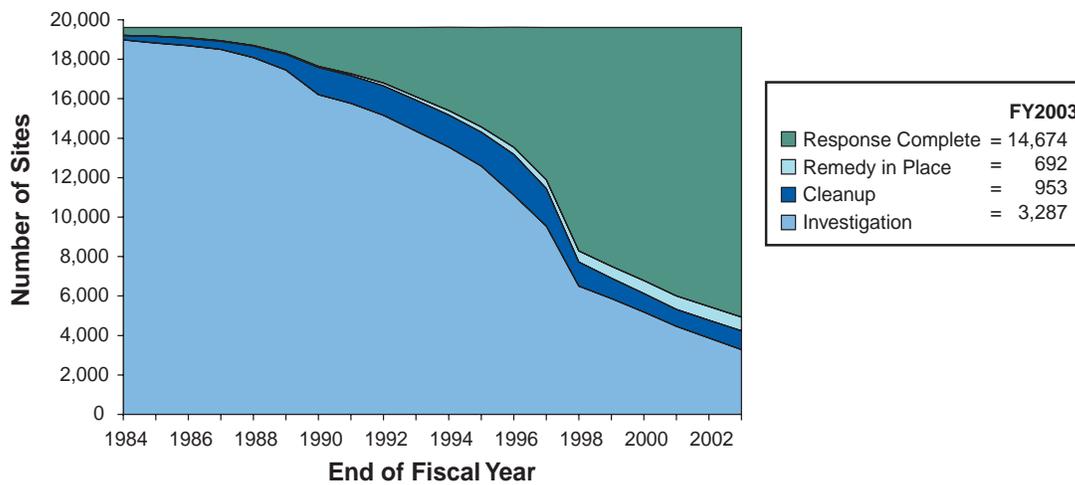
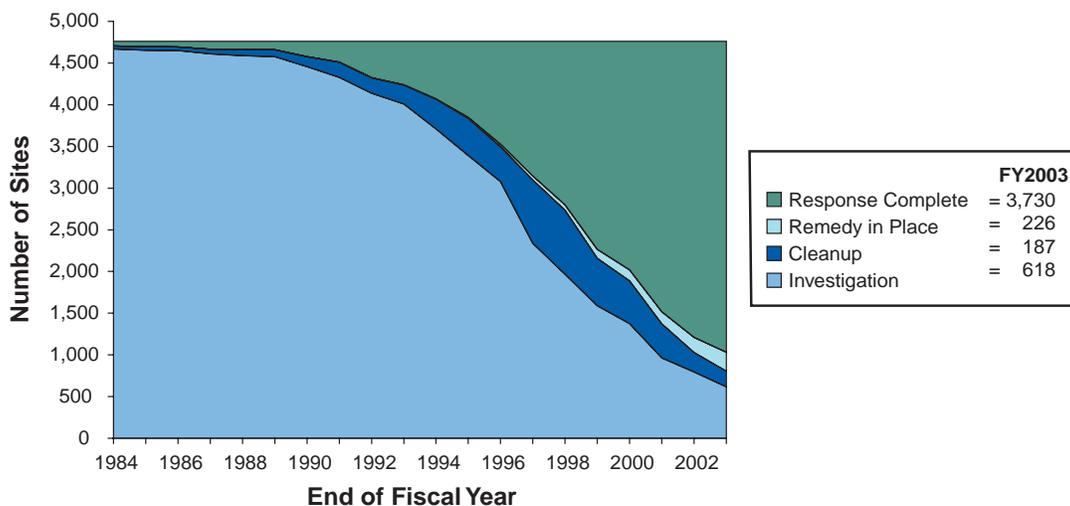


FIGURE 3: BRAC INSTALLATION IRP SITE PROGRESS OVER TIME





Figures 4 and 5 highlight the status of IRP sites at active and BRAC installations as of the end of FY2003. These figures illustrate the number of sites in the investigation and cleanup phases of the environmental restoration process, as well as the number of sites that have reached RC through FY2003. DoD continues to make significant progress in increasing the number of sites that have achieved RC. During FY2003 alone, DoD achieved RC at an additional 598 sites at active and BRAC installations (see the FUDS Status and Progress section for FUDS IRP site status). These figures also show that by the end of FY2003 DoD achieved RC at 75 percent of active sites and 78 percent of BRAC sites, and that the Department is steadily moving forward in its commitment to complete environmental restoration actions. In total, DoD has achieved RC at 74 percent of all IRP sites, an increase of 2 percent from FY2002.

FIGURE 4: ACTIVE INSTALLATION IRP SITE STATUS
(As of September 30, 2003)

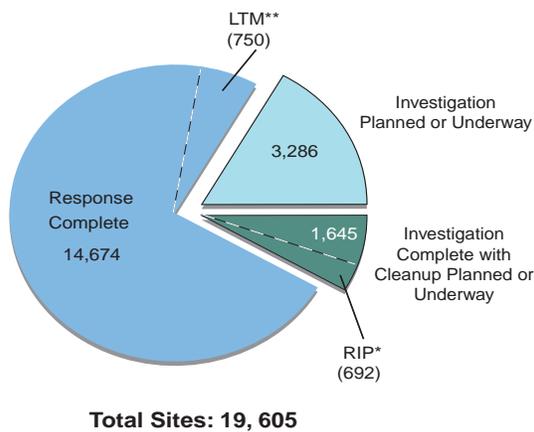
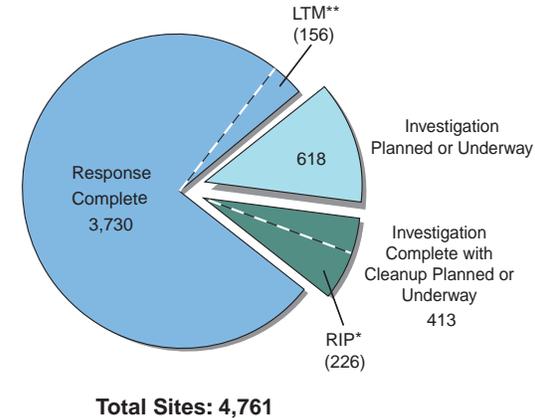


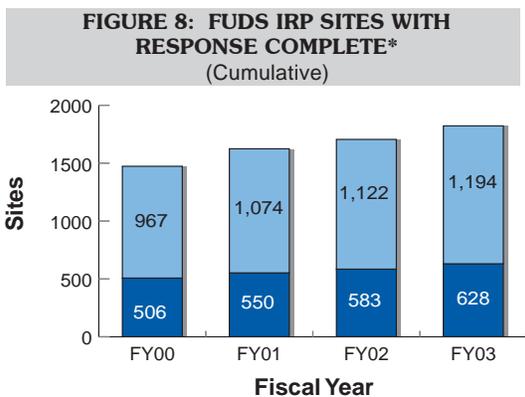
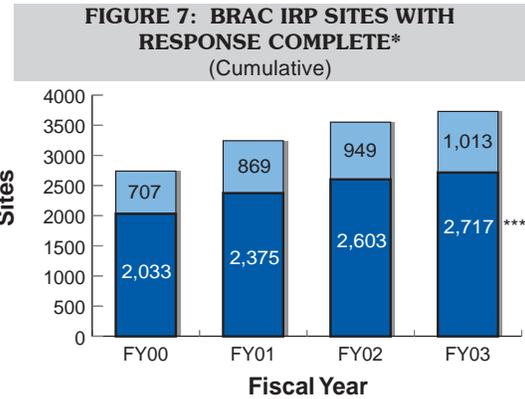
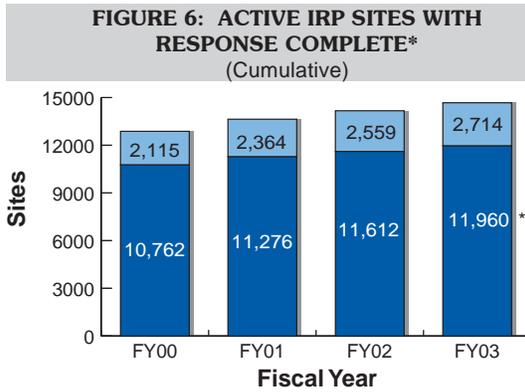
FIGURE 5: BRAC INSTALLATION IRP SITE STATUS
(As of September 30, 2003)



*Remedy in place (RIP) includes sites where remedial action operations are underway.
**Long-term management (LTM) occurs as a subset of the sites that have achieved response complete.

Upon completion of investigation at many sites, DoD determines that there is no risk to human health and the environment, and the site is categorized as RC. To date, 82 percent of active installation IRP sites achieving RC have done so through investigation activities only, as shown in Figure 6. The majority of BRAC sites achieving RC have also been completed in this manner, which is evidenced in Figure 7. Figure 8 shows a majority of FUDS IRP sites achieving RC through cleanup. In recent years however, the number of IRP sites achieving RC each year through investigation alone has been decreasing, as DoD is completing its investigation activities and concentrating on cleanup actions. This trend indicates that the DERP has progressed from the earlier investigation phases into the cleanup phases as the program has matured. Those sites not requiring cleanup have been predominantly identified, and what remains requires more extensive environmental restoration work.

Interim actions—whether interim remedial actions, involving implementation of a cleanup remedy, or interim removal actions, where contamination is simply removed from a site—are vital methods of mitigating immediate risks to human health and the environment. These actions are typically short-term, quick responses to eliminate or sufficiently reduce risk to human health and the environment at sites causing an immediate danger. By using interim actions, DoD protects affected communities faster than if the normal cleanup process were implemented. Often these actions reduce risk such that no further action is needed at the site. DoD completes a number



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

* FY2000 through FY2002 totals have been updated since the previous Annual Report to reflect new and revised data as of FY2003.
 ** Includes 556 IRAs conducted prior to the completion of the studies.
 ***Includes 363 IRAs conducted prior to the completion of the studies.

of these quick-response actions each year, as needed, to prevent contamination from affecting threatened communities and environments. The cumulative number of interim actions completed through the DERP at active and BRAC installations and FUDS properties are shown in Figures 9, 10, and 11, respectively. As of the end of FY2003, DoD completed 5,885 interim actions to address immediate concerns at IRP sites, including 4,144 at active installations, 1,613 at BRAC installations, and 128 at FUDS properties.

IRP Installation Progress

Building the DERP based on site-level data enables the Components to plan environmental restoration activities and budget funding based on the needs of each specific site and the risks they present. Tracking site progress at an installation-level allows the Department to see how cleanup activities are progressing on a larger scale. This is especially important at BRAC installations, where the Department's primary goal is transfer of all excess installation property. To expedite transfer, DoD looks to complete all restoration activities across an installation. Thus, another performance measure DoD uses to gauge progress is the achievement of RIP/RC at the installation and property level. An installation achieves RIP/RC when all sites at the installation or property have remedies in place or have reached RC. This metric is the basis for the environmental restoration goals at BRAC installations.

By the end of FY2003, DoD achieved RIP or RC at 61 percent of its installations and properties. This represents 73 percent of active installations, 68 percent of BRAC installations, and 49 percent of FUDS properties. Figures 12 and 13 display DoD's expected RIP/RC completion



FIGURE 9: INTERIM ACTIONS COMPLETED AT ACTIVE IRP SITES*
(Cumulative)

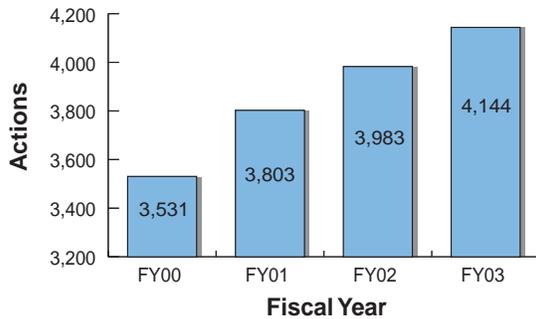
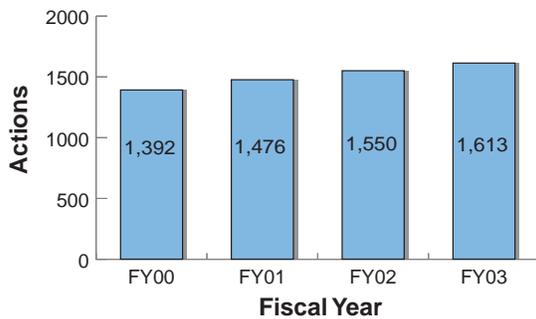
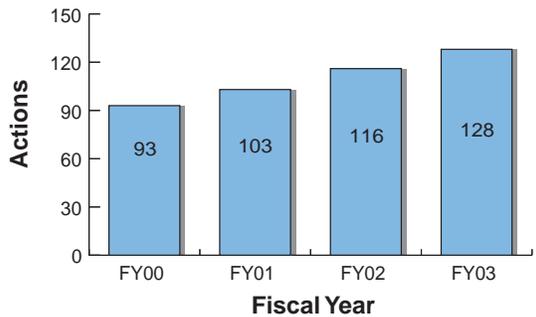


FIGURE 10: INTERIM ACTIONS COMPLETED AT BRAC IRP SITES*
(Cumulative)



*FY2000 through FY2002 totals have been updated since the previous Annual Report to reflect new and revised data as of FY2003.

FIGURE 11: INTERIM ACTIONS COMPLETED AT FUDS IRP SITES*
(Cumulative)

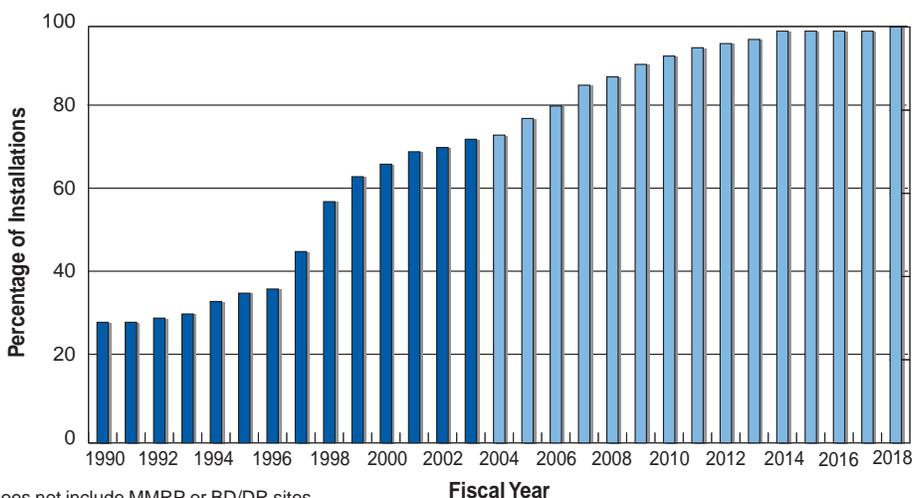


trends for active and BRAC installations (see the FUDS Status and Progress section for FUDS RIP/RC trends). DoD does not anticipate meeting its goal of achieving RIP or RC at 100 percent of BRAC installations by FY2005, as seen in Figure 13. DoD does, however, expect to have achieved RIP or RC at 83 percent of BRAC IRP sites. DoD projects that those installations not achieving RIP/RC by FY2005 will only have one or two sites without remedies in place or completed response actions.

IRP Relative-Risk Reduction

Reviewing the number of sites in each relative-risk category is another performance metric DoD uses to measure progress toward program goals. This metric captures the RRSE categories and is the basis of DoD's goals for active installations and FUDS properties. As DoD addresses

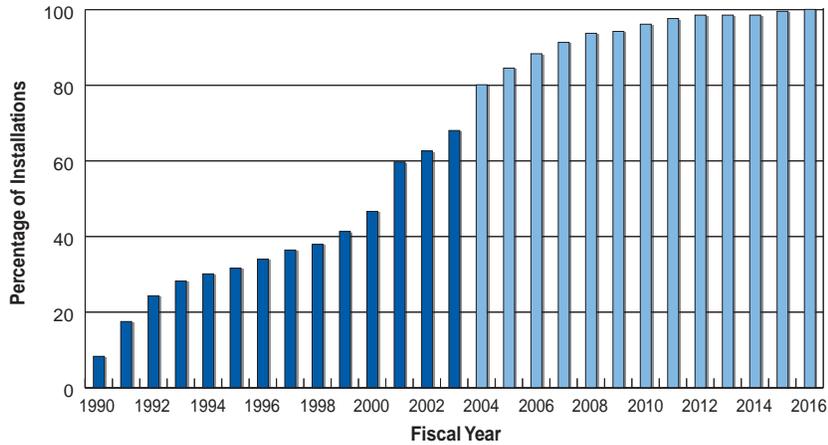
FIGURE 12: DOD ACTIVE INSTALLATIONS ACHIEVING FINAL RIP/RC AT ALL IRP SITES*
(Cumulative and projected, FY1990 through completion)



*Does not include MMRP or BD/DR sites.



FIGURE 13: BRAC INSTALLATIONS ACHIEVING FINAL RIP/RC AT ALL IRP SITES *
(Cumulative and projected, FY1990 through completion)

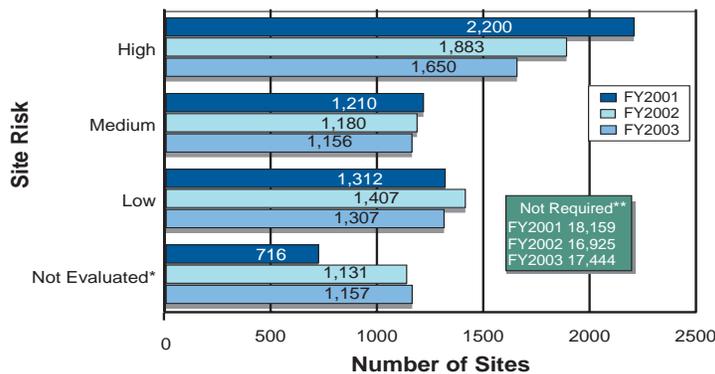


*Does not include MMRP sites.

sites, the number of sites in the high, medium, and low relative-risk categories decrease while the number of sites in the Not Required category—those that no longer require a relative-risk ranking—increases, demonstrating progress in risk reduction.

As of FY2002, DoD reduced its inventory of high relative-risk IRP sites at active installations and FUDS properties by 58 percent, exceeding the FY2002 goal of achieving RIP or RC at 50 percent of high-risk sites. In FY2003 alone, DoD reduced the total number of high relative-risk FUDS and active installation sites by 233.

FIGURE 14: ACTIVE INSTALLATION AND FUDS PROPERTY RELATIVE-RISK SITE EVALUATION PROGRESS



*The Not Evaluated category includes a large number of FUDS sites that are exclusively associated with aboveground and underground storage tanks; sites requiring Relative-Risk Site Evaluation will be determined after tank removal.

**The Not Required category includes sites that have already achieved RIP or RC, as well as IRP sites requiring only military munitions response, building demolition and debris removal, or potentially responsible party actions.

relative-risk category, particularly the high-risk category, is illustrated in Figure 14. With this progress, DoD is on track to meet its FY2007 goal of achieving RIP or RC at all high relative-risk sites.

In addition to reducing the number of high relative-risk sites, DoD has also been successful in reducing the number of medium and low relative-risk sites. DoD is on track to meet its FY2011 and FY2014 goals of achieving RIP or RC at all medium relative-risk sites and all remaining relative-risk sites, respectively. Additionally, DoD is working to achieve RIP or RC at all remaining relative-risk sites on FUDS properties by the end of FY2020.



MMRP Site Status and Progress

DoD continues to build the MMRP, and is making progress on all the key program elements, including setting useful program progress goals. DoD developed near-term MMRP goals and is in the process of establishing long-term goals and metrics to measure progress in completing work at MMRP sites. The initial MMRP site inventory was produced in FY2002 and will be updated annually. As the site-level MMRP inventory is updated, sites are prioritized, funding is budgeted, and work is executed, DoD will be better able to further develop appropriate goals and metrics for the MMRP. Having established goals and metrics will, in turn, allow DoD to more accurately budget for and fund MMRP requirements.

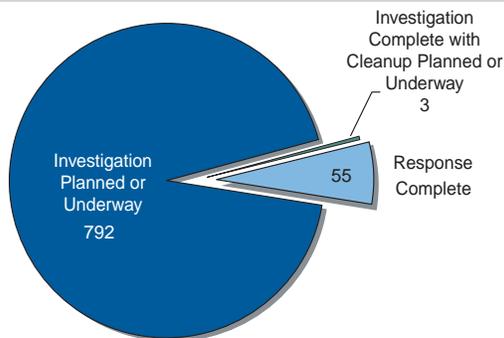
MMRP Site Progress by Phase

During FY2003, DoD further developed its inventory of sites known or suspected to contain UXO, discarded military munitions, or munitions constituents. By the end of FY2003, DoD identified 2,817 sites, an increase of 510 sites from FY2002. DoD anticipated this site increase as part of the MMRP development process; as the Department collects MMRP site information, it is better able to identify discrete areas of contamination and define specific sites within large areas. This enables munitions response action to be more exact and targeted, and thus more efficient.

As is the case in the IRP, MMRP sites are categorized according to their phase status in the response process as of the end of FY2003. Progress is demonstrated as MMRP sites move from investigation through cleanup and achieve categorization as response complete. Since the MMRP is in the early stages of development, the majority of sites are still in the investigation stage. Figures 15 and 16 illustrate the status of sites at active and BRAC installations, respectively (see the FUDS Status and Progress section for FUDS MMRP Site Status).

Munitions response actions have been a part of the DERP for several years, primarily at BRAC installations and FUDS, equipping DoD with a solid experience base for addressing the environmental and safety hazards associated with the past use of military munitions and munitions constituents. As a result, some MMRP sites have already achieved RC at BRAC

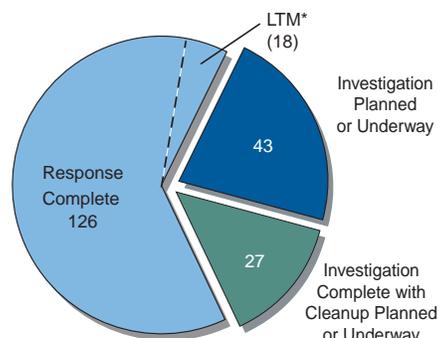
FIGURE 15: ACTIVE INSTALLATIONS* MMRP SITE STATUS
(As of September 30, 2003)



Total Sites: 850

* "Active Installations" refers solely to areas other than operational ranges.

FIGURE 16: BRAC INSTALLATIONS MMRP SITE STATUS
(As of September 30, 2003)



Total Sites: 196

*LTM is a subset of Response Complete



FOCUS ON THE FIELD

FUDS

Rapid Response Protects Human Health and Historic Places

DoD is addressing cleanup of military munitions according to the health and safety risks posed by the munitions. In cases where the potential risks are too great to wait for completion of the full response process, DoD must act quickly to reduce the immediate risks posed at a site. To achieve this rapid response, DoD conducts interim actions or time-critical removal actions. Quick, thorough actions minimize the chances for additional danger.

In 1942, loud booms echoed through the East Fork at Camp Hale, Colorado, as the Army's 10th Mountain Division honed winter warfare skills that would help win decisive victories in the mountains of Italy during World War II.

In 2003, the bang of explosions ricocheted through the mountains once again: this time from the destruction of World War II-era munitions that did not detonate during training years ago.



MMRP surface sweep and removal efforts at Camp Hale.

The presence of unexploded ordnance became a concern in the summer of 2000 following a hiker's discovery of a live mortar shell. Site investigations revealed potentially explosive munitions, including rifle grenades, mortar rounds, recoilless rifle projectiles, and anti-tank land mines. This prompted the U.S. Forest Service to close 1,400 acres of the East Fork Valley in September 2000, including the Camp Hale National Historic Site. The discovery of these weapons sparked an immediate need to remove any materials that could potentially threaten public health and safety.

The Omaha District of the U.S. Army Corps of Engineers (USACE), working with the Colorado Department of Public Health and Environment and the U.S. Forest Service, decided to undertake a time-critical removal action involving a surface sweep of the valley floor.

Surface sweep and removal staff received extensive training including ordnance recognition, sweep procedures, magnetometer training, and local environmental hazards awareness. Training also included the Occupational Safety and Health Administration's 40-hour hazardous waste operations course, and practice sweeps in clean, seeded grids to ensure preparedness.

Work at the site ended on time, as scheduled, in early August 2003. "When the valley is reopened to the public, it will be a much safer place," said Jerry Hodgson, Camp Hale project manager. "We did a good thing this summer. We spent taxpayer's money in a responsible and prudent manner. We did the work safely and in cooperation and partnership with the state and the U.S. Forest Service. We also used local resources and aided the local economy."



installations and FUDS properties. Many MMRP sites reach the RC milestone directly from investigation, when it is determined that the site does not pose a safety or environmental risk that requires a remedial action. Figures 17 and 18 illustrate the cumulative number of BRAC sites and FUDS sites, respectively, achieving RC from both investigation and cleanup over the last four fiscal years.

FIGURE 17: BRAC MMRP SITES WITH RESPONSE COMPLETE*
(Cumulative)

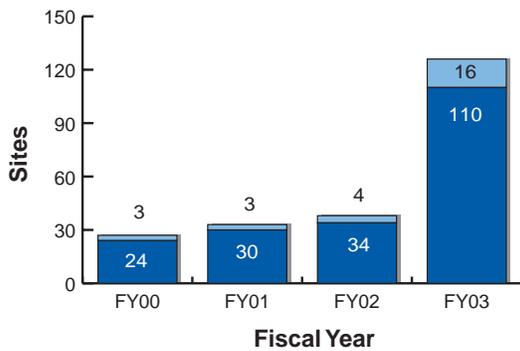
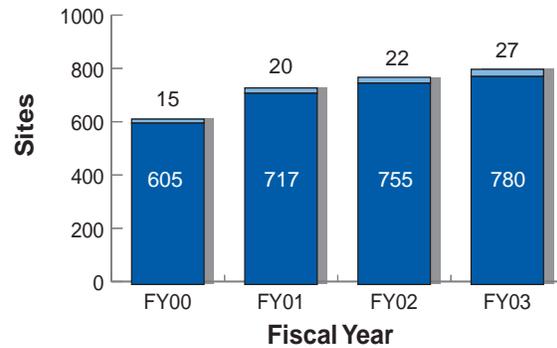


FIGURE 18: FUDS MMRP SITES WITH RESPONSE COMPLETE*
(Cumulative)



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

*FY2000 through FY2002 totals have been updated since the previous Annual Report to reflect new and revised data as of FY2003.

Alternatively, some sites are found to require an immediate response, where the risk requires mitigation in an accelerated timeframe. At these sites, DoD may conduct an interim action to address any immediate risks to human health and the environment. Figures 19 and 20 show the number of interim actions completed at MMRP sites on BRAC installations and FUDS properties. As of the end of FY2003, DoD conducted one interim action at an active installation MMRP site. This interim action was performed at Naval Magazine Lualualei.

FIGURE 19: INTERIM ACTIONS COMPLETED AT BRAC MMRP SITES*
(Cumulative)

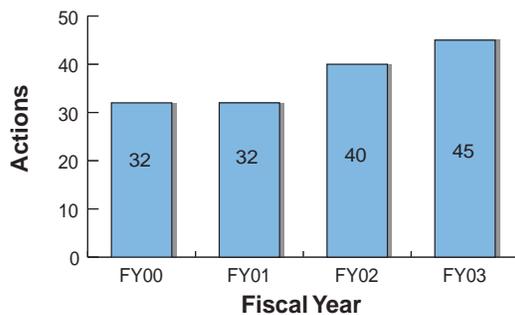
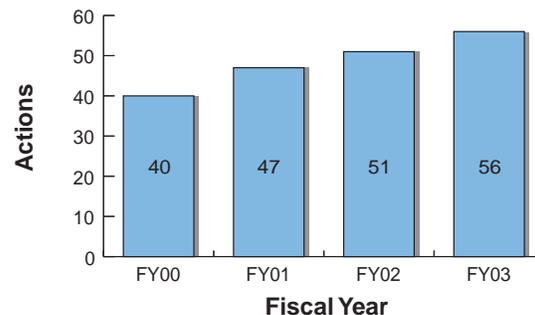


FIGURE 20: INTERIM ACTIONS COMPLETED AT FUDS MMRP SITES*
(Cumulative)



*FY2000 through FY2002 totals have been updated since the previous Annual Report to reflect new and revised data as of FY2003.



DERP Funding

Conducting and managing environmental restoration activities at over 30,000 sites requires accurate planning, funding, and execution. DoD carefully coordinates, prioritizes, and tracks environmental restoration activities to use funding efficiently. Due to the cost and complexity of restoration work, DoD must plan its activities years in advance to ensure that adequate funding is available for the DERP to progress smoothly toward completion of environmental restoration requirements. DoD's ability to plan for and conduct cleanup activities depends on stable and predictable funding.

The DERP Budget Process

DoD develops the budget for the DERP based on the anticipated funds needed to meet environmental restoration requirements. The DERP's budget process is designed to ensure that adequate funding is received and efficiently executed in the program. To achieve this, DoD's budget process is closely tied to program planning and execution, with budget development beginning with site-level funding requirements and building through the Component-level submissions to determine total program funding needs. Many factors influence cleanup funding levels, including prioritization of sites, progress toward program goals, and identification of new sites.

DoD builds the DERP budget based on site-level data and funding requirements. Using this site-level information, each installation or property in the DERP develops and maintains a management action plan, or a BRAC cleanup plan for BRAC installations, to manage environmental restoration activities under both the IRP and MMRP. These tools are used to estimate anticipated funding needs and to allocate funding received. Management action plans and BRAC cleanup plans contain information about an installation's past environmental restoration activities and current status, present a vision for future site-level requirements, establish cleanup schedules, and identify anticipated funding requirements through completion. Each installation updates its management action plan at least once a year, and updates BRAC cleanup plans as needed, to reflect changes in priorities, additional cleanup information, new policies, cleanup progress, and funding.

Once Congress approves the budget, environmental restoration funding for active installations and FUDS properties is appropriated into five Component-specific Environmental Restoration (ER) accounts. The Army, Navy, and Air Force manage individual ER accounts for environmental response activities at their active installations. A fourth account funds the FUDS program. The Army serves as the executive agent for the FUDS program, which the U.S. Army Corps of Engineers executes. The fifth account, the Defense-wide account, supports OSD's oversight of the DERP and cleanup initiatives for DLA and DTRA. Environmental restoration activities at BRAC installations are funded through a separate account structure, which addresses closure-related environmental compliance and environmental planning activities, in addition to environmental restoration.

The DERP's budget process takes approximately two years to complete, so that the DERP budget appropriated for FY2003 began development at the installation level in FY2001. This process requires DoD to carefully plan both its environmental restoration activities and assess its funding needs years in advance.

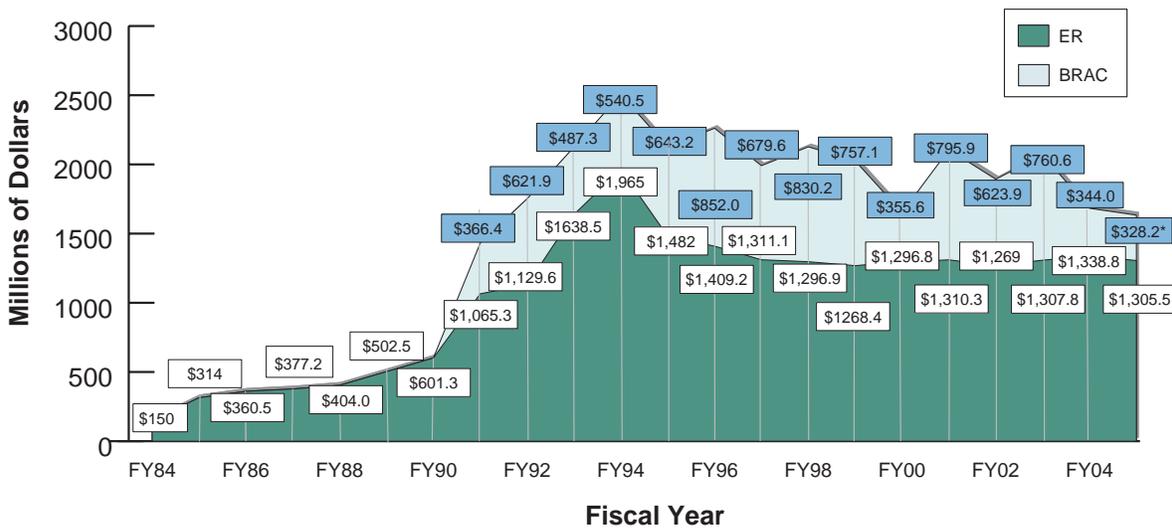


Funding Trends

In the past 19 years, DoD has invested around \$25 billion in environmental restoration. For FY2003 alone, Congress appropriated approximately \$1.3 billion for environmental restoration activities at active installations and FUDS properties. Congress appropriated an additional \$760 million for environmental activities at BRAC installations, including compliance and planning, as well as cleanup.

Congress has provided stable funding for the DERP since FY1995, as evidenced by DoD’s funding profile illustrated in Figure 21. The Department depends on congressional support to provide this stable and predictable funding, needed to effectively plan and conduct environmental restoration activities and achieve program goals.

FIGURE 21: ENVIRONMENTAL RESTORATION AND BRAC ENVIRONMENTAL FUNDING TRENDS



*Includes DLA prior year unobligated balance available for execution in FY05.

Environmental Restoration Funding

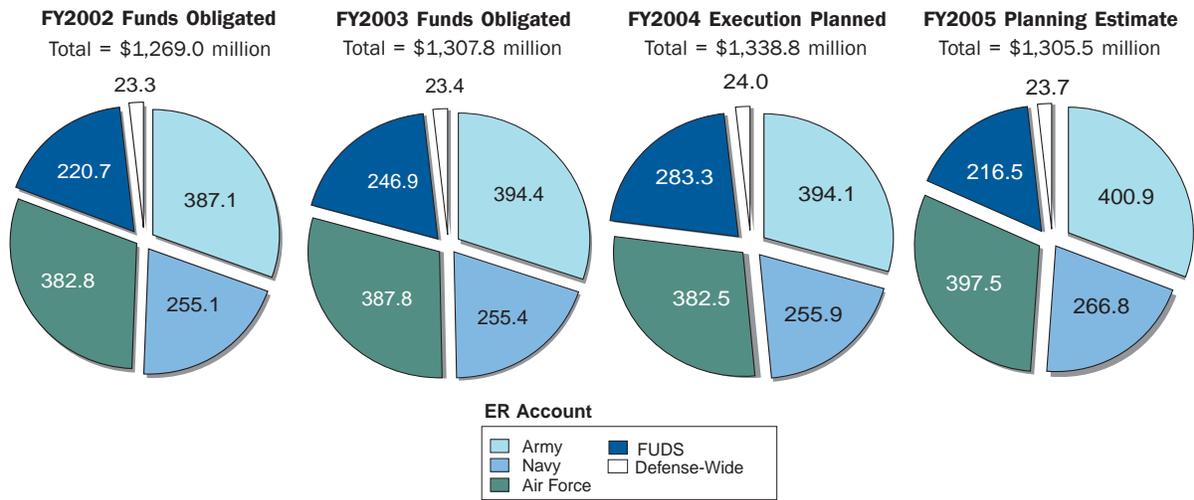
Actual and requested FY2002–FY2005 DoD funding by Component for environmental restoration activities at active installations and FUDS properties is shown in Figure 22. In FY2003, Army obligated \$394.4 million (\$393.7 million in appropriations and \$0.7 million in recoveries); Navy obligated \$255.4 million; Air Force obligated \$387.8 million (\$387.6 million in appropriations and \$0.2 million in recoveries); FUDS obligated \$246.9 million, and Defense-wide activities obligated \$23.4 million. ER funding has remained stable both for the DERP as a whole and also for the five individual accounts, as the figure illustrates.

ER Funding Trends in the IRP

As IRP sites progress through the cleanup process, more sites complete investigations and advance to cleanup activities. As a result, DoD spends increasingly more funding on cleanup activities and less on investigation. This trend is reflected in Figure 23, which shows the actual



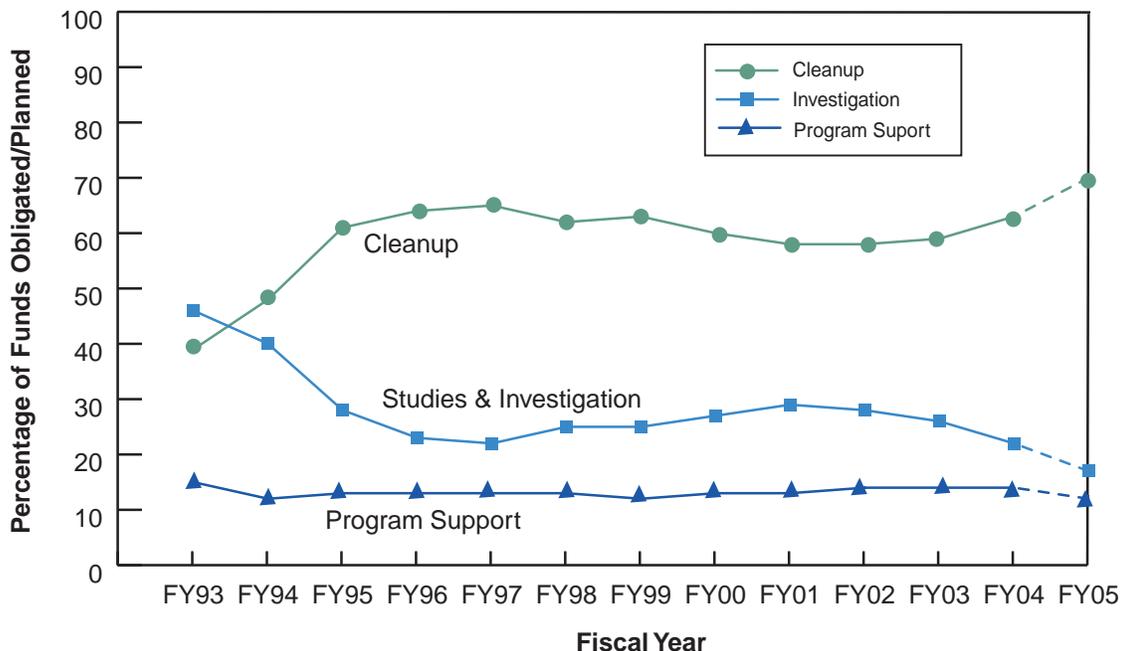
FIGURE 22: ENVIRONMENTAL RESTORATION FUNDING PROFILE FOR ACTIVE INSTALLATIONS AND FUDS PROPERTIES*
(In millions of dollars)



*Funding shown includes all IRP, MMRP, and management and support costs. Due to rounding, Component subtotal may not equal fiscal year totals.

and planned funding for IRP cleanup, investigation, and program support at active installations and FUDS from FY1993 through FY2005. During FY2003, DoD spent approximately 59 percent of funding on cleanup and used 26 percent to complete investigation phases. Figure 23 also demonstrates that the DERP maintains a consistently low level of program management and support costs.

FIGURE 23: ENVIRONMENTAL RESTORATION OBLIGATIONS AND PLANNING ESTIMATES FOR CLEANUP, INVESTIGATION, AND PROGRAM SUPPORT AT ACTIVE INSTALLATIONS AND FUDS





Progress can also be measured using program cost-to-complete (CTC) estimates, which are an estimation of anticipated costs necessary to complete environmental restoration requirements. CTC estimates, derived from the budgeting process, are based on site-level data and provide the most accurate picture of anticipated cost trends for addressing environmental restoration requirements. As such, CTC estimates are an important oversight and program management tool used to assess future funding needs and determine if funding is being used effectively.

DoD forecasts that the shift in sites from investigation phases to cleanup phases will continue to increase, causing an increasingly larger portion of the total IRP CTC estimate to be devoted to cleanup phases. This trend toward decreased investigation funding requirements and corresponding increases in cleanup funding requirements is demonstrated in Figures 24 and 25.

FIGURE 24: ACTIVE INSTALLATION AND FUDS PROPERTY IRP COST-TO-COMPLETE ESTIMATES BY PHASE CATEGORY, FY2004-COMPLETE*
(In \$000)

Phase	FY04	FY05	FY06	FY07	FY08	FY09	FY10-Complete
Investigations	252,268	172,145	105,141	89,920	145,704	102,804	350,460
IRA	158,924	117,142	145,406	100,774	81,649	65,887	402,864
RD	42,095	38,408	29,321	13,537	19,247	17,747	51,666
RA-C	385,935	449,724	508,520	549,997	412,881	500,127	1,837,944
RA-O	159,579	179,619	197,653	229,820	318,197	303,122	3,038,441
LTM	48,829	56,718	69,376	82,027	92,483	93,603	1,580,113
Total	1,047,630	1,013,756	1,055,417	1,066,075	1,070,161	1,083,290	7,261,488

*Does not include program management, DTRA, other miscellaneous costs, and MMRP funding.

FIGURE 25: ACTIVE INSTALLATION AND FUDS PROPERTY IRP COST-TO-COMPLETE ESTIMATES BY PHASE CATEGORY AND COMPONENT, FY2004-COMPLETE*
(In \$000)

Phase	Army	Navy	Air Force	DLA	FUDS	Total
Investigation	284,700	347,990	199,803	7,150	378,799	1,218,442
IRA	76,503	517,211	446,935	0	31,997	1,072,646
RD	58,100	36,077	52,344	1,355	64,145	212,021
RA-C	1,352,552	747,366	704,285	30,124	1,810,801	4,645,128
RA-O	785,122	845,439	1,968,845	59,323	767,702	4,426,431
LTM	527,041	238,764	684,653	5,648	567,043	2,023,149
Total	3,084,018	2,732,847	4,056,865	103,600	3,620,487	13,597,817

*Does not include program management, DTRA, other miscellaneous costs, and MMRP funding.

The Department spent the greatest portion of funding in FY2003 on remaining high relative-risk sites, continuing its commitment to addressing all of these sites by FY2007. The amount of funding required for high relative-risk sites, though, as shown in Figure 26, will decrease as DoD nears its goal. Greater funding amounts will then be used to address medium relative-risk sites, commensurate with meeting DoD's FY2011 goal for these sites. Further evidence that the Department is focusing on addressing sites that pose the greatest risk is evidenced by the overall funding amounts forecasted by the Components for each relative-risk site type: the majority of funding, as shown in Figure 27, is planned for addressing high relative-risk sites.



FIGURE 26: ACTIVE INSTALLATION AND FUDS PROPERTY IRP COST-TO-COMPLETE ESTIMATES BY RELATIVE RISK, FY2004-COMPLETE*
(In \$000)

Relative-Risk	FY04	FY05	FY06	FY07	FY08	FY09	FY10-Complete
High	563,840	593,400	563,607	521,763	353,500	354,604	2,670,769
Medium	166,691	138,633	207,324	245,305	372,276	397,274	1,113,347
Low	65,761	75,963	65,642	93,225	139,695	162,505	954,557
Not Evaluated	57,876	35,871	54,564	56,461	50,458	38,283	994,584
Not Required	193,462	169,889	164,280	149,321	154,232	130,624	1,528,231
Total	1,047,630	1,013,756	1,055,417	1,066,075	1,070,161	1,083,290	7,261,488

*Does not include program management, DTRA, other miscellaneous costs, and MMRP funding.

FIGURE 27: ACTIVE INSTALLATION AND FUDS PROPERTY IRP COST-TO-COMPLETE ESTIMATES BY RELATIVE RISK AND COMPONENT, FY2004-COMPLETE*
(In \$000)

Relative-Risk	Army	Navy	Air Force	DLA	FUDS	Total
High	1,291,898	1,597,617	1,517,783	10,050	1,204,135	5,621,483
Medium	893,738	405,143	837,898	18,737	485,334	2,640,850
Low	378,258	286,908	544,846	14,423	332,913	1,557,348
Not Evaluated	50,852	19,791	305,645	264	911,545	1,288,097
Not Required	469,272	423,388	850,693	60,126	686,560	2,490,039
Total	3,084,018	2,732,847	4,056,865	103,600	3,620,487	13,597,817

*Does not include program management, DTRA, other miscellaneous costs, and MMRP funding.

ER Funding Trends in the MMRP

As in the IRP, CTC estimates show anticipated cost trends for addressing MMRP requirements. As the MMRP matures and sites are further characterized, DoD's CTC estimates will continue to improve and provide a more refined picture of munitions response requirements.

Similar to the early years of the IRP, a large percentage of MMRP funding at the beginning of the program is planned for investigation activities. As the MMRP matures, DoD expects to spend the majority of MMRP funding on implementing cleanup remedies at MMRP sites. Funding requirements anticipated for MMRP activities, as shown in Figure 28, demonstrate that the Department believes the majority of these sites will require cleanup activities, such as discrete removal actions, which occur in the remedial action construction phase.

FIGURE 28: ACTIVE INSTALLATION AND FUDS PROPERTY MMRP COST-TO-COMPLETE ESTIMATES BY PHASE CATEGORY, FY2004-COMPLETE*†
(In \$000)

Phase	FY04	FY05	FY06	FY07	FY08	FY09	FY10-Complete
Investigation	43,436	55,527	50,963	42,509	42,771	50,800	2,249,444
IRA	1,417	58	0	0	0	0	35,085
RD	112	1,754	1,976	2,878	1,200	469	133,125
RA-C	37,929	49,593	46,509	59,752	78,540	72,861	11,871,371
RA-O	0	0	0	0	0	0	281,496
LTM	740	2,405	72	356	488	386	1,081,777
Total	83,634	109,337	99,520	105,495	122,999	124,516	15,652,298

*Does not include program management, DTRA, other miscellaneous costs, and IRP funding.

†"Active installations" refers solely to areas other than operational ranges.



The FUDS program has the highest CTC estimates for MMRP activities due to the large number of MMRP sites present at FUDS properties. All Components with MMRP sites, however, will be spending an increasing amount of funding on MMRP activities in future years, as shown in Figure 29, as DoD continues to increase its focus on addressing the risks associated with these sites.

FIGURE 29: ACTIVE INSTALLATION AND FUDS PROPERTY MMRP COST-TO-COMPLETE ESTIMATES BY PHASE CATEGORY AND COMPONENT, FY2004-COMPLETE†**
(In \$000)

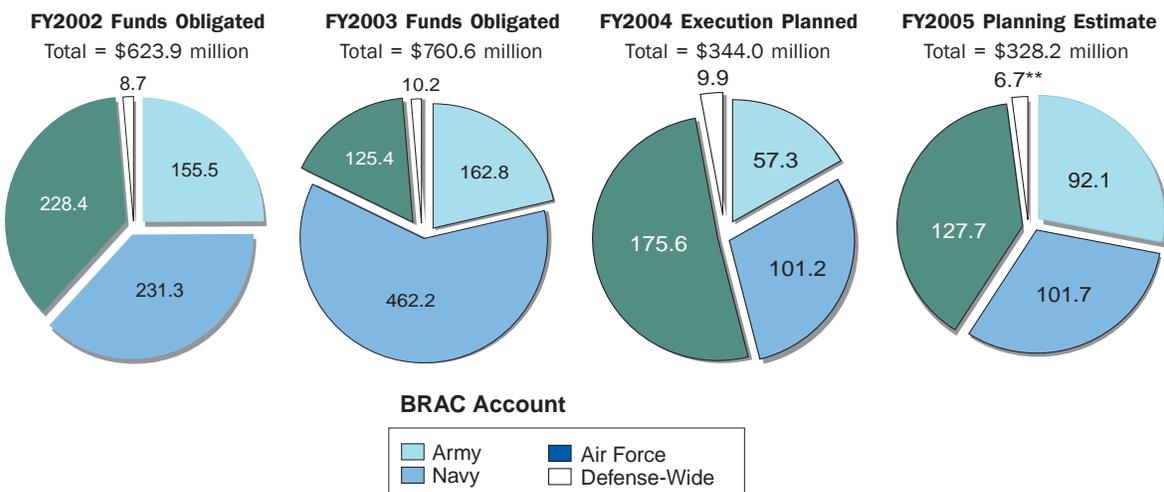
Phase	Army	Navy	Air Force	DLA	FUDS	Total
Investigation	555,392	93,880	140,027	0	1,746,151	2,535,450
IRA	0	28,189	6,896	0	1,475	36,560
RD	57,969	6,198	24,522	0	52,825	141,514
RA-C	2,303,794	213,507	389,152	0	9,310,102	12,216,555
RA-O	64,702	1,788	215,006	0	0	281,496
LTM	107,881	41,931	62,459	0	873,953	1,086,224
Total	3,089,738	385,493	838,062	0	11,984,506	16,297,799

*Does not include program management, DTRA, other miscellaneous costs, and IRP funding.
†"Active installations" refers solely to areas other than operational ranges.

BRAC Funding

Funding for environmental activities, including compliance and planning, at BRAC installations has steadily declined from FY2002 through FY2005, as shown in Figure 30, demonstrating that DoD is completing environmental restoration requirements at these installations and less funding is needed in future years. FY2003 BRAC environmental funding includes \$162.8 million for Army, \$462.2 million for Navy, \$125.4 million for Air Force, and \$10.2 million for DLA. FY2004 and FY2005 funding requirements will continue this trend of decreasing funding required, as additional cleanup actions are completed and BRAC installations reach the RIP/RC milestone.

FIGURE 30: BRAC ENVIRONMENTAL FUNDING PROFILE FOR BRAC INSTALLATIONS*
(In millions of dollars)



*Funding shown includes all IRP, MMRP, compliance, planning, and management and support costs. Due to rounding, Component subtotals may not equal fiscal year totals.

**Includes DLA prior year unobligated balance available for execution in FY05.



At Navy installations, BRAC funding requirements are further decreased due to the incorporation of Navy’s land sale revenues generated through property transfer. As Navy transfers its excess property the revenue created is being used to fund cleanup requirements at other Navy BRAC installations, offsetting the amount needed from Congress.

BRAC Funding Trends in the IRP

Similar to the progression of IRP sites at active installations and FUDS, BRAC IRP sites are also demonstrating progress through phases, moving from investigation to cleanup. Over the past 10 years, DoD has devoted increasingly more BRAC resources for funding cleanup activities, while less funding was needed for investigation activities. This trend extends through the end of the environmental restoration program as shown in Figures 31 and 32, which display DoD’s IRP CTC estimates for BRAC installations. These data demonstrate program progress by showing that funding estimates for early phases in the restoration process are expected to continue to decrease, while funding for later phases will increase.

FIGURE 31: BRAC INSTALLATION IRP COST-TO-COMPLETE ESTIMATES BY PHASE CATEGORY, FY2004-COMPLETE*
(In \$000)

Phase	FY04	FY05	FY06	FY07	FY08	FY09	FY10-Complete
Investigation	21,742	12,185	7,030	1,238	1,000	659	865
IRA	24,053	6,191	44,204	0	0	0	0
RD	3,237	7,193	2,951	3,350	528	3,851	2,138
RA-C	99,262	83,045	115,662	37,780	63,655	40,776	403,806
RA-O	79,340	100,134	126,403	62,536	61,762	49,832	929,151
LTM	20,885	16,918	42,105	11,423	12,179	11,371	259,776
Total	248,519	225,666	338,355	116,327	139,124	106,489	1,595,736

*Does not include program management, other miscellaneous costs, and MMRP funding.

FIGURE 32: BRAC INSTALLATION IRP COST-TO-COMPLETE ESTIMATES BY PHASE CATEGORY AND COMPONENT, FY2004-COMPLETE*
(In \$000)

Phase	Army	Navy	Air Force	DLA	Total
Investigation	8,998	9,479	26,242	0	44,719
IRA	26	58,063	16,359	0	74,448
RD	11,354	5,246	6,398	250	23,248
RA-C	212,467	88,075	529,879	13,565	843,986
RA-O	126,023	271,659	998,441	13,035	1,409,158
LTM	80,259	96,636	194,315	3,447	374,657
Total	439,127	529,158	1,771,634	30,297	2,770,216

*Does not include program management, other miscellaneous costs, and MMRP funding.

BRAC Funding Trends in the MMRP

DoD conducted munitions response actions and addressed explosive safety hazards under the IRP incidental to hazardous waste remediation, particularly at BRAC sites, prior to the development of the MMRP in FY2001. This experience is reflected in the MMRP site progress at BRAC installations, where a significant number of MMRP sites have already advanced to the cleanup stages of the environmental restoration process. This experience is also shown in DoD’s estimated funding requirements for MMRP activities at BRAC sites, provided in Figure 33 by budget year and phase. The bulk of BRAC funding has been allocated for remedial action construction in both the current year and future years, indicating that a large portion of BRAC MMRP sites have already moved into cleanup stages.


FOCUS ON THE FIELD

DLA

Remedial Process Optimization Leads to Efficient Cleanup in the Arctic

One tool that DoD uses to evaluate and improve site remediation processes so that maximum risk reduction is achieved for each dollar spent is remedial process optimization (RPO). RPO is a systematic, iterative process that evaluates remedial processes for overall system effectiveness to enhance remedy effectiveness and reduce overall site cleanup costs, taking alternative remedial approaches and new technologies into consideration.

For more than 50 years, a privately owned salvage yard 6 miles southeast of Fairbanks, Alaska, has been home to a variety of scrapped and damaged materials: assorted old cars, military vehicles, batteries, and transformers—all at one point thought to contain salvageable metals. Efforts to recover the metals, as well as the unprotected dumping of asbestos and thousands of drums of liquid wastes, led to the inevitable: the contamination of this site with significant levels of lead and polychlorinated biphenyls (PCBs), posing a huge risk to human health and the surrounding environment.



Stakeholders tour the Arctic Surplus Salvage Yard.

Years of interagency disagreement and budget obstacles prevented a viable remedy from being implemented at this site, now known as the Arctic Surplus Salvage Yard, but that all changed in 2002 when DoD tasked the Defense Logistics Agency (DLA) as lead agency for cleaning up the yard.

DLA assembled an RPO team of remediation experts from DLA, Air Force, EPA, and the Alaska Department of Environmental Conservation to visit the site and review EPA's 1995 Record of Decision (ROD) for cleaning up Arctic Surplus. The RPO team recommended several modifications to the remedial actions specified in the original ROD, such as re-sampling the soils at the site to better identify PCB hot-spots, which refined the estimate of highly contaminated soil from 5,200 cubic yards stated in the original ROD, to 70 cubic yards. The RPO team also recognized that PCB solvent extraction was not necessary and instead recommended solidifying and stabilizing all PCB- and lead-contaminated soil and placing the mixture as a cover over the old landfill found at the site. In addition, the RPO team invited local fire departments to conduct fire-training exercises at the site to help neutralize pressurized tanks, which reduced the original cost estimate for neutralizing the tanks by 90 percent and resulted in enhanced relationships with the local community.

By implementing the RPO team's recommendations, DLA reduced the cost of remedial action at the site from \$38 million to \$3.5 million, a ten-fold decrease. The remediation time also decreased, from an anticipated four years to just one year. In addition, the original remediation proposal rendered the property unusable, while the RPO proposal to change the landfill contaminant cap to a flat design allows for unlimited industrial use on almost all of the land.

This site will serve as an RPO case study for use in training other states, federal agencies, and stakeholders in the benefits of conducting a successful optimization process. The completed remedial actions will now allow the EPA to delist the site from the National Priorities List next year.



DoD's estimated CTC for munitions responses at BRAC installations is composed primarily of funding for addressing MMRP requirements at Army BRAC installations, as shown in Figure 34. The majority of funding across each Component having identified MMRP requirements, however, centers on cleanup activities, rather than on investigation, further demonstrating the progress already made at BRAC installations to address MMRP requirements.

FIGURE 33: BRAC INSTALLATION MMRP COST-TO-COMPLTETE ESTIMATES BY PHASE CATEGORY, FY2004-COMPLETE*
(In \$000)

Phase	FY04	FY05	FY06	FY07	FY08	FY09	FY10-Complete
Investigation	604	14,704	0	25	25	290	398
IRA	0	0	0	0	0	0	0
RD	59	281	145	0	0	605	573
RA-C	12,001	16,712	40,540	2,145	2,566	25,708	381,376
RA-O	0	50	100	0	1,778	0	526
LTM	621	1,175	1,466	1,358	1,446	1,308	39,296
Total	13,285	32,922	42,251	3,528	5,815	27,911	422,169

*Does not include program management, DTRA, other miscellaneous costs, and IRP funding.

FIGURE 34: BRAC INSTALLATION MMRP COST-TO-COMPLETE ESTIMATES BY PHASE CATEGORY AND COMPONENT, FY2004-COMPLETE*
(In \$000)

Phase	Army	Navy	Air Force	DLA	Total
Investigation	14,041	2,005	0	0	16,046
IRA	0	0	0	0	0
RD	1,531	132	0	0	1,663
RA-C	432,261	48,787	0	0	481,048
RA-O	1,924	530	0	0	2,454
LTM	46,318	352	0	0	46,670
Total	496,075	51,806	0	0	547,881

*Does not include program management, DTRA, other miscellaneous costs, and IRP funding.

Partnerships with Stakeholders

The Department continues to improve stakeholder involvement in the environmental restoration process to ensure that the concerns of the public and regulators are being addressed. DoD relies on partnerships with communities, tribal governments, and state and federal agencies to facilitate the DERP's implementation by providing the insight necessary to effectively execute restoration requirements and expedite the cleanup process. The remainder of this chapter discusses these relationships and the mechanisms used to facilitate community and stakeholder involvement.

Community Partnering

Engaging the community is an effective way to identify and address environmental restoration concerns. DoD involves the community in the DERP through public outreach and efforts to promote public participation. Informally, through outreach, the Department works to give stakeholders a better understanding of the DERP. DoD also uses formal mechanisms to promote community understanding of and participation in the environmental restoration process, including Restoration Advisory Boards (RABs) and technical assistance for public participation (TAPP) contracts.



Restoration Advisory Boards

RABs are groups comprising local community members and representatives of the installation, the U.S. Environmental Protection Agency (EPA), and state, Tribal, and local governments that provide advice to an installation or FUDS property regarding environmental restoration activities. RAB members share community views with installation decision-makers and report information back to the community on DoD’s environmental restoration activities. In addition, RABs increase community understanding and support for the DERP by providing a venue for DoD to discuss and share information regarding cleanup activities, enabling early and continuous flow of environmental restoration information among the affected community, DoD, and regulatory agencies.

The RAB program is now one of the largest public involvement efforts through a federal agency. DoD ensures that the installation representatives and the other RAB members have access to the tools and resources necessary to make the program effective. In FY2003, DoD had 298 active RABs across all of the Military Components, and invested approximately \$3.3 million in the administrative cost of RAB operations. Figures 35 and 36, respectively, show the number of RABs and their expenditures by Component in FY2003.

For more information on the RAB program, visit

<http://www.dtic.mil/envirodod/Stakeholder/WCommunity/>

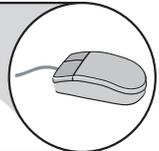


FIGURE 35: NUMBER OF RABS PER COMPONENT IN FY2003

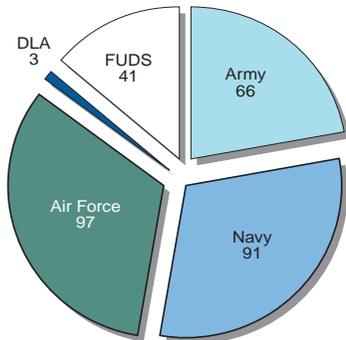
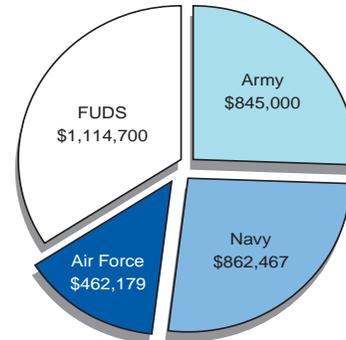


FIGURE 36: FY2003 RAB EXPENDITURES BY COMPONENT



Technical Assistance for Public Participation

Another way DoD facilitates meaningful community involvement in the DERP is through TAPP contracts. Through a TAPP contract, DoD procures the services of an independent technical consultant with appropriate expertise to advise the local RAB or technical review committee (TRC) on a specific project, and provide them with an explanation of technical issues independent of DoD. Environmental restoration issues can be complex, and this complexity may be a barrier to a community’s understanding and acceptance of an installation’s environmental restoration efforts. TAPP contracts assist communities in understanding and evaluating technical issues. With this increased understanding comes increased community trust, confidence, and meaningful involvement in environmental restoration activities. TAPP awards for FY2003 are listed in Figure 37.



FOCUS ON THE FIELD

NAVY

**Strong Partnership Ensures
Efficient Cleanup for Naval Shipyard**

DoD relies on partnerships with federal and state agencies and communities to advance restoration efforts. Collaboration with stakeholders provides DoD with a mechanism to most effectively and cost-efficiently clean up property.

Significant contamination at two Portsmouth, Virginia, NPL sites will no longer threaten the Elizabeth River thanks to a collaborative agreement forged by the Navy, state and federal regulators, and a local industry.

The landmark agreement represented a major breakthrough in discussions about cleaning up the two comingled properties, which belong to the Norfolk Navy Shipyard and Atlantic Wood Industries.



Treating contaminated water in waste lagoons at Norfolk Naval Shipyard.

Through the resolution, the Navy and Atlantic Wood agreed to approach the cleanup as a single project. They also settled several legal and financial issues with federal and state agencies.

“The relationship forged between [this agreement’s] partners will be a foundation for success in future projects not yet started,” said Mike Host of the Norfolk Naval Shipyard Environmental Division. “It will demonstrate in a very real way what people and organizations, working together, can accomplish.”

The Navy and Atlantic Wood worked with the Department of Justice, the U.S. Environmental Protection Agency, and the Virginia Department

of Environmental Quality to plan the cleanup. Locally, community participants included the Restoration Advisory Board, Virginia Institute of Marine Sciences, and Elizabeth River Project.

The cleanup plan included the excavation of waste lagoons to create a 1.5-acre wetland. To achieve this, cleanup measures involved removing abrasive blast material and petroleum-contaminated soil, capping a disposal area, and draining and treating contaminated water from the waste lagoons. Contaminants at the sites came from past industrial operations at the property, and include calcium hydroxide, abrasive blast material, metals, polycyclic aromatic hydrocarbons, treated wood wastes, and inert construction debris. During the cleanup, an engineering firm excavated 42,000 tons of soil and treated more than 4 million gallons of contaminated water. In addition to the creation of the wetland, shrubs and bushes were planted to create a riparian buffer.

“This is a major, major breakthrough in the restoration of the Southern Branch of the Elizabeth River,” said Majorie Mayfield-Jackson, executive director of the Elizabeth River Project.

“Congratulations to all for persevering to overcome complex and daunting obstacles. Future generations will appreciate it.”



FIGURE 37: RABS AND TRCS UTILIZING TAPP CONTRACTS IN FY2003

Component	RAB/TRC	TAPP Award
Army	Army Research, Development, and Engineering Command (Picatinny Arsenal)	\$23,000
	Fort McClellan	\$2,000
	Jefferson Proving Ground	\$25,000
	Longhorn Army Ammunition Plant	\$15,000
Navy	Treasure Island, Hunters Point Annex	\$16,000
	Calverton NWIRP	\$24,600
	Vieques	\$24,960
Air Force	Four Lakes Community Air Guard Station	\$600
	Spokane International Airport	\$600
	North Smithfield ANGS	\$82,900
DLA	DLA received no TAPP awards	
FUDS	Marion Engineer Depot	\$12,000
	Scioto Ordnance Plant	\$12,000

State Partnerships

Environmental restoration is most cost-effective and expeditious with state support of DoD’s cleanup decisions. DoD’s partnerships with states streamline the environmental restoration process and improve decision making. By maintaining open communication with states, DoD is better able to understand state-specific issues and ensure consistency of environmental restoration decisions within a state. Partnerships established with individual states through venues such as the Defense and State Memorandum of Agreement (DSMOA) program provide an opportunity for DoD to address the specific concerns and objectives of each state. Most recently, DoD has been engaged with state, tribal, and other federal agency representatives in the Munitions Response Committee to address concerns with DoD’s MMRP. In addition, DoD partners with many state-led organizations, including the Interstate Technology Regulatory Council, the Environmental Council of States, and the Association of State and Territorial Solid Waste Management Officials, to advance the environmental restoration program in a wide range of subject areas.

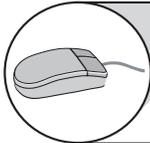
Defense and State Memoranda of Agreement

Through the DSMOA program, DoD reimburses states for the services they provide in support of DERP activities. When DoD and a state sign a DSMOA, the two establish an ongoing partnership. Both parties then enter into a Cooperative Agreement (CA), which provides the planning and funding framework for the environmental restoration support activities the state will conduct at DoD facilities over the next two years.



DoD signed 51 DSMOAs with 46 states, 4 territories, and the District of Columbia by the end of FY2003. Of the states and territories eligible for DSMOA funding, 45 states and 2 territories have submitted applications for CAs to receive funding. Oklahoma, American Samoa, and Puerto Rico did not file CAs. A list of the states and territories eligible to participate in the DSMOA program, including their status as of September 30, 2003, and point of contact information, is available

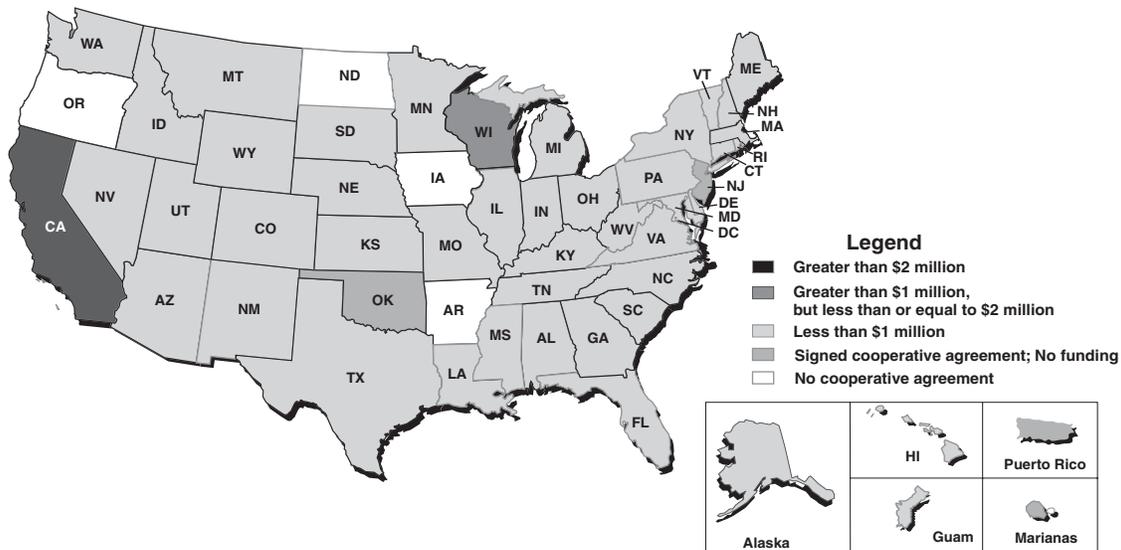
though the Web site for the FY2003 DERP Annual Report to Congress. During FY2003, DoD reimbursed states with \$27.1 million for their assistance through the DSMOA program. The distribution of FY2003 DSMOA funding by state is provided in Figure 38.



FY2003 DERP Annual Report to Congress Web site:

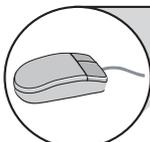
http://63.88.245.60/DERPARC_FY03

FIGURE 38: DSMOA REIMBURSEMENTS IN FY2003



Interstate Technology Regulatory Council

The Interstate Technology Regulatory Council (ITRC), is a state-led coalition that works with industries and stakeholders to achieve regulatory acceptance of environmental technologies. Through this organization, DoD partners with other ITRC members, including states, other federal agencies, private industry experts, and other stakeholders to facilitate the use of new technologies by reducing technical and regulatory barriers, improving regulatory permitting processes, and speeding the implementation of new environmental technologies. DoD's partnership with ITRC has enhanced cooperation among state regulators, DoD personnel, and community stakeholders and increased the deployment of innovative technology at DERP sites. For examples of this partnership, visit ITRC's Web site.



For more information on ITRC, visit

<http://www.itrcweb.org>

**FOCUS ON THE FIELD****FUDS**

New Web Site Offers Information on Formerly Used Defense Sites

DoD recognizes the need for easily accessible and available information related to cleanup, and continued to enhance the program's methods of community outreach in FY2003. The Internet provides DoD with a wide range of opportunities to communicate with its own personnel and stakeholders. The use of Web sites devoted to DERP projects makes current information about program-wide issues, as well as information on activities at local installations and communities, readily available to the public.

A new Web site is making it easier for people to find the information they need about Formerly Used Defense Sites (FUDS) that the U.S. Army Corps of Engineers (USACE) is cleaning up.

The site's chief highlight—a public geographic information system (GIS)—features an easily navigated map of 1,500 FUDS properties across the nation. Users simply zoom in on the property they would like to learn about, click on it, and a detailed information page appears. This page provides a synopsis of the property's location, a brief description and history of restoration-related activities, and estimated cleanup costs. Users can also find out if the property has a Restoration Advisory Board, and can obtain the phone numbers of USACE district office contacts.

USACE plans to update the GIS property information annually based on data in the DERP Annual Report to Congress.

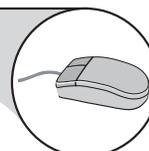
"It is important to us that the public knows and understands what we are doing at these properties, and can provide their thoughts on how best to clean up these properties," said Robert Lubbert, Chief, USACE FUDS Branch.

Other Web site features include success stories, an informational brochure, the FUDS inventory, and a copy of the FUDS Program Manual for environmental restoration. Site designers also built in a feedback loop for users to send their questions and suggestions on how to make the Web site more useful.

"This is the culmination of a great deal of work to get this information out to the public in a readily accessible way, taking advantage of the technology available to us today," Lubbert said.

To access the new FUDS Web site, go to:

<http://m1.crrel.usace.army.mil/fuds/>

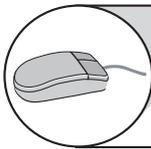




ECOS and ASTSWMO

DoD also partners with state organizations that address environmental regulatory and policy issues, such as Environmental Council of States (ECOS), and Association of State and Territorial Solid Waste Management Officials (ASTSWMO). ECOS is a nonprofit, nonpartisan national association of state and territorial environmental commissioners that works to enhance the exchange of ideas and foster cooperation in environmental management among states and with federal agencies. ASTSWMO, an organization supporting the environmental agencies of the states and territories, works to enhance and promote effective state and territorial waste management programs and national waste management policies. In the past two years, DoD has worked with state representatives of these organizations and with other federal agencies to establish the Munitions Response Committee to address concerns related to DoD's implementation of its MMRP. Through partnerships with these organizations, DoD is

able to work collaboratively with states to address emerging environmental issues and solicit state input on DERP policies and guidance. This collaboration garners state support for the DERP and expedites the restoration process by promoting better communication and planning with states.



For more information on ECOS and ASTSWMO, visit:

<http://www.sso.org/ecos/> or
<http://www.astswmo.org>

Federal Agency Partnerships

DoD has established many working relationships with other federal agencies that continue to be crucial to the success of the DERP. These partnerships support efficient cleanup by expediting reviews of technical documents and helping DoD apply sound approaches to site remediation. In addition, the partnerships DoD has formed with federal agencies have assisted DoD in mitigating interagency conflicts potentially harmful to the DERP's progress. Two agencies that DoD partners with most prominently are the Agency for Toxic Substances and Disease Registry (ATSDR) and EPA.

Agency for Toxic Substances and Disease Registry

ATSDR, an agency of the U.S. Department of Health and Human Services, often assists DoD in resolving community health concerns about the release of hazardous substances resulting from past DoD activities. Under CERCLA, ATSDR has the authority to provide a variety of health services, including public health assessments (PHAs), to protect human health at DoD and non-DoD sites that are on or proposed for the NPL or are the subject of citizen petition.

The PHA evaluates hazardous substance releases, community health concerns, and local health outcome data. ATSDR performs these assessments through a variety of methods, including consultations and health studies that involve public comment periods and community assistance panels; health education to the community; and education for DoD and private health care providers. DoD provides funding to ATSDR through a memorandum of understanding. To date, ATSDR completed 151 PHAs for DoD installations and properties as a result of this partnership. Three PHAs are currently undergoing public comment, and 4 are undergoing initial review. ATSDR published 12 initial release documents, 14 public comment releases, and 12 final release documents in FY2003. ATSDR's public health activities at DoD NPL sites provide valuable information to both DoD and the local community regarding human health risks at installations.



Environmental Protection Agency

EPA is the Department’s most frequent federal partner throughout the restoration process. As the agency responsible for ensuring compliance with federal environmental laws and regulations, EPA is an active participant in the environmental restoration decision-making process at many DoD installations. Like DoD, EPA has been engaged with the states, tribes, and other federal agencies for the Munitions Response Committee. One of the most common partnership tools for involving EPA in the restoration process is an interagency agreement (IAG) or Federal facility agreement (FFA). Federal facilities are required to enter into an IAG or an FFA within 180 days of completion of the remedial investigation/feasibility study at an NPL installation. These agreements outline the roles and responsibilities of the Military Component(s), EPA, and, frequently, the state in the cleanup process.

DoD had 12 IAGs under negotiation in FY2003, and has signed 118 IAGs as of September 30, 2003. Figure 39 lists all installations that conducted negotiations toward or signed IAGs or FFAs

FIGURE 39: INSTALLATIONS THAT CONDUCTED NEGOTIATIONS TOWARD OR SIGNED IAGS AND FFAS IN FY2003

Component	Installation Name	IAG/FFA Status	Description of Cases in Which Negotiations Are Under Way or No Agreement Was Reached Within 180 Days of Completion of the RI/FS
Army	Fort Eustis	Negotiations ongoing	Draft FFA undergoing legal review. RI/FS underway.
	Fort Meade	Negotiations ongoing	Disagreements continue with HQ EPA over enforcement language and with EPA Rgn III over NPL boundary delineation. Draft FFA reviewed. RI/FS field work completed.
Navy	Cherry Point Marine Corps Base	Negotiations ongoing	Re-negotiations between Navy and regulator to begin November 2004 now that EPA and DoD principles for land use controls and Post ROD actions are final.
	Mechanicsburg Naval Inventory Control Point	Negotiations ongoing	Consensus on most of the language in the agreement has been completed. Previous issues with post-ROD and LUC authority have recently been resolved. Expect signed agreement in FY2004.
	Parris Island Marine Corps Recruit Depot	Negotiations ongoing	Negotiations in progress between DoD and EPA. Expect signed agreement in early FY2004.
	Puget Sound Naval Shipyard (Jackson Park Housing Complex)	Negotiations ongoing	Negotiations on hold until issue regarding primary documents and post ROD authority is resolved between EPA and DoD.
	Whiting Field Naval Air Station	Negotiations ongoing	Signing delayed. Discussions continuing but execution is delayed pending resolution of DoD and HQ EPA issues related to post ROD authority and LUCs. Should resume negotiation in FY2004.
Air Force	Air Force Plant 44	Negotiations ongoing	In FY2003, FFA not signed because of disagreement between AF and EPA. The agencies could not agree on what documents should be primary and what documents should be secondary.
	Hanscom Air Force Base	Negotiations ongoing	Negotiations at the local level has been completed but two outstanding issues remain which have been elevated to EPA Headquarters/Secretary of the Air Force for resolution. The issues concern the "Reservation of Rights" language and whether or not the Remedial Action Completed Report is to be a primary document.
	Hill Air Force Base	Negotiations ongoing	Negotiations for an innovative IAG for the Utah Testing and Training Range (UTTR) took place in FY2002 and FY2003 but regulatory issues delayed its completion.
	Langley Air Force Base	Negotiations ongoing	EPA Region III invoked dispute resolution because of a disagreement over the institutional control language used in Langley's recent ROD. DoD and HQ EPA became the dispute resolution authorities. ACC is proceeding with the cleanup/construction at the sites where EPA agrees with our proposed physical remedies. Five additional RODs are delayed at Langley until the outcome of this dispute.
	McGuire Air Force Base	Negotiations ongoing	Draft FFA under review. The RI/FS is not complete.



in FY2003, and provides additional information regarding the status of these agreements. Cost estimates and budgetary proposals for IAGs can be found in Table B-1. This table provides information on environmental restoration costs associated with the IAG or FFA that each DoD installation has incurred through FY2003 and estimates of each installation's costs for the partnership from FY2004 through completion. The public did not submit any comments on IAGs to DoD during FY2003.



The purpose of this report is to fulfill the Department's statutory reporting requirements to Congress. This report presents information on environmental restoration activities funded through the Component ER accounts or, for BRAC installations, through the Component Military Construction Appropriations. This chapter provided a general overview of the DERP, highlighting DoD's success in advancing the program. It also outlined DoD's past, current, and estimated future funding requirements to ensure continued program success and summarized DoD's progress in both the IRP and MMRP categories of the DERP. The status and progress of each Component's environmental restoration program is described in the subsequent chapter. Further detail on funding and site progress, down to the installation level, is provided in the appendices.