

Restoring Our Past,

Every person has the inherent right to a safe and healthful environment. We are continually striving to ensure that this is a core value at the Department of Defense, and throughout the country.

Sherri W. Goodman,
Deputy Under Secretary of Defense
(Environmental Security)



Our Environmental Restoration Mission

- Clean up the environment at military installations and formerly used defense properties
- Reduce risk to U.S. troops, their families, local communities, and the environment resulting from past practices
- Restore installations and properties to productive use

The Department of Defense (DoD) has made tremendous progress in cleaning up the contamination resulting from decades of training and preparing for its national defense mission. Until the mid-1970s, industry, agriculture, and government often managed and disposed of wastes in accordance with standard practices that were later found to be detrimental to the environment. Today, we all have a better understanding of the environmental and health concerns associated with past contamination. Through the Defense Environmental Restoration Program (DERP), DoD is cleaning up contamination at military installations and former defense properties throughout the United States and restoring land for new uses.

Since beginning environmental restoration activities in the mid-1970s, DoD's efforts have evolved into a nationwide program that is cleaning up the environment and reducing risk to U.S. troops, their families, and local communities. This \$2-billion-a-year program is getting the job done, using innovative technologies, best practices, and lessons learned to improve performance and speed success.

The following pages portray the evolution, present status, and future of DoD's efforts to clean up contamination from past practices, reduce risks to human health and the environment, and restore land to productive use. The Department is proud to share the DERP's progress and successes.

Most of the contaminants at DoD sites are similar to contaminants found at commercial industry properties, airfields, and cities —

- Gasoline, diesel, and jet fuel
- Heavy metals such as lead and mercury
- Cleaners, degreasers, dyes, paints, and strippers
- Motor oil and hazardous household products.

What is a site?

Sites in DERP are discrete locations on an installation where contaminants have been released into the environment. On Formerly Used Defense Sites (FUDS) properties, the term “projects” is used as an equivalent to “sites.”

DoD installations and formerly used properties fall into three categories —

- Active installations, where the military currently conducts operations
- Base Realignment and Closure (BRAC) installations, which are being cleaned up and prepared for transfer to communities and to other federal and state agencies
- FUDS, which are properties that DoD once owned, operated, or leased

Through the years, the environmental restoration process and the DERP have evolved. The Department has rigorously examined its procedures and policies to ensure the integrity of the restoration process and maximize progress. Once criticized by environmentalists, DoD now regularly wins recognition from past critics for its achievements in environmental restoration.

As part of its constant efforts to improve the DERP during the past 5 years, several key policy initiatives stand out —

- Devolving the program to the Military Services and Agencies
- Applying new program goals based on site-level data
- Developing and implementing the Relative-Risk Site Evaluation methodology.

DoD devolved the program to increase the efficiency, consistency, and accountability of the Military Components. While the Military Components have more control over their own restoration efforts, DoD has strengthened its program management and oversight mechanisms. Applying goals and measures based on site-level data collection and an evaluation of relative risk also strengthened the program by enabling DoD to refocus its efforts on the sites that pose the greatest risk to human health and the environment. This “worst sites first” approach meant DoD could quantify its goals in terms of cost and progress expectations. Consequently, DoD began to measure performance using specific metrics — Measures of Merit (MOMs) — to provide a better link between program execution and the planning, programming, and budgeting process.

Site-level data collection and analysis are fundamental to the program’s successes in the 1990s. Current program data are more detailed than the information collected in the early years of environmental restoration. Data collection and analysis have improved, and requirements have changed to meet policy and programmatic needs. As the program moves toward completion, DoD continues to refine and adapt data collection to support oversight and management of the program, using information technology to improve speed and accuracy.

Good News from the Field:

Army Cleans Up Explosives Contamination at Camp Navajo, Arizona



A pilot study at Camp Navajo near Flagstaff, Arizona, shows that innovative cleanup does not always require complex technology. In some cases it can be as simple as helping nature take its course. From May through October 1999, the Army National Guard at Camp Navajo cleaned up TNT-contaminated soil by composting.

This process removed explosives from the soil quickly and cost-effectively, saving the Army time and potentially hundreds of thousands of dollars in cleanup costs. In this effort, the cleanup team used backhoes and dump trucks to put the affected soil in windrows (like rows of hay) along with organic material and microorganisms that promote decomposition. The compost was turned and watered daily to speed decomposition, which ultimately took only 11 days. Approximately 4,000 cubic yards of



The cleanup team at Camp Navajo used backhoes and dump trucks to put contaminated soil in windrows.

soil was treated over the summer, reducing TNT concentrations from over 5,000 parts per million in the most contaminated soil to under 10 parts per million. The cost of remediating the TNT-contaminated soil at Camp Navajo was about \$200 per cubic yard — substantially less than the \$300 to \$400 per cubic yard estimated cost for using other treatments or conventional soil remediation techniques. This remedial approach holds promise for remediation at other sites with similar and other types of contamination. The contractor who conducted the Camp Navajo pilot study states that the process used at Camp Navajo can also be used to treat other types of explosives, petroleum products, wood preservatives, and most pesticides and herbicides. DoD's vigorous pursuit of better, cheaper cleanup techniques is yielding benefits.

In the past decade of progress, the DERP has gradually shifted from a focus on identifying sites and investigating the extent and severity of contamination, to selecting the best remedies for a problem, and actually implementing solutions and cleaning up sites. As a result, the pace of restoration has increased, and more sites are being cleaned up and prepared for reuse. DoD now devotes more resources to actual cleanup than to study, and is applying many innovative cleanup and program management approaches to restoration at its installations and properties.

10 Years Cleaner, 10 Years Smarter

The 1990s: A Decade of Progress

This timeline illustrates some key milestones in the Department's environmental restoration efforts.

How It Began...

During the 1970s, as the nation's environmental awareness grew, federal agencies, including DoD, began to understand the impact their past activities had on the environment.

1970s

In the late 1970s and early 1980s, DoD focused primarily on identifying contaminated sites from the past. In 1980 Congress passed the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) to address contamination problems caused by industry. CERCLA provided a model framework that DoD adopted to address sites with potential environmental hazards.

1980s

In 1986, Congress passed the Superfund Amendments and Reauthorization Act (SARA). SARA amended CERCLA to include federal facilities, formalizing DoD's program by establishing the DERP and the Defense Environmental Restoration Account (DERA), its funding source.

In the late 1980s, DoD concentrated on responding to imminent threats and identifying the extent of contamination at its known sites. In the course of addressing these sites, the Department continued to identify new sites. DoD established technical review committees (TRCs) to provide stakeholders with a forum for reviewing site technical documents. In 1989, DoD launched its first partnering initiative by supporting state participation in its environmental restoration program through Defense and State Memorandums of Agreement (DSMOAs).

How We Improved...

In the early 1990s, the Department continued to assess the extent of its environmental responsibilities. DoD wanted to make sure that it addressed all known problems and eliminated any imminent threats to the

1990s

CERCLA is the main environmental legal authority for cleaning up sites in DoD's environmental restoration program. DoD complies with the same requirements that apply to private parties conducting cleanup under CERCLA.

Environmental Restoration Program Legacy:

Technical Review Committees

Partnering with States

**1990s
(cont.)**

public or the environment. In the process, DoD conducted supplemental assessments and continued investigations to support cleanup decisions and funding allocations. To address imminent threats and underscore its commitment to restoration, DoD also focused on Interim Remedial Actions.

Assessments and Investigations

Reflecting the growing importance of environmental protection within DoD, in 1993 President Clinton created the Office of the Deputy Under Secretary of Defense for Environmental Security (ODUSD(ES)). Within ODUSD(ES), the Cleanup Office oversees the DERP.

Office of the Deputy Under Secretary of Defense for Environmental Security

By the early 1990s, DoD efforts to restore the environment at installations in the BRAC program were well under way. DoD is working to transfer the property at these installations to local communities and developers for economic reuse and job creation. Cleanup efforts include focusing on making property available for transfer.

Base Realignment and Closure

In Fiscal Year 1993 (FY93), to assist in the economic recovery of communities around closing and realigning bases, DoD began using Fast-Track Cleanup, part of the President's Five-Part Plan to revitalize communities impacted by base closure. This plan focused on accelerating environmental cleanup and transferring property while still ensuring protection of human health and the environment.

Fast-Track Cleanup

To encourage communities to become involved in cleanup decisions and reuse planning, DoD established restoration advisory boards (RABs) to expand the scope of TRCs and provide more opportunity for public participation. Most TRCs were then converted to RABs, and many new RABs were formed. DoD also implemented Relative-Risk Site Evaluations to help sequence site cleanup so that the worst sites would generally be addressed first.

Restoration Advisory Boards

Relative-Risk Site Evaluation

10 Years Cleaner, 10 Years Smarter

1990s
(cont.)

Although it was now diligently conducting cleanup activities, DoD still needed to improve planning and tracking of progress. To address this issue, DoD set Defense Planning Guidance (DPG) goals to reduce risk, implement remedies, complete cleanup responses at sites, and make property suitable for transfer. To ensure that these goals are met, DoD also developed performance metrics, known as MOMs. These measures enhanced DoD's ability to monitor the performance and progress of its program.

***Defense Planning
Guidance Goals***

Measures of Merit

In fiscal year 1995 (FY95), DoD conducted a major self-assessment of its environmental restoration program. On the basis of this assessment, DoD decided to devolve DERA to the Military Services and Agencies. DERA was separated into five Environmental Restoration (ER) accounts — Army, Navy, Air Force, FUDS, and Defense-Wide. Through devolvement, DoD changed its planning, programming, and budgeting process to increase efficiency and accountability.

Devolved Accounts

DoD is now managing the DERP at active installations and FUDS properties through these devolved accounts. The Department depends on stable funding from Congress for the effective and efficient planning and execution of the restoration program.

Stable Funding

Where We Are Now...

2000

DoD continues to focus on completing restoration at its sites. One way is to use private-sector ideas and capital to expedite property cleanup and reuse, allowing DoD to expedite the transfer of properties to local reuse authorities along with specific cleanup requirements. To facilitate economic development in communities around closing and realigning bases, the Department is emphasizing making property available for transfer by using innovative tools to expedite the process. The presence of unexploded ordnance (UXO) on closed, transferred, and transferring DoD ranges is a challenging problem for DoD. The Department is investing in new UXO detection and removal technologies and is supporting training for UXO technicians.

Completing Restoration

***Property Available for
Transfer***

Unexploded Ordnance

Where We Are Going...

DoD is now looking to the next decade. Building on its successes in cleanup, DoD is focusing on remedial system optimization, site closeout, and beyond. Our top priorities will remain the expedition of restoration activities in an effective and efficient manner at active, closed, and realigning installations through greater emphasis on and exposure to private sector models and innovation; improvement of ties with state and federal regulators, tribal governments, and communities; and oversight of the Military Components' environmental restoration activities. The Department will also continue its efforts to involve communities, regulators, and other stakeholders in its environmental activities, viewing partnering as key to the success of its restoration program.



Site Closeout

Partnering

Proof of Progress: What the Data Tell Us

DoD manages one of the world's largest environmental restoration programs, with nearly 28,000 potentially contaminated sites. The process for addressing these sites is complex, involving many steps, or phases, and requiring formal decisions at key junctures. Figures 1 and 2 illustrate this CERCLA-based restoration process.

Once DoD has identified a potential site, the Department investigates the site to discover whether it is actually contaminated, and if so, to what extent. If investigations show that remedial activities are required, the site moves into the Feasibility Study (FS) phase. A final remedy is selected based on the findings of the FS, and then the site moves into the cleanup phases. Sometimes, after conducting thorough studies, DoD finds that a site poses no threat to human health or the environment. DoD then labels the site as requiring no further action and submits documentation for regulator concurrence. When all necessary studies and cleanup actions at a site are finished, DoD defines the site as Response Complete (RC). The movement of sites from investigation to cleanup, and specifically, attainment of the RC milestone, is a sign that the program is making progress toward completion.

What the Data Tell Us

Proof of Progress:

DoD often uses “**study**” and “**investigation**” as general terms to cover the PA, SI, RI, and FS phases of the restoration process.

Interim Remedial Actions or **Removal Actions** are early cleanup actions that reduce risks before final cleanup remedies are completed. Sometimes the Interim Action is selected as the final remedy, after further study shows that the action has eliminated unacceptable risk to human health and the environment.

This report uses the term **Interim Actions** to refer to Interim Remedial Actions and Removal Actions.

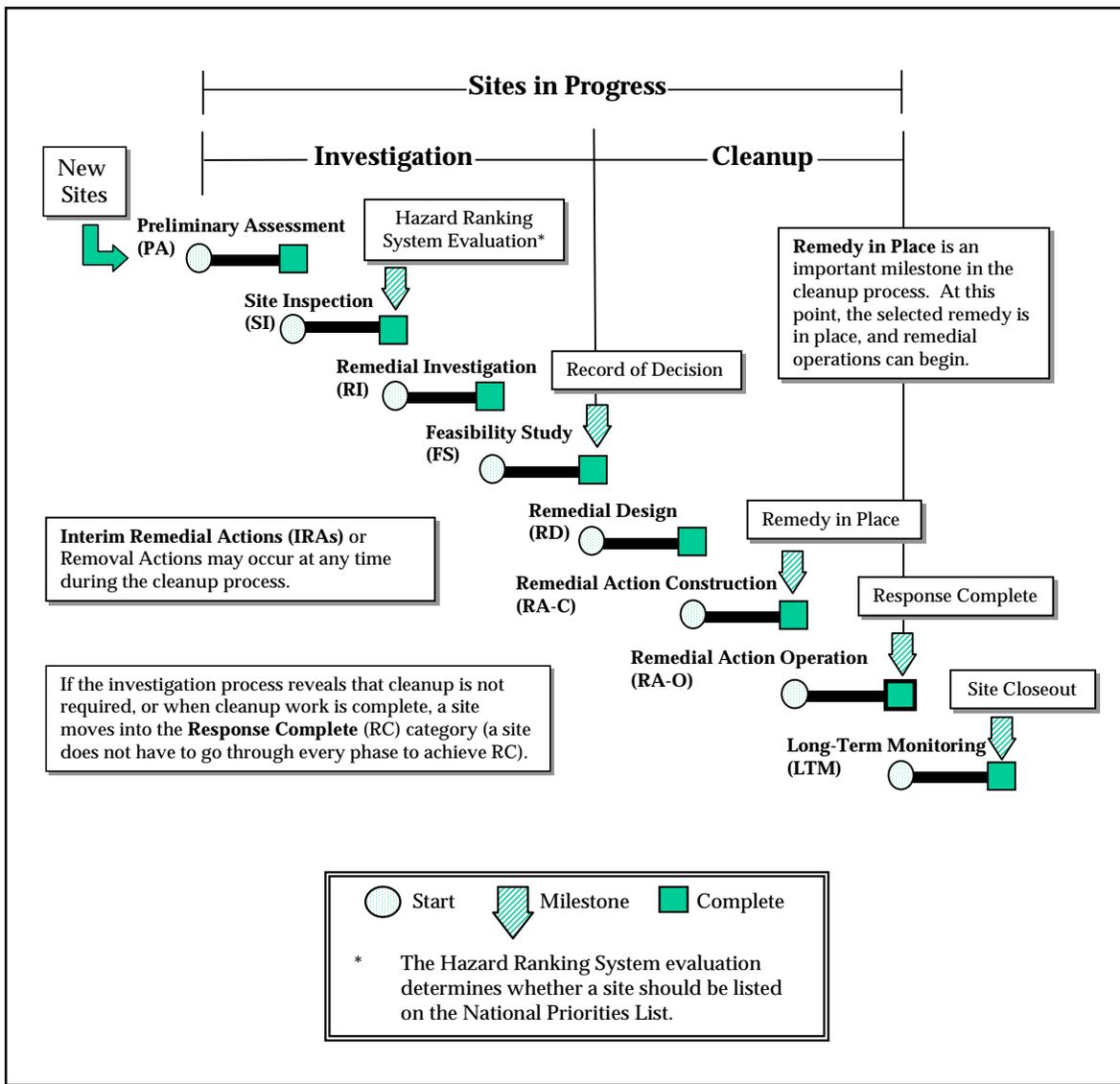
The Department’s environmental restoration program follows the framework of the CERCLA process. Figure 1 shows the phases of the process and describes the actions commonly performed during those phases.

Figure 1
DoD’s Game Plan:
How the Department Tackles Restoration

Cleanup Process Phase	What Happens	INTERIM ACTIONS MAY OCCUR
<i>Preliminary Assessment (PA)</i>	DoD identifies sites where a potential contaminant release may have occurred.	
<i>Site Inspection (SI)</i>	DoD studies the site to determine the presence, extent, and source of contamination. This process includes sampling and analysis to collect data needed to characterize the site and wastes. The RI also includes a risk assessment to evaluate the significance of any contamination and determine whether cleanup is needed.	
<i>Remedial Investigation (RI)</i>		
<i>Feasibility Study (FS)</i>	DoD conducts the FS after the RI, using it to develop, evaluate, and select alternative Remedial Actions, such as use of new technologies. The FS culminates in a Record of Decision (ROD) or an equivalent document, which documents the investigation and remedial selection process. The selected remedy may be No Further Action if no cleanup is required.	
<i>Remedial Design (RD), Remedial Action Construction (RA-C), Remedial Action Operation (RA-O)</i>	At sites that require cleanup, DoD develops a remedy design based on the results of the RI/FS, constructs the design and implements it. Some remedies require an operations phase to achieve the cleanup objective.	
<i>Long-term Monitoring (LTM)</i>	When DoD completes all cleanup activities at a site (i.e., cleanup objectives are achieved), or if cleanup is not necessary, DoD considers the site RC. After RC is achieved, DoD may conduct LTM to ensure the remedy remains protective of human health and the environment.	

While Figure 1 describes the phases of the environmental restoration process, Figure 2 shows how the elements of the process fit together. The restoration phases and milestones laid out in Figure 2 provide a guide to the terms used throughout this report. Although the restoration process is not as linear as Figure 2 depicts, the figure shows the general order in which restoration activities occur.

**Figure 2
Restoration Process Phases and Milestones**



What the Data Tell Us

An increase in the number of sites in the program reflects DoD's continued commitment to identifying potential hazards and cleaning up the environment.

With a program of this size and technical complexity, it is difficult to gain a clear picture of how it works amid all the numbers and graphs. In the following section, DoD presents a few select examples of statistics that demonstrate the changes and improvements in the environmental restoration program during the 1990s, including —

- The number of sites in the program
- The number of sites achieving RC
- Reduction of relative risk at sites.

The trends depicted here demonstrate that DoD is successfully pursuing completion of the program. A more in-depth analysis of the DERP's status and progress is presented in the FY99 Status and Progress chapter.

How Many Sites Are in the DERP?

At the beginning of its restoration program, DoD faced an effort of unknown size and complexity. DoD's first requirements were to determine how many sites it had, the extent of contamination, and eliminate all imminent threats to human health and the environment. During the last half of the 1980s, DoD concentrated on removing imminent threats using Interim Actions and on identifying the extent of contamination at known sites. While addressing known sites, the Department continued to identify new sites. By FY90, DoD had identified 24,462 sites. At the end of FY99 there were 27,945 sites in the DoD program.

The increase in the number of sites through the years of the program reflects DoD's commitment to making sure it addresses all of its sites. DoD assumes operational and financial responsibility for environmental restoration at each and every site.



Workers remove an underground storage tank at Los Alamos Armed Forces Reserve Center.

Prioritizing Sites Helps DoD Protect Public Health

Before 1994, DoD set general environmental restoration priorities by a variety of methods. Because there was no single, consistent approach, concerns arose that the most potentially harmful sites were not receiving the attention they deserved.

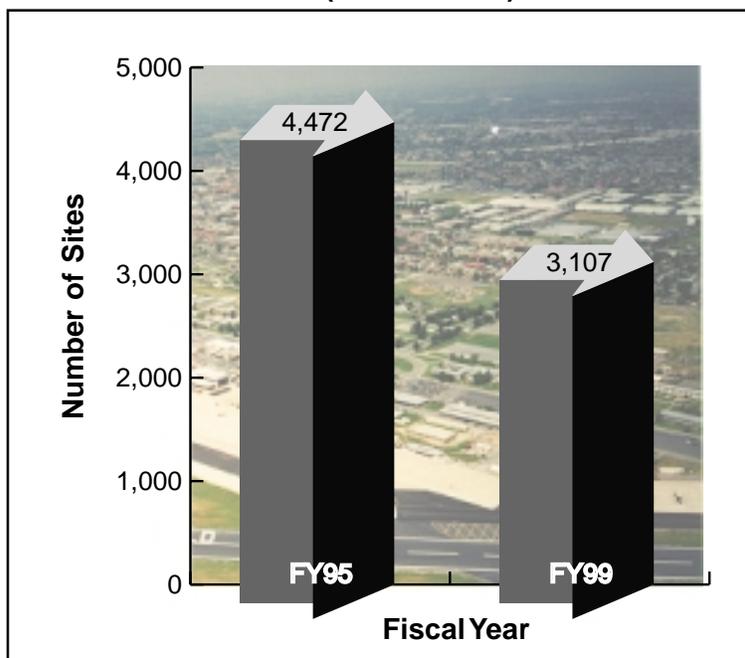
In 1994, DoD implemented a framework for evaluating sites based on their relative risk to human health and the environment. Using this framework, DoD categorizes sites as having a high, medium, or low relative risk and, using these findings and additional factors, prioritizes them for cleanup. Relative-Risk Site Evaluation is recognized as an effective tool for helping prioritize sites for restoration.

Once sites are categorized, DoD focuses on cleaning up the worst sites first. As stated in the Defense Planning Guidance, one of the Department's goals is to clean up or at least reduce the relative risk at 50 percent and 100 percent of high relative-risk sites to a lower risk category by the end of FY02 and FY07, respectively. As Figure 3 indicates, DoD's efforts have reduced the number of high relative-risk sites by more than 1,300 sites in the past 4 years. DoD is on track and continues to steadily march toward achievement of its relative-risk reduction goal.

DoD designates sites as high, medium, or low relative-risk based on three primary factors —

- Contaminant hazard — What is the ratio of the contaminant concentration to a comparison value?
- Migration pathway — Is the contaminant moving or likely to move?
- Receptors — Are humans or sensitive environments affected or likely to be affected?

**Figure 3
High Relative-Risk Site Reduction
(Overall DoD)**



Since FY95, DoD has reduced the number of sites categorized as high relative risk by 30 percent.

What the Data Tell Us

Proof of Progress:

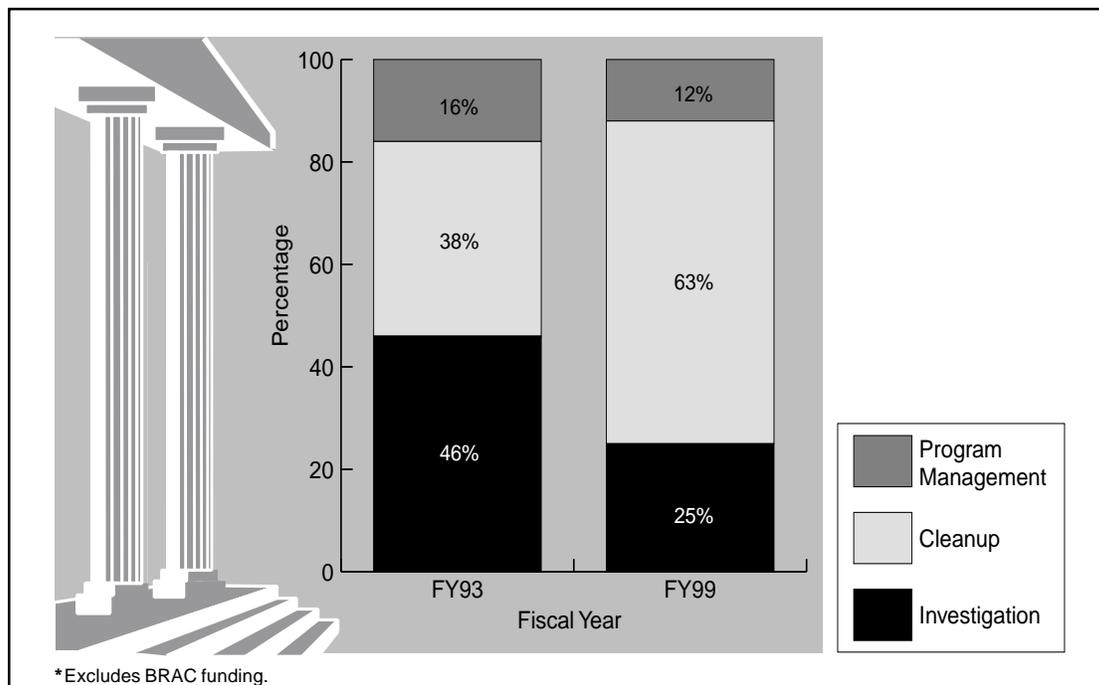
DoD now spends most of its environmental restoration funding on cleanup.

Funding Trends

Another indicator of restoration progress and program maturity is the relative amount of funding that DoD spends on investigation and cleanup activities each year. The increasing number of sites at which DoD is conducting cleanup reflects the trend in the 1990s: there are fewer new sites requiring investigations and an increasing number of sites in later stages of the process. The percentage of restoration dollars spent on cleanup has increased, and the percentage of funds spent on investigation has decreased, as more sites move out of the investigation phases and into cleanup phases or achieve RC.

Figure 4 illustrates DoD's dramatic progress and the shift in environmental restoration program focus from investigation to cleanup that occurred during the 1990s. In FY99, DoD programmed 63 percent of its Environmental Restoration budget for the cleanup phases at active installations and FUDS properties compared to 38 percent in FY93. Additionally in FY99, DoD spent only 25 percent of its Environmental Restoration budget on investigation activities, compared to the 46 percent it spent on investigations in FY93.

Figure 4
DoD Environmental Restoration Funding*
(DERA, All DoD)

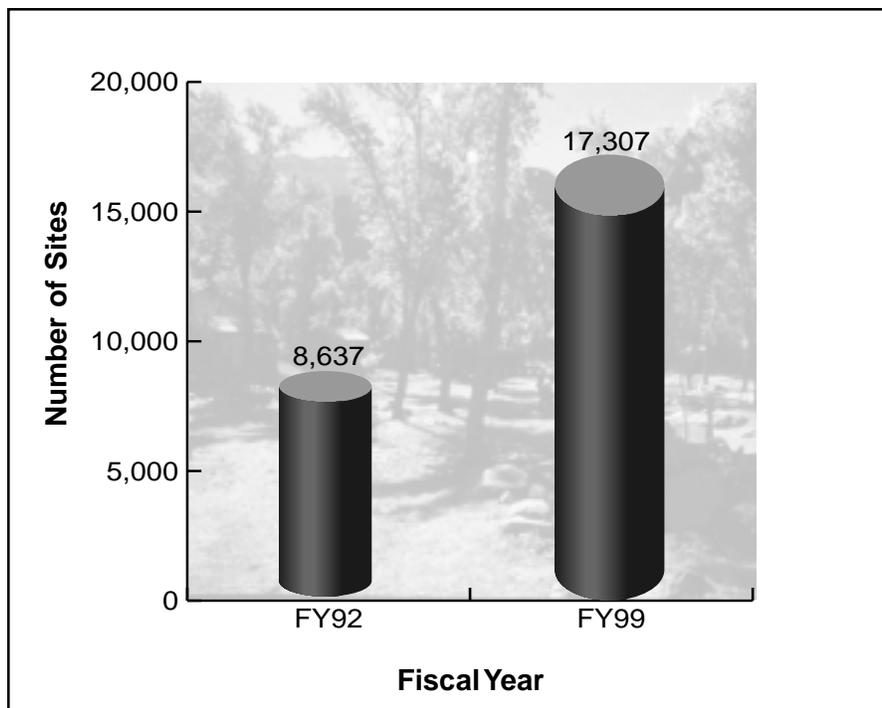


The Number of Sites Reaching Response Complete is Increasing

DoD categorizes a site as RC — Response Complete — when all investigation and cleanup activities at the site are finished. This designation indicates that DoD has effectively addressed these sites through the restoration program. When a site reaches RC, the major cleanup work is done, and only monitoring and administration activities remain. DoD is beginning to develop requirements for closing out sites and conducting 5-year reviews. Chapter 3 of this report describes DoD’s efforts, together with regulators and other stakeholders, to develop a guide to the site closeout process.

As the DERP matures, the number of sites reaching RC is increasing. For instance, 8,637 sites had reached the RC milestone in FY92. In FY99 the number totaled 17,307 — an increase of more than 100 percent. Figure 5 illustrates the progress DoD has made from FY92 to FY99 in achieving RC at sites. DoD considers achieving RC to be a key milestone in measuring program progress because all investigation and cleanup activities are complete at that stage.

Figure 5
Sites with Response Complete: FY92 vs. FY99
(Overall DoD)



The Budget Process

How does DoD Obtain the Funding for the DERP?

DoD receives its program funding from Congress. The process of securing this funding, illustrated in Figure 6, spans several years and requires careful long-range planning. The Department must plan its budget needs well in advance to ensure that sufficient funding for site restoration is available in a given fiscal year. DoD must also forecast specific restoration activities several years in advance to obtain appropriate funding. The development of one year's budget requires several years of work. After a two-year iterative development process, the President submits the budget to Congress.

Many factors influence funding for cleanup, including changing priorities in the cleanup process, identification of new sites, policy initiatives, and in some cases, changes in national security policy and priorities.

How Much Federal Funding is Allocated to the DERP?

DoD invested almost \$4.3 billion in FY99 in environmental, occupational health, and safety programs — more than 1.5 percent of the total DoD budget. Environmental restoration and BRAC projects received over 45 percent of the DoD environmental budget. The Department also allocated an additional \$38 million for environmental technology initiatives in its environmental restoration program.

Why is Stable Funding Important to Program Success?

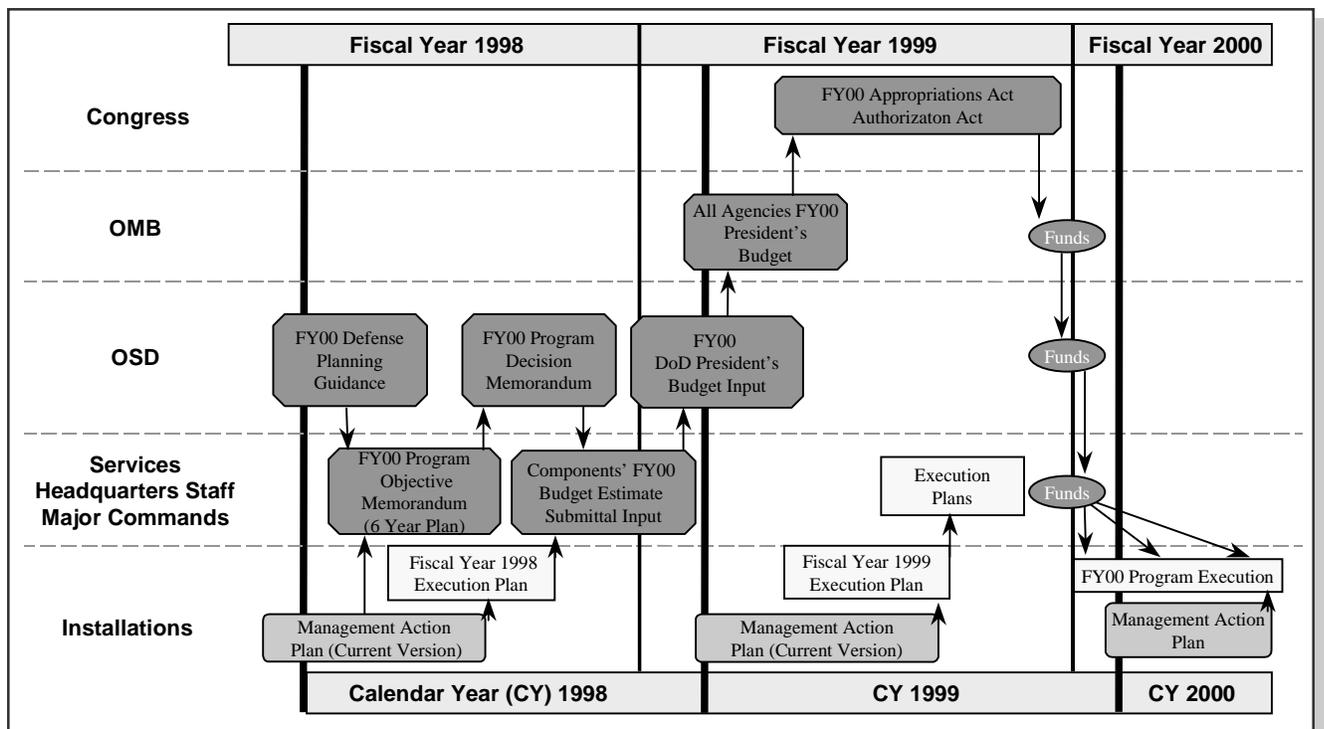
DoD relies on stable funding from Congress to effectively plan its restoration activities, to make commitments to communities and regulatory agencies for conducting these activities, and then to carry out its plans. When communities are confident that funding will be available in the future and that there is a plan for addressing required restoration activities, they are more comfortable with DoD's priorities.

How Does the Budget Process Work?

The complex process of building the DERP's budget requirements begins at the site level — as shown in Figure 6. Each installation determines its site-level cleanup requirements and the funding it needs to achieve DoD's restoration goals. The installation documents those needs in its Management Action Plan (MAP) or, for BRAC installations, in its BRAC Cleanup Plan. The installations then communicate their funding requirements to the Military Component Headquarters level.

The Military Components use their installations' information to develop 5- to 6-year plans detailing how they will achieve DoD's overall goals. These long-range plans are called program objective memorandums (POMs). The Office of the Secretary of Defense (OSD) reviews the POMs and provides comments in decision documents known as program decision memorandums. Using this guidance from OSD, the Components prepare their budget estimates and submit them to OSD for review. The Office of Management and Budget (OMB) then reviews the budget, and if the estimate aligns with OMB's budget targets, OMB approves it and forwards it to the President for signature. The President then submits the budget request to Congress.

**Figure 6
Cleanup Budget Process**



The Budget Process

Funding Cleanup:

“Military Components”

refers to the Military Services (Army, Navy, and Air Force), DLA, and DTRA. FUDS is managed by the Army.

DERA was devolved to the Services and a DoD-wide account, which provides funding for DLA and DTRA.

How Does DoD Manage its Environmental Restoration Funds?

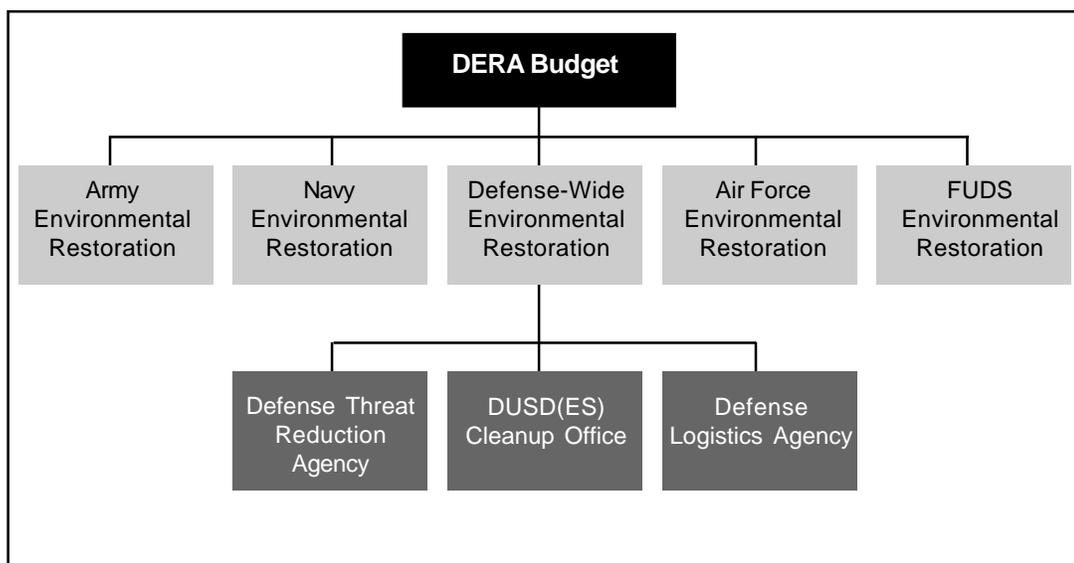
After Congress approves the budget and appropriates funding, funds for environmental restoration at active installations and FUDS properties are allocated to five ER transfer accounts that the Military Services and Agencies manage. These accounts, shown in Figure 7, are —

- ER, Army
- ER, Navy
- ER, Air Force
- ER, FUDS
- ER, Defense-Wide (including the Defense Logistics Agency (DLA), the Defense Threat Reduction Agency (DTRA), and the DUSD(ES) Cleanup Office operating budget).

The Military Services and Agencies are responsible for allocating funds to subordinate units for program execution. DoD oversees the program, including expenditure of funds by the Components.

Congress provides funding for BRAC environmental activities through the BRAC account. In addition to funding environmental restoration requirements, the BRAC account funds other BRAC-specific requirements, such as environmental compliance and closure-related requirements.

Figure 7
DoD Management Structure for Active Installation and FUDS Funding



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DoD is proud of its progress and successes in environmental restoration. Across the nation, in every state, DERP is achieving the goal of getting sites cleaned up and, for BRAC sites, ready for other uses. The innovations and program improvements the Department has invested in and implemented over the past 10 years have yielded results. Relative-Risk Site Evaluation, program devolvement to the Military Services and Agencies, adopting performance goals and metrics, and instituting formal community involvement are just a few of DoD's successes. These program management mechanisms have improved performance and accountability and will continue to add value as DoD pursues program completion.

Good News from the Field:

Environmental War Room Improves Project Management at Reese Air Force Base, Texas



Comprising DoD, U.S. EPA, and state regulatory project managers, the BRAC cleanup team (BCT) at Reese Air Force Base is using a variety of innovative project management tools to successfully streamline the cleanup process. One of these tools is the team's Environmental Vision Center, or war room, which helps team members visualize and communicate about the Reese environmental restoration program. In this room, Reese team members mount sheets of insulation board on the walls, allotting space for each major site. The team uses this board to display critical, need-to-know information.

An important information tool in the war room is the decision matrix for each site. By using this matrix, the BCT determines in advance where the decision points will be for each site and what actions will take place at those junctures. This system provides a number of advantages, including early buy-in from regulatory agency representatives on the team. Because of the up-front approval the matrix provides, the Air Force does not need to deliberate with regulators before proceeding from one step to another. The decision matrix helps keep the BCT focused on results and minimizes the need for lengthy discussions concerning the next step. Consolidating and sharing information improves consensus-building and speeds the process.



Teamwork conducted in Reese Air Force Base's environmental war room led to a faster and more successful cleanup.

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