
ENSURING READINESS THROUGH ENVIRONMENTAL RESTORATION



Environment is a fundamental component of our national power. We must be ever vigilant in ensuring lack of attention to environment does not undermine or degrade our national power. As a leader in environmental management, we will complete environmental remediation quickly and effectively at both our current and former installations and will protect our service members and others from the results of past contamination.

—Raymond F. DuBois, Deputy Under Secretary of Defense (Installations and Environment)

The Department of Defense (DoD) must always be prepared to protect our nation, our citizens, and our interests. An essential element of a strong defense is military readiness—DoD's initiatives that prepare our military men and women to address threats to our national security. Readiness is most commonly associated with training exercises and deployment of new technology. In addition to traditional military training and weapons acquisition, however, DoD also ensures military readiness by protecting human health and the environment through environmental restoration.

DoD depends on the use of national lands and waters to conduct training and other military operations vital to our national defense. Appreciating this need, the American people have entrusted DoD to use the country's resources responsibly. DoD accepts responsibility for practicing good stewardship as it pursues readiness. One way in which DoD is fulfilling its responsibility is to restore the environment impacted by past defense activities. Maintaining access to the resources it holds in the public trust is critical to future readiness, and environmental restoration is critical to maintaining that access.

Through DoD's Defense Environmental Restoration Program (DERP), the Department is reducing risks to human health and the environment at its active installations, formerly used defense sites (FUDS), closing installations, and active installations whose missions are being realigned to better address the current and future needs of our military. DoD is making meaningful progress in cleaning up contamination from past defense activities. In all 50 states, the District of Columbia, and the 8 U.S. territories, DoD is working to protect its forces, their families, and civilian neighbors from environmental health and safety hazards. Military readiness depends on it.

DoD's Environmental Restoration Program

Until the mid-1970s, hazardous substances and wastes were often managed and disposed of using standards practices that were later found to be detrimental to the environment. Today, the environmental and health concerns associated with contamination from those past activities are better understood. The environmental restoration process and the DERP evolved as

awareness of environmental consequences of past practices grew. DoD created the Installation Restoration program in 1975 to begin to investigate and remediate contaminated sites remaining from past DoD activities.

Five years later, Congress passed the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This act, also known as Superfund, established a framework for the identification, investigation, and cleanup of past hazardous substance releases. CERCLA was refined and expanded in 1986 by the Superfund Amendments and Reauthorization Act (SARA). This important legislation formally established the DERP and its funding mechanism, the Defense Environmental Restoration Account (DERA).

Also during the 1980s, Congress recognized that DoD's defense mission could be improved by eliminating excess infrastructure and reducing operating costs. This realization prompted Congress to authorize four rounds of base realignment and closure (BRAC) in 1988, 1991, 1993, and 1995. DoD is cleaning up both installations intended for transfer to non-DoD parties for other uses and realigned installations that remain DoD property. Environmental restoration at BRAC installations is funded through the BRAC account, but is managed as part of the DERP.

During the early years of the DERP, the Office of the Secretary of Defense (OSD) managed the DERA for the Department's Components—the Army, Navy, Air Force, Defense Logistics Agency (DLA), and Defense Threat Reduction Agency (DTRA)—which execute environmental restoration activities at their respective installations. To better align each Component's

DERP responsibilities and accountability, the DERA was separated into five Environmental Restoration (ER) accounts. The Army, Navy, and Air Force manage their own ER accounts. The U.S. Army Corps of Engineers manages the FUDS program for the Army, the Department's designated executive agent for FUDS. This program is funded by the fourth account and addresses environmental impacts on properties DoD once owned, leased, or operated. The fifth ER account, the Defense-Wide account, funds cleanup programs for DLA and DTRA in addition to providing the operating funds for the OSD's oversight of the DERP.

The Department continues to shape its environmental restoration program to meet evolving environmental challenges. In January 2001, the Office of the Under Secretary of Defense for Acquisition and Technology combined the Offices of the Deputy Under Secretary of Defense for Installations and Environmental Security to create the Office of the Deputy Under Secretary of Defense (Installations and Environment), or ODUSD(I&E). This integration will help implement environmental programs more efficiently, ensuring that installations can maintain required land uses and are ready for new uses. ODUSD(I&E) will continue improving the base realignment and closure process for cleanup and transfer of property in current and future BRAC rounds. Recognizing that excess infrastructure and changing defense requirements were impeding DoD's ability to address new threats, Congress approved a future base closure round for FY05 in the FY02 Defense Authorization Act.

Most of the contaminants that DoD addresses under the DERP are similar to those found at municipal landfills or industrial areas. Unlike any other entity, however, DoD must also address the environmental legacy resulting from decades of manufacturing and training with military munitions. Munitions response is very complex and must contend with both the toxicological risks of chemicals that may have been released and the potential explosive safety risk of the munitions.

DoD has been addressing the toxicological risk of chemicals, including those associated with munitions, at traditional DERP sites. Because the explosive risks and requirements of dealing with munitions are so different from the “traditional” DERP sites, DoD created two distinct programs within the DERP to most effectively address the two types of sites. In September 2001, the Department established the Military Munitions Response program (MMRP) to manage cleanup of unexploded ordnance (UXO) and waste military munitions (WMM) at areas other than operational ranges. DoD continues to conduct traditional environmental restoration activities under the mature Installation Restoration program (IRP). Both are part of the DERP, and both are discussed in this report.

DoD's environmental restoration program is successfully cleaning up sites and ensuring land is ready for new uses. Despite its environmental restoration achievements, however, DoD is always working to improve the DERP. Current initiatives, described in the following pages, include—

- ❑ Developing new policies and guidance to promote efficient cleanup methods at the site level

- ❑ Developing and utilizing tools and techniques to achieve better program management
- ❑ Partnering with regulators and other stakeholders to promote understanding for better-informed decisions
- ❑ Advancing innovative technologies to expedite and improve cleanup.

New Policies and Guidance Provide a Framework for Efficiency

The DERP constantly evolves as sites advance through the restoration process into new phases, steadily increasing DoD's experience and knowledge. In response, DoD develops new policies and guidance to help the Components meet new program challenges. In FY01, several substantial new policies and guidance dramatically changed the shape of the DERP.

Updating the DERP Management Guidance

Recognizing the need for updated guidance on changing issues and new requirements, DoD worked to revise the DERP Management Guidance, last issued in March 1998. In September 2001, OSD issued the revised guidance document that provides consistent direction on Program execution across all DoD Components. Two of the most notable changes are improvements in reporting environmental restoration liabilities and establishment of requirements for addressing military munitions and their residues.

In response to criticism of its financial management practices, DoD established specific requirements aimed at producing more reliable and consistent financial records. The guidance directs the Components to better integrate cost-to-complete estimates with their annual financial statements. The guidance also sets reporting requirements to help the Components obtain better audit results.

The DERP Management Guidance for the first time defines and establishes the MMRP to address UXO, WMM, and chemical residues of munitions in areas that are no longer operational ranges. Specifically, the guidance requires Components to—

- ❑ Identify by September 2002 all locations that may potentially require a military munitions response
- ❑ Complete an initial evaluation of the risks posed by these sites by the end of FY03
- ❑ Program funding into budgets to address environmental restoration at these sites
- ❑ Follow procedures detailed in the Guidance for implementing responses at MMRP sites.

Affirming DoD's approach to military munitions response, Congress enacted Sections 311 through 313 of the FY02 Defense Authorization Act, which sets MMRP requirements similar to those in the DERP Management Guidance. As identification and investigation of these sites proceed, the Department will build a robust program to respond to military munitions. Progress in developing the MMRP is discussed in Chapter 4 of this report.

Land Use Controls Protect Human Health and the Environment

Through the DERP, DoD investigates and cleans up installations and former properties quickly and efficiently to ensure human health and the environment are protected. To expedite the environmental restoration process, DoD explores options for providing appropriate means to address risk at sites where cleanup is impractical or not required. One way that DoD and other parties do this is through risk-based cleanup to meet regulatory standards for specified land use scenarios. DoD then uses land use controls (LUCs) to ensure that future land use activities are compatible with the remediation and remaining contamination.

LUCs include any type of mechanism that limits the use of or restricts access to property in order to reduce risks to human health and the environment. These controls can be physical devices, such as fences and signs; legal measures, including restrictive covenants and deed notices; or administrative mechanisms, like land use plans, building permits, and ordinances. By providing a means to control risk prior to remedy completion, LUCs facilitate property transfer and reuse.



Policy on Land Use Controls Associated with Environmental Restoration Activities

https://www.denix.osd.mil/denix/Public/Library/Cleanup/luc_policyguidance.pdf

Previously DoD had no formal, unified approach to handle LUCs. In January 2001, DoD issued its policy for implementing LUCs on military installations and installations transferring out of DoD's control. The Policy on Land Use Controls Associated with Environmental Restoration Activities provides the Components with an overall framework for implementing, documenting, and managing land use controls for both active installations and transferring properties. The intent is to ensure that LUCs

remain effective and protective, and that future land use activities remain compatible with the restrictions previously imposed on the property during the environmental restoration process. DoD issued two guidance documents with the policy, followed by additional guidance in March 2001, to provide more detailed information on how to implement and manage LUCs. The Department is planning a series of workshops in 2002 to educate DoD personnel about the policy framework.



FOCUS ON THE FIELD:

Shaw Air Force Base Becomes First DoD Facility in South Carolina to Gain Approval for Land Use Control Management Plan

Shaw Air Force Base has completed its *Land Use Control Management Plan* (LUCMP) as the final action in closing three former waste landfill sites on the installation. Shaw Air Force Base is the first DoD facility to complete such a plan in South Carolina.

Investigations at the sites found minimal groundwater contamination at one landfill and no soil contamination at any of the landfills. Therefore, based on possible future land use scenarios and risk assessments, no cleanup action was needed at the landfills. Even though no cleanup action was necessary, Shaw established land use controls (LUCs) on the three landfills to ensure that any actions conducted at the sites do not disturb any contamination that might be discovered in the future, and to ensure that people are not exposed to any contamination that may be discovered. However, LUCs alone were not considered an appropriate final action for the landfill; therefore, environmental personnel proposed the LUCMP.

This plan covers inspections of the sites, LUC monitoring, funding commitments, and property transfer, and will serve as a guide for implementing the LUC process. If the property is transferred, Shaw Air Force Base's LUCMP will ensure that the established LUCs are maintained so that future construction and land use practices in and around the sites do not compromise the environmental remedies and systems in place.

Not only is Shaw Air Force Base's LUCMP a cost-effective final action for the three former waste landfills, the Air Force served as a model for providing a role and consulting opportunities for Region 4 of the Environmental Protection Agency (EPA) and state regulators. This plan is expected to be a model for other DoD installations in South Carolina and throughout EPA Region 4.

The Department's focus on LUC implementation at property that is transferring out of DoD's control is to ensure that the future use of the property is appropriate. DoD may not be able to influence actions on private property after transfer, as state and local laws govern property transfer and land use. Implementation and management of LUCs will be governed primarily by state and local requirements. Because property laws differ from state to state, there is uncertainty about the future of LUCs implementation, management, and enforcement. This uncertainty has impacted DoD's ability to transfer property. This is a national issue and applies to all property, not just property owned by DoD.

In November 2000, DoD joined with the Joint Editorial Board on Real Property Acts to discuss the issues of LUC implementation and management. Based on recommendations from the board, the National Conference of Commissioners on Uniform State Laws unanimously agreed in June 2001 to convene a drafting committee to develop a uniform state statute for LUCs. State adoption of such a law promoting consistency across the nation will facilitate the transfer of property as uncertainty regarding LUC implementation, management, and enforcement is resolved.

Environmental Restoration Program Improvements

DoD seeks to develop innovative tools and techniques to improve its management and implementation of the DERP. The following discussion on management action plans (MAPs) shows how DoD has expanded its use of an already effective installation management tool to improve FUDS operations at a state-wide level.

State-wide Management Action Plans for FUDS

DoD uses MAPs as the key document for managing environmental restoration activities. MAPs are installation-specific planning documents that lay out the cleanup strategy. MAPs include information about past restoration accomplishments, funding activity, project schedules, current project status, and plans for future cleanup activity. MAPs have already been widely used at the installation level, where they have been found to be essential building blocks for the budget process and excellent vehicles for obtaining regulatory and stakeholder input for planning environmental restoration activities.

In an effort to improve communication with regulatory agencies and communities, the Army, as DoD's executive agent for the FUDS program, issued a policy in March 2001 calling for the Army and regulatory agencies to jointly prepare state-wide MAPs for FUDS properties. This Army initiative will take cleanup planning from the property level to a state-wide level by incorporating input from the Environmental Protection Agency (EPA), state regulators, tribes, and other stakeholders. The MAP for each FUDS property in a state will be consolidated into a state-wide MAP that will provide a coordinated state strategy for investigation and cleanup. These MAPs involve regulators and stakeholders early in the Army's decision making and planning, enhancing overall communication and improving technical and budget discussions. The state-wide MAP process will interface with the existing Defense and State Memorandum of Agreement (DSMOA) process.

This new policy was a result of the FUDS Improvement Working Group discussions to develop recommendations for increasing



FOCUS ON THE FIELD:

Kansas Management Action Plan

The Management Action Plan (MAP) for the State of Kansas is one of four prototype MAPs being prepared by the Formerly Used Defense Sites (FUDS) Improvement Working Group. The purpose of this initiative is to provide a key document for managing the state's FUDS environmental restoration program.

A MAP is a planning document that identifies cleanup activities, projected schedules, and overall project funding requirements at all FUDS within the state. It provides detailed information for each FUDS property, including location, property history and description, projects at active properties, cost to complete, past cleanup progress, and other pertinent property information. The Kansas MAP includes a description of the activities that the Kansas Department of Health and Environment (KDHE) and EPA Region 7 have undertaken at each of the properties, as well as a physical map of each property.

Preparing the Kansas MAP has significantly improved the partnering and communication among KDHE, EPA Region 7, and the U.S. Army Corps of Engineers Kansas City District (NWK). Preparing the property data sheets for the MAP was a true sharing of responsibilities among KDHE, EPA, and NWK, in that KDHE, as the state regulator, prepared over 50% of the data sheets. EPA Region 7 then reviewed the document and provided comments for all properties.

coordination and communication in FUDS environmental restoration. This Working Group included representatives from EPA, states, tribes, and DoD. To date, state-wide MAPs have been prepared for Colorado, Kansas, South Dakota, and Ohio, and more are planned for FY02.

Stakeholder Involvement Improves Decision Making

Stakeholder involvement has a positive impact on DERP progress. Working side by side, DoD is better able to address stakeholders' concerns, while stakeholders gain greater understanding of the challenges of environmental restoration. Partnering with regulators, tribes, and local communities strengthens communication

between DoD and stakeholders, which streamlines the cleanup process. DoD values these partnerships and works to foster trust, confidence, and open communication.

Strengthening Communication by Partnering with Federal Organizations

DoD recognizes the importance of coordinating with other federal organizations to improve the environmental restoration process. To this end, DoD and four military Components participated in a joint forum in June 2001. The forum, the EPA Region 4 Executive Session for Environmental Leaders, brought together for the first time senior officials from DoD, USACE, eight states within the Region, and four other federal agencies, including EPA. At the forum, DoD reaffirmed its commitment to work with

these other agencies toward shared environmental goals, including continuing to improve communication and partnering, which DoD considers a large part of current accomplishments and an essential feature of future successes.

Partnering Promotes New Technologies

DoD strongly believes that early, consistent, and meaningful input in the decision-making and cleanup processes results in a more efficient and effective cleanup program. DoD has forged partnerships with several federal and state agency working groups to enlist help in expediting the use of new cleanup technologies, such as the diffusion sampler and UXO characterization technology.

In FY01, the Air Force Base Conversion Agency (AFBCA) deployed diffusion samplers at six closed and closing Air Force bases in California. In order to ensure that the samplers are deployed appropriately, AFBCA, the Interstate Technology Regulatory Cooperation (ITRC) Working Group, and the U.S. Geological Survey are currently working together to train cleanup teams, provide information and technical guidance to cleanup teams, assist stakeholders during deployment efforts, manage resources, track costs and performance, and capture successes.

With more than 10,000 monitoring wells at Air Force BRAC installations, the cost avoidance estimate for using this innovative sampling technique is between \$3 million and \$7 million dollars annually.

DoD is also partnering with states to handle one of its greatest challenges, UXO detection and removal. At the former Fort Ord in Marina, California, for example, a Strategic Management Analysis, Requirements, and Technology (SMART) Team was created to provide a multi-agency approach to address UXO cleanup and land transfer issues. During the 1999 UXO/Countermine Forum, DoD learned that lack of communication and state regulator involvement was a major barrier to the use of innovative and advanced technology at UXO sites. States noted that earlier state regulator involvement in the UXO technology selection process would increase state regulator confidence in the remediation program and also expedite the cleanup process.

The Fort Ord SMART Team has facilitated state regulator involvement by holding solution-oriented public meetings that focus on exploring the issues, developing a common understanding of technical matters, creating innovative solutions for difficult UXO issues, and aggressively involving the public. As a result, California state regulators had early and meaningful involvement in the technology selection process and supported technology transfer. Based on the



FOCUS ON THE FIELD:

Diffusion Samplers Reduce Project Costs

In a precedent-setting arrangement, the Air Force Base Conversion Agency (AFBCA) formed a unique partnership with the Interstate Technology and Regulatory Cooperation (ITRC) Working Group, a state-led coalition of industry, state, and Federal environmental regulators who monitor and evaluate treatment technologies.



Personnel retrieve a sample from a diffusion sampler

The first joint AFBCA-ITRC initiative began in January 2001, when the AFBCA and the ITRC signed a formal partnership agreement to encourage the use of diffusion samplers. Diffusion samplers are polyethylene bags, about 18 inches long, filled with distilled water. Contaminants in the groundwater pass into the sampler and are held there, enabling a more consistent sampling technique. Using this technology, contaminant levels in groundwater can be measured at a fraction of the cost associated with conventional methods without affecting

data quality or sampling objectives. Currently, the Air Force and ITRC are working with the U.S. Geological Survey to provide training and technical guidelines on using diffusion samplers, and assisting stakeholders with information, tracking costs and performance data, and documenting successes. With more than 10,000 monitoring wells at Air Force BRAC installations, AFBCA estimates that between \$3 million and \$7 million dollars in costs can be avoided annually by using diffusion samplers.

AFBCA and ITRC have also teamed up to promote a new process for evaluating cleanup actions at six closed Air Force bases in California. The process, called Remedial Process Optimization (RPO), evaluates the protectiveness of the cleanup systems in place, identifies opportunities for improvement, and prepares the bases to demonstrate that the systems are operating properly and successfully. This approach ensures that each remedial action is effective and efficient, and is protecting human health and the environment. As part of the RPO effort, ITRC arranges for a state regulator to accompany the RPO team as an added resource for incorporating new ideas into the cleanup process.

This partnership is a framework for cleaning up military installations faster and cheaper by using innovative technologies, while protecting human health and the environment.



FOCUS ON THE FIELD:

Team Hawthorne Wins Hammer Award

Professionals from the Hawthorne Army Depot partnered with the State of Nevada, private companies, and other DoD organizations to implement a low-cost, low-technology environmental cleanup solution for soils contaminated with explosives. For their efforts, the team was awarded a Vice President's Hammer Award in FY01. The Hammer Award is awarded to government or private entities who have demonstrated significant impacts on customer service, bottom-line results, streamlining government, or saving money, and have displayed exemplary achievements in government problem-solving.

Team Hawthorne performed a pilot program by mixing 2,800 cubic yards of explosives-contaminated soil with compost containing hay, water, wood chips, and potatoes. The compost mixture promotes the bioremediation process by allowing microorganisms in the compost to multiply rapidly and consume, or "eat," the explosives. Team Hawthorne showed that this process reduces the level of ammonium picrate, an explosive that is traditionally difficult to remove from the soil.

The technologies used at Hawthorne have also been successfully employed at other installations and have the potential to avoid having the Army spend hundreds of thousands of dollars in future site cleanup costs.



Team Hawthorne Members Receive Hammer Award

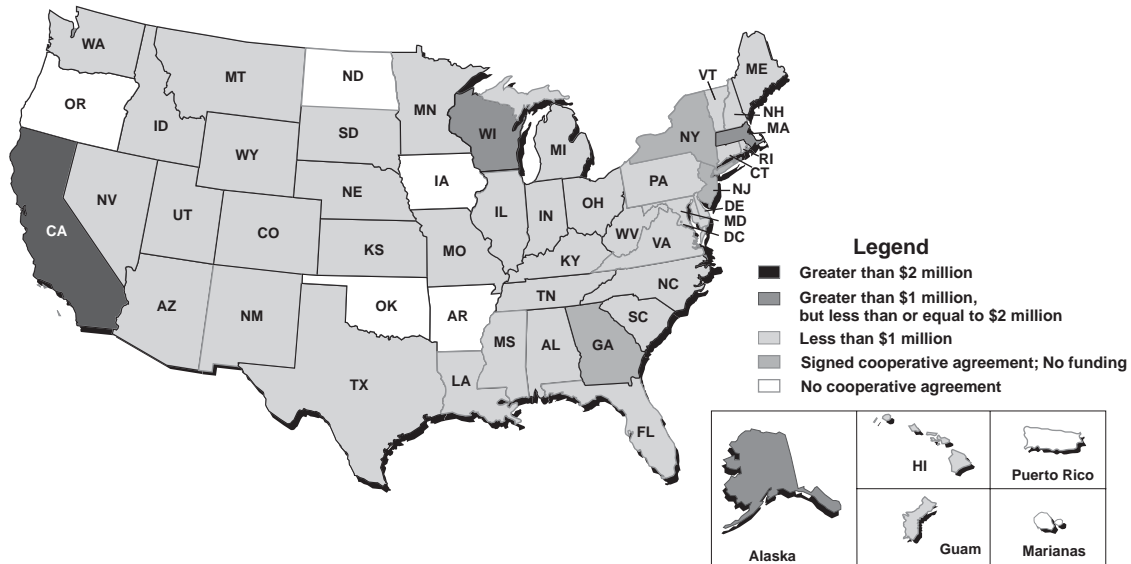
success at Fort Ord, a SMART team was established at the Savanna Army Depot in Savanna, Illinois, to address UXO technologies.

Partnering with States Through DSMOA

Environmental restoration is expedited and most cost effective with state support of DoD's cleanup decisions. To encourage this involvement, DoD and a state sign a Defense and

State Memorandum of Agreement (DSMOA), which establishes an ongoing partnership between DoD and the state. Through this well-established DSMOA program, DoD reimburses states for the services they provide in support of DERP activities. Once a DSMOA has been signed, both parties enter a cooperative agreement, which provides the planning and funding framework for the activities the state will conduct over the next two years. During FY01 alone, DoD reimbursed states \$23.1 million for their restoration

Figure 1
DSMOA Reimbursements in FY01



assistance. Figure 1 shows reimbursements by state. Additional information on cooperative agreements is provided in Appendix D of this report.

RABs Foster Partnering with Communities

Recognizing that community input helps the Department best address community concerns, DoD has established Restoration Advisory Boards (RABs) at over 300 installations within the U.S. and its territories since 1994. RABs are advisory boards comprising local community members and representatives of the installation, EPA, and state, tribal, and local governments. RABs provide a forum for all stakeholders to provide input to the cleanup process. RABs also increase community understanding and support for the cleanup program by providing a venue for DoD to discuss and explain information regarding cleanup activities. Contact information for each RAB installation co-chair is maintained in DoD's

RAB Directory. Additional information on RABs is provided in Appendix H of this report.

Knowledge Yields Understanding

By educating stakeholders about the challenges facing the DERP and how DoD is working through these challenges, stakeholders can better understand the program and help it move forward. Community support allows DoD to implement environmental restoration activities more efficiently and effectively, saving both time and taxpayer dollars. The Department uses several methods to promote community understanding and retain the public's confidence, including stakeholder forums, community workshops, and Internet outreach.

Restoration Advisory Board Directory
<http://www.dtic.mil/envirodod/rab/rabdir/index.html>



FOCUS ON THE FIELD:

Landfill Cap Construction Complete At NSWC Dahlgren Division, Virginia

As a result of a constructive and effective relationship among the Naval Surface Warfare Center Dahlgren Division (NSWC DL) in Virginia, the local Restoration Advisory Board (RAB), and other partnering groups, NSWC DL successfully planned, constructed, and completed a landfill cap at Site 17.

Capping the landfill at Site 17 had been the subject of much discussion and debate with regulators and the community because the site is located on land also occupied by residential and developed areas, forests, and marshland. Regulators were primarily concerned with preventing damage to wetlands, monitoring groundwater, removing any sediment contaminated with mercury, and protecting the forests.

After comparing the benefits and costs of three technologies, the cleanup team chose the option of a vegetative soil cap combined with phytoremediation. Phytoremediation is a low-cost cleanup option for sites with widely dispersed contamination at low concentrations, which involves letting trees do the cleanup work by drawing up contaminated groundwater through their roots and converting the contaminants to non-toxic elements. This method was estimated to cost \$1.8 million less than an impermeable landfill cap, and would provide greater short- and long-term groundwater control and removal of mercury-contaminated sediment than a sanitary landfill cap.

Through frequent and productive communication, NSWC DL and the community worked through potential problems related to landfill construction. RAB members and the partnering groups supported the proposed landfill technology, and NSWC DL was able to address any concerns or questions at public meetings.

NSWC DL completed constructing the landfill cap in seven months, and is currently reviewing a long-term management work plan to address groundwater sediment, surface water and groundwater monitoring, and care of the nearby vegetation.

Promoting Stakeholder Understanding Through Forums and Workshops

DoD is committed to keeping stakeholders informed about its current environmental restoration activities and remaining open to stakeholder input concerning future DERP efforts. Forums provide an ideal arena for DoD and stakeholders to engage in a productive exchange of information.

In an effort to foster a common understanding of current cleanup issues, the ODUSD(I&E)

Cleanup Office hosted the DoD Environmental Cleanup Stakeholders Forum in St. Louis, Missouri, in November 2000. This two-and-a-half-day public forum featured eight sessions; seven were targeted to specific areas of the DERP, and an eighth session was reserved for open discussion of additional topics. The forum was a valuable opportunity for stakeholders to share their thoughts with DoD on how the DERP is progressing and what improvements could advance the program.

This forum was well attended, with over 300 representatives from a wide variety of groups, including citizens, contractors, tribes, DoD, the private sector, and federal, state, and local government. Senior DoD representatives, including the Services' Deputy Assistant Secretaries, enjoyed the opportunity to meet with and listen to stakeholders, who explained where the public feels the program currently stands and where they believe it should go in the future.

Since the St. Louis Stakeholder Forum, DoD has worked hard to address stakeholder suggestions. For example, DoD and the Services hosted several workshops and meetings to address issues identified at the forum. A month after the forum, DoD held a UXO roundtable discussion on issues raised during the Range Cleanup session. In addition, the Air Force hosted a one-day risk communication session during their annual environmental meeting to address issues raised during the forum's Risk Management and Communication session. DoD will issue a forum update newsletter to stakeholders to review issues discussed in St. Louis.

A major concern that stakeholders raised at the St. Louis forum was the need for improved guidance for implementing certain policies and programs. One of the most frequent requests was for RAB guidance that specifically addresses common RAB issues, such as membership, the scope of RAB topics, and basic ground rules for RAB participation. In response to stakeholder requests DoD is finalizing the RAB Rule, which will help meet each of these needs.

DoD has found that educational workshops are another excellent medium for helping stakeholders understand issues that are unclear to them. For example, the Army, EPA, and



A panel addresses stakeholders at the St. Louis forum

Center for Public Environmental Outreach hosted a FUDS workshop for the public. This August 2001 workshop gave the public an opportunity to learn how the Army's cleanup program is organized, talk directly with senior Army personnel about the FUDS program, and discuss mutual concerns and interests.

Building a Common Understanding Through Internet Outreach

The Internet offers immediate access to an abundance of up-to-the-minute information from many sources. The ODUSD(I&E) Cleanup Office Web site contains information on a variety of topics that interest stakeholders. OSD is redesigning this Web site to make it easier for both the public and Department personnel to find information about the Cleanup Office and the DERP. With this redesign the Web site also achieves compliance with Section 508 of the Americans with Disabilities Act, which requires federal agencies to ensure agency electronic information technology is accessible to people with disabilities. In addition, a text-only version of the site will be available for users who cannot download information from graphic-intensive

sites. This new site will be available in early 2002 and will remain at the same address: <http://www.dtic.mil/envirodod/>.

While the Internet is a valuable informational tool, it is not the only medium DoD uses to share information about the DERP. The Department continues to use and improve upon traditional communication means, such as providing installations and community libraries with printed brochures and informational booklets, providing program and installation fact sheets for installation communities and RABs, and conducting on-site tours of installations. In addition, DoD provides literature in multiple languages, posts information in community-oriented locations such as local newspapers, sponsors public meetings at convenient times and locations, and airs many of these meetings on local public television stations.

Innovative Technology Streamlines Cleanup

DoD invests considerable effort in the identification and promotion of innovative technology to expedite the environmental restoration process. New technology initiatives play a critical role in improving the effectiveness of cleanup by reducing the overall cost of remediation and expediting the cleanup process, while still maintaining a high level of protection for human health and the environment.

The Department has two programs that research and assess cleanup technologies to identify those that are most appropriate for DoD. The Strategic Environmental Research and Development Program (SERDP) is DoD's corporate environmental research and development program. Planned and executed in full

partnership with the Department of Energy and EPA, SERDP focuses on identifying, developing, and implementing environmental restoration technologies that minimize or eliminate the environmental impact of DoD's activities. The Department also relies on the Environmental Security Technology Certification Program (ESTCP), a program that demonstrates, tests, and validates new technologies. This program has been instrumental in advancing innovative technologies that help resolve some of DoD's biggest environmental challenges.

Every year DoD introduces several cutting-edge restoration technologies that offer better solutions to cleanup challenges. This year, two of these innovations are the RangeSafe System, developed in conjunction with ESTCP, and the biowall, an in-situ remediation technique developed with the support of SERDP.

RangeSafe Offers an Efficient Remediation Strategy

The RangeSafe System, which is a result of cooperation between private corporations, ESTCP, and ITRC, is a system that combines soil washing with phytoremediation to clean lead-contaminated soil from small arms ranges. Contaminated soil from the range is sifted and washed in a "gold panning" method to separate the denser lead contaminants from the surrounding soil. After these larger pieces are removed, lead-leaching plants like the Indian Mustard are planted to further reduce the contamination.



OSD Cleanup Office

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

**FOCUS ON THE FIELD:*****Norfolk Naval Shipyard Transforms Landfill from Hazardous Waste Site Into Thriving Wetland***

By implementing several innovative ideas, the Navy reduced the cost of the removal actions at a hazardous waste site more than \$2 million, and created a 1.9-acre wetland area in the process.

Norfolk Naval Shipyard (NNSY), Virginia, builds, repairs, and maintains ships for the Navy. As part of these activities, NNSY paints ships and removes existing paint coatings. The process for removing existing paint produces a waste product called abrasive blasting material (ABM), which often contains hazardous metals, such as lead, chromium, and cadmium. ABM may be classified as hazardous waste when concentrated at high levels. Historically, NNSY disposed of ABM in the New Gosport landfill.

The New Gosport landfill is located near a neighborhood and a Navy Youth Center in Portsmouth, Virginia. In 1982, low levels of lead were found in the landfill. To prevent human exposure to the material, the Navy graded the site, covered it with clean soil, and planted grass. Although further studies indicated that ABM waste had not significantly impacted surrounding soils, there were elevated levels of metal contamination in wetland soil samples downstream of the landfill. It was determined that removal of the material was necessary.

In the initial stages of the removal action, the Navy's remediation contractor proposed an innovative treatment process that used a pretreatment of the soil to stabilize the lead during cleanup. This treatment made the material nonhazardous and easier to dispose of. Using this process, 55,000 tons of ABM and contaminated soil were removed from the site. The use of innovative ideas and technologies during the cleanup process produced an estimated \$1.4 million in cost avoidance.

Other innovative ideas helped save time and money as well. For example, heavy debris contained in the ABM was sifted from the material, cutting costs for transportation and disposal. After the ABM was excavated, rather than backfilling the large area with clean fill, NNSY created a 1.9-acre tidal wetland consisting of native salt marsh plants. This decision resulted in an additional estimated cost avoidance of \$750,000.

The removal of the hazardous waste site and the transformation of the property into a thriving wetland were accomplished as part of the Navy's Installation Restoration program with the full support and input of the Virginia Department of Environmental Quality and the EPA.



FOCUS ON THE FIELD:

Vegetable Oil as a Low-Cost Alternative for Enhanced Bioremediation

Adding vegetable oil to traditional cleanup methods for certain contaminants is a less intrusive approach to site cleanup. As a result, Naval Support Activity (NSA) Mid-South in Millington, Tennessee, avoided spending several million dollars in cleanup costs.

To treat a large amount of trichloroethene (TCE)-contaminated groundwater, this innovative approach consisted of applying a special form of soybean oil to the contaminated area to stimulate microorganisms that “eat” the contamination. The oil slowly dissolves in the aquifer and provides a food source that the microorganisms can “eat,” thus breaking down the contaminants, which results in decreased concentrations of TCE in the groundwater.

Traditional cleanup methods often have high operation and maintenance costs or require multiple injections of relatively expensive slow release compounds. This special form of soybean oil slowly dissolves into the aquifer, providing the organic substance necessary for bioremediation. The oil can also last for many years without follow-up treatment. This approach eliminates both operation and maintenance costs and requires only monitoring to verify that the contaminants are being destroyed.

Based on the initial success at NSA Mid-South, the Navy is using the technology at several other sites to gain acceptance of this innovative technology and to avoid several million dollars in cleanup costs.



Personnel monitor the injection process



Monitoring wells ensure the remedy is effective

This remediation strategy may offer a more cost-effective and environmentally favorable solution for DoD than the current practice of excavating and disposing of entire firing ranges and stabilizing lead-contaminated soils. Two companies that participated in the development of the RangeSafe System are partnering in the demonstration of this technology at Fort Dix, New Jersey. Lessons learned, including cost and system performance information, will later be exported to other DoD installations.

Innovative Biowall Eliminates Contaminants

One of the most successful environmental restoration projects at Offutt Air Force Base in Omaha, Nebraska, involves the use of a biowall. The biowall technique uses a natural organic matter treatment trench for in situ bioremediation. After the identification of a trichloroethene-contaminated hot spot, the environmental restoration team inserted a pilot biowall treatment trench into the contaminated area in January 1999. The trench was filled with material comprising 50 percent mulch produced at the base and 50 percent coarse sand. This organic material ferments, producing hydrogen, which causes a chemical reaction known as reductive dechlorination. As contaminants pass through the trench they are broken down into safer byproducts. The pilot test was extremely successful, and in June 2001 the biowall was extended to treat a larger area of the base.



DoD is committed to protecting both the environment and the health and safety of its troops, their families, and the surrounding communities through environmental restoration at its installations and former properties. This commitment is illustrated by DoD's successes in implementing the DERP—through efficient and effective management, through strengthening communication with and involving stakeholders, and through improving the use of technology.

The purpose of this report is to fulfill the Department's statutory reporting requirements as identified by Congress. Chapter 1 highlighted some of the initiatives DoD is pursuing to advance the program in these areas. The next three chapters describe funding the DERP, DoD's achievements in the Installation Restoration program, and progress in building an equally robust Military Munitions Response program. DoD must continue to follow through on this commitment to ensure continued access to the national lands and waters it requires to ensure the military is prepared for future challenges.