

The Role of Technology

"DoD's environmental cleanup program has done a thorough job in identifying the nature of our sites. Now, we must get effective technologies into the hands of the program managers in the field who are doing the work. Through research and development, collaboration with our stakeholders, and pure innovation, we can meet this challenge. The clock is ticking though. We are in the next phase of the cleanup program—remedy selections are being made right now for the next decade."

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The goal of DoD's environmental technology efforts is to provide its environmental program managers with technology alternatives in time for implementation in the field. By developing better environmental technologies, DoD can reduce costs, accelerate cleanups, and increase the overall effectiveness of the environmental cleanup program. By placing effective technologies into the hands of those who execute and oversee cleanup projects, DoD is bringing the cleanup program one step nearer to final closure.

Finding the Best Technologies To Do the Job

Now that many investigations have been completed, DoD has identified its most common contaminants and can focus its technology development and application efforts on these contaminants. These include fuels and cleaning solvents in groundwater and heavy metals such as lead and mercury in soil and groundwater. Some of the most difficult problems DoD faces are "military unique." For example, the treatment of soil contaminated with explosives in training areas, both in the form of unexploded ordnance (UXO) and the materials used in ordnance manufacture, is especially challenging because there are few technologies available that can address this type of contamination. Therefore, DoD must develop innovative approaches for which no satisfactory "off-the-shelf" method exists, while focusing on the acute safety issues facing the personnel who perform the characterization and cleanup of these areas.

The challenge for DoD is to expand the technology tools currently available and develop new technologies that will do the job more efficiently. To do this, DoD's environmental technology community uses a combination of approaches. These approaches consist of applying special remedial technologies that have been proven by other federal agencies or the private sector; obtaining "off-

the-shelf" technologies; and developing, testing, and validating special technologies.



Passive bioremediation is being used to clean up two large fuel spill sites with contaminated groundwater at [Beaufort Marine Corps Air Station \(MCAS\)](#) in South Carolina. Data analyses have shown that groundwater contamination is being successfully treated through natural attenuation. Natural attenuation, a remedial alternative where natural subsurface processes are allowed to reduce contaminant concentrations to acceptable levels, is a predictable way of cleaning up fuel spills. Implementation of natural attenuation requires modeling of the science involved, and evaluation of contaminant degradation rates and pathways. A component of natural attenuation is passive bioremediation. This technology harnesses bacteria already present in the groundwater to break down organic contaminants to acceptable levels. The Marine Corps is working together with the Navy and the U.S. Geological Survey to make information available and the technology readily accepted throughout South Carolina. Beaufort MCAS estimates that by using passive bioremediation, the cleanup process will be significantly accelerated—at a cost avoidance of more than half a million dollars when compared to conventional cleanup methods.

"The department's cleanup tasks are, for the most part, similar to those found in the civilian sector. . . investments by DoD in research and development of new technologies for locating, characterizing, and remediating contamination could have widespread dual-use applications."

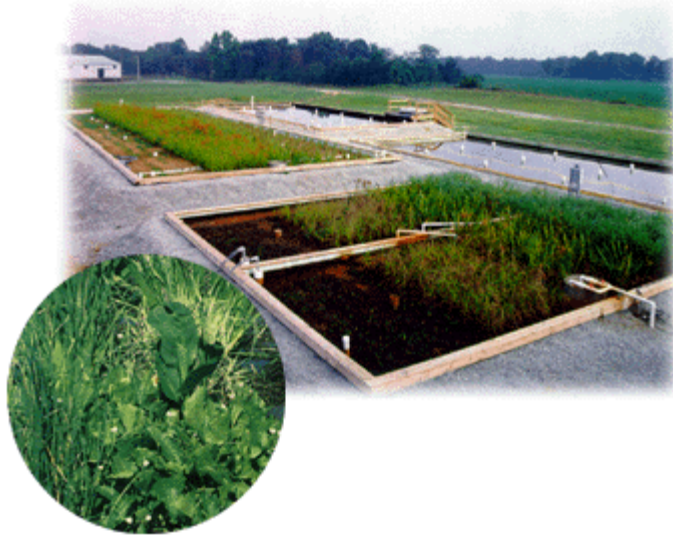
Cleaning Up Defense Installations: Issues and Options
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Technology research and development (R&D) coordinating bodies, such as the interagency Strategic Environmental Research and Development Program (SERDP) and demonstration and validation efforts such as the environmental Security Technology Certification Program (ESTCP), work to fill the gaps between DoD's need for environmental cleanup remedies and the availability of suitable technologies. By using the information collected by the military services on the status of their cleanup program activities, program managers can project the peak need for specific remedies in the coming years and share their findings with R&D programs to assure that technologies are available when the need for them is most urgent.

During FY96, DoD continued to collaborate with other federal agencies and local and state governments to develop methods and performance standards to evaluate the effectiveness of new and innovative technologies.

Putting Technology to Work in the Field

Phytoremediation is being implemented to remediate groundwater contaminated with ordnance and explosives at [Milan and Iowa Army Ammunition Plants](#). This process pumps contaminated groundwater to artificial wetlands where plants degrade explosive waste. Sampling indicates that the constructed wetlands are successfully treating the explosives contamination, and hopes are high that this innovative technology will soon be available for widespread use.



Moving technologies from the controlled environment of a laboratory to actual application in the field is one of the greatest challenges DoD faces. Along the way are regulatory and technical requirements, which can, at times turn into barriers. To address this, a federal advisory committee, Develop On-Site Innovative Technologies (DOIT), was formed in 1992 at the urging of the Western Governors' Association (WGA). DOIT was created to foster a more cooperative approach to developing technical solutions to environmental problems shared by states, industry, and the federal government.

DOIT also addressed broader citizen involvement in decision making, enhanced coordination among state and federal agencies, streamlined regulatory review of approaches and technologies, and special incentives for innovation. The committee completed its work in 1996 with the publication of *Collaborative Approaches that Save Time and Money in Cleaning Up Federal Waste Sites*. This report contains recommendations based on findings of more than 500 individuals from federal

agencies, tribal nations, industry, states, and organized environmental groups.



The DOIT Committee's final report is available on the World Wide Web at <http://www.westgov.org/wga/publicat/doitweb.htm>

The Interstate Technology and Regulatory Cooperation (ITRC) working group of the WGA is an outgrowth of the DOIT initiative. This national coalition of representatives of state environmental regulatory agencies works with federal agencies, tribal nations, industry, and other stakeholders to improve the acceptance and interstate deployment of innovative environmental technologies. They are developing technology-specific protocols and regulatory guidelines for states to consider in reviewing and permitting new cleanup technologies. ITRC participants believe that the linkage of regulatory partnerships, technology and environmental policies and standards will reduce the barriers to deploying environmental technologies.

"The vision of the Interstate Technology and Regulatory Cooperation (ITRC) Work Group is to improve environmental performance and protection while reducing associated costs and regulatory burdens by streamlining the deployment of environmental technology. This streamlining will be accomplished through the development of commonly accepted standardized processes for the performance verification and permitting of such technologies."

-- Vision Statement From the ITRC

One example of how collaboration between DoD and its stakeholders can produce better, faster cleanups, is the certification of the Navy's Site Characterization and Analysis Penetrometer System (SCAPS) technology by the California Environmental Protection Agency. The certificate is the result of a two-year process in which the technology was tested by independent third parties and found to be effective in identifying underground petroleum, oil, and lubricant contamination.

California Secretary for Environmental Protection James Strock said, *"The Navy's penetrometer system is an excellent example of how a new technology can be used to improve our nation's environment. By enhancing and speeding monitoring of contaminated soil, the penetrometer system promises to help return to productive use not only closed federal facilities, but also the thousands of Brownfields which dot our nations' urban areas."*



At [Grand Forks Air Force Base](#) in North Dakota, Air Force personnel discovered fuel compounds in the groundwater. Although the contamination was not an immediate threat to human health or the environment, the Air Force proactively began the process of identifying a remedy. After completing the site investigation, the Air Force selected natural attenuation. A public hearing was held to inform the community of the situation and receive feedback from both the public and the state. The state eventually sanctioned the use of natural attenuation, and, as a result, a successful effective cleanup solution was selected over other technologies that would have been more disruptive to the environment.