Secretary of Defense Environmental Awards FY 2002 U.S. Army Nomination for Environmental Restoration—Installation

The Center for Industrial and Technical Excellence
for Air Defense and Tactical Missile Systems

Letterkenny Army Depot
Chambersburg, Pennsylvania

INTRODUCTION

Letterkenny Army Depot (LEAD) is located in south-central Pennsylvania in Franklin County, five miles north of Chambersburg, Pennsylvania. The Depot covers 19,243 acres, most of which is devoted to ammunition storage (11,880 acres).

LEAD is the premier provider of Air Defense and Tactical Missile System support to the Department of Defense (DoD) and Foreign Allies and is the Center of Industrial and Technical Excellence for Air Defense and Tactical Missile Systems. Its tactical missile repair capabilities apply to a variety of DoD missile systems, including the PATRIOT Missile and its ground support and radar equipment. LEAD has a civilian population of approximately 1,085, including three military personnel. Tenants and contractor support at LEAD employ approximately 600 people. LEAD is the second-largest employer in Franklin County.

PATRIOT Missile Launcher in Action

As part of the **Base Realignment and Closure** (BRAC) decision of 1995, approximately 1,450 acres will be transferred to the **Letterkenny Industrial Development Authority** (LIDA) for future commercial/industrial reuse. Volatile Organic Compound (VOC)-contaminated groundwater underlies the majority of the land in the southeast area of LEAD. Because of the ongoing remedial investigation (RI) and remedial action (RA) efforts at LEAD, land is being transferred to LIDA in phases to facilitate timely property transfer.

BACKGROUND

Restoration Challenges

LEAD's environmental restoration challenges result from a limited staff that must comply with all regulatory requirements under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) associated with cleanup of two U.S. Environmental Protection Agency (EPA) National Priorities List (NPL) sites. At the same time, the staff must meet fast-track cleanup and transfer objectives under BRAC. The U.S. Army is the owner of the property and the lead agency under CERCLA. The EPA and

the Pennsylvania Department of Environmental Protection (PADEP) have roles as support agencies and entered into a Federal Facilities Agreement with the Army in 1989. In 1995, a **BRAC Cleanup Team** (BCT) consisting of LEAD, EPA, and PADEP was formed in addition to a **Restoration Advisory Board** (RAB) that includes community participation on both restoration and BRAC activities at LEAD.

Challenging Restoration/BRAC Activities

- Transferring approximately 1,450 acres of land to the LIDA in the time frames specified by BRAC.
  - Most of the acreage being transferred has groundwater contamination.
  - Innovative teaming and technical concepts must be developed in order to transfer the land within the specified time frame.
- Complying with all regulatory requirements under the CERCLA.
- Developing innovative methods to transfer property while overseeing two NPL sites.
- Meeting fast-track cleanup and transfer objectives under BRAC.
- Partnering with a variety of different organizations with varying interests and agendas.

Program Organization and Staffing

The Installation Restoration Program (IRP) is part of the Environmental Management Division of the Directorate of Public Works. One IRP Manager provides the immediate oversight of the program.

The program relies heavily on the input and recommendations of a variety of stakeholders:

LEAD management approach is strongly geared toward incorporating the opinions of all parties in the decision-making process; therefore, LEAD achieved a consensus before initiating any actions. **This approach propelled LEAD into the forefront of environmental restoration and enabled it to initiate innovative methods and technologies while ensuring the best use of limited funding and resources.** No work was started until the concerns of all parties were adequately addressed.

Designated LEAD personnel maintain contact with appropriate officials at all levels of the government, including municipal, county, state, and national representatives. In addition, by developing and maintaining these relationships, LEAD identifies individuals or groups involved with the site to gain an understanding of the level of community concern about the site. Such groups include the RAB and the Franklin County Reuse Committee. Briefing sessions with local government officials during remedial activities are conducted to inform them about recent developments at the site, and to provide them with background material and technical studies, investigation results, and proposed remedial actions. LEAD informs officials of the site activities and CERCLA procedures, since local officials may participate in public or small group meetings and news conferences, which require an understanding of the site particulars and Superfund process.

Community Involvement and Restoration Advisory Board (RAB)

Community relations activities at LEAD include public meetings, review and coordination meetings with federal and state regulatory personnel, site visits, meetings with elected officials and community groups, news releases to the local media, and direct contact with nearby property owners. LEAD has a RAB, which began meeting in 1995 and focuses primarily on the restoration activities related to Defense Environmental Restoration Act and BRAC actions. In 1995, the RAB replaced the Technical Review Committee (TRC), which was formed in 1988. LEAD representatives attend RAB and LIDA meetings and provide status updates on environmental activities at LEAD.

The RAB meets bi-monthly to discuss environmental restoration activities at LEAD and provides an opportunity for information to be exchanged between community members and LEAD staff.

Shippensburg University student Sara Henke, a graduate intern at LEAD.

Shippensburg University Internship. Since 1999, LEAD has been a partner with Shippensburg University, giving graduate and undergraduate interns hands-on experience with environmental issues and problems. Current intern Sara Henke is the fifth student to join the program since it was instituted in 1999. Henke is getting hands-on experience with the Geographical Information System (GIS). She explains, "By using the GIS we can layer the map so that a person can see what building used to be there, what facility is there now, and from there track the environmental concerns."

"To the Army's environmental program, GIS is value added. It can track sources of contamination by looking at the development of real estate and identifying the functionality of buildings," says Joe Petrasek, Letterkenny Restoration Program Manager. "By tracking the activities that occurred at the contaminant sources, restoration needs are more easily identified, cleanup solutions can more quickly be established, and tax payer dollars are saved."

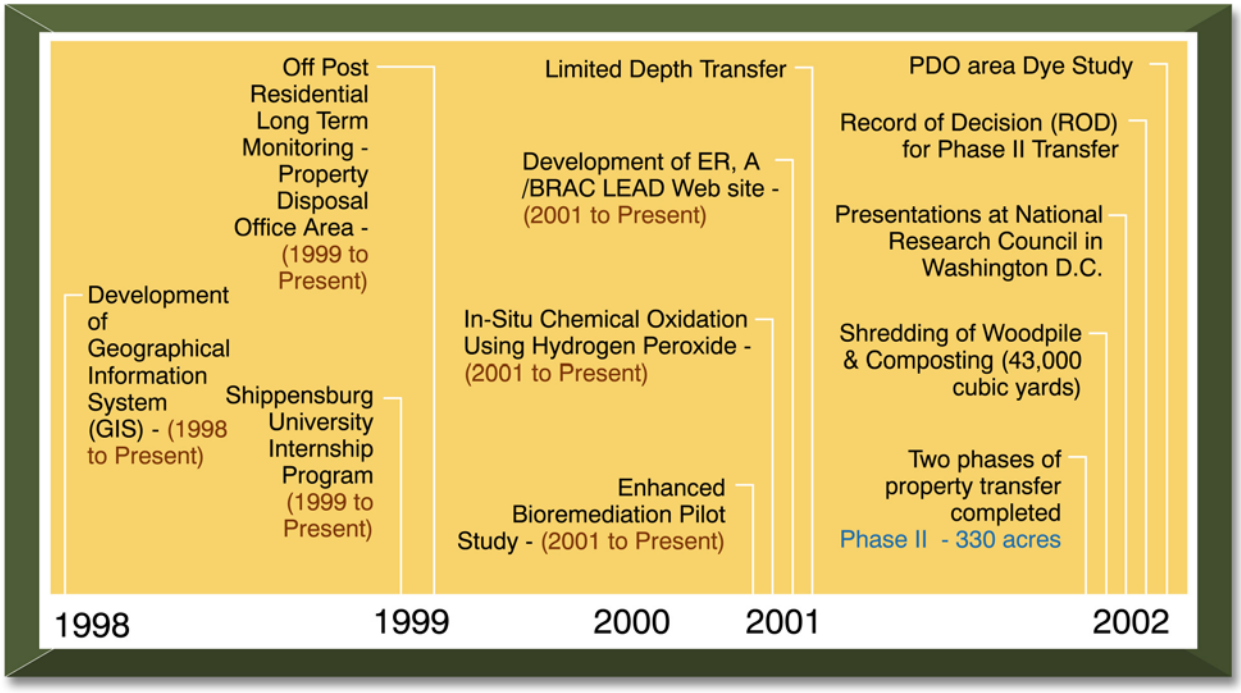
"The internship at Letterkenny is a good example of the community, the university, and the Army working together for the good of the greater community."

John E. Benhart, Ph.D., Interim Dean of Arts and Sciences Chair, Geography & Earth Science Dept., Shippensburg University

The Army has benefited from the partnership; while the students are mapping the installation,

the office staff is free to do the more technical applications. The situation has proven to be a win-win situation for the students, the school, and the LEAD.

Henke, a heart-and-lung transplant survivor, comes from an Army family dating back to the Civil War. "I couldn't join the Army because of medical reasons, so I was really excited about this opportunity with Letterkenny. I have been able to combine all of my passions—the environment, geography, and military—into one." The students get credit hours for the GIS internship at LEAD.



Restoration Agreement and Plans

The IRP and BRAC efforts at LEAD were initiated in 1978, when an Installation Assessment was performed. Past operations and practices at LEAD have resulted in the generation of various types of contaminants and their disposal or release across the installation. Solvents, heavy metals, petroleum hydrocarbons (PHCs), and polychlorinated biphenyls (PCBs) are the primary contaminants of concern within the BRAC parcel at LEAD. LEAD has signed agreements with the federal and state regulators and has established a procedural framework to implement and monitor appropriate response actions at the facility in accordance with CERCLA, the National Contingency Plan, Superfund guidance and policy, Resource Conservation and Recovery Act (RCRA) guidance and policy, and state statutes. LEAD has entered into a partnership with all stakeholders in the restoration and cleanup of environmental responsibilities from past operations.

Plans and Agreements with Stakeholders

- **Interagency Agreement (IAG) – *since 1989***
- **RCRA (Subpart B) Permit – *ongoing***
- **Installation Action Plan (IAP) – *updated annually***
- **Milestone Charts – *updated quarterly***
- **Priority Lists – *updated monthly***

Program Summary

Program Objectives and Success

Objective 1 In 2001, the transfer of approximately 1,450 acres to LIDA within BRAC timeframe. Phase II transfer of 330 aces was accomplished by using the innovative limited depth transfer process that enabled LEAD to transfer property quickly and safely.

Objective 2 Partnering to maximize use of limited resources. LEAD partnered with regulatory agencies and community representatives, guiding the team through complicated negotiations and groundbreaking regulatory and technical issues in order to transfer land to LIDA. Comprehensive IRP reviews, including a review of the proposed projects and studies, were also conducted monthly or as needed to obtain a consensus.

Objective 3 Innovative technologies were used in an attempt to streamline and determine the most cost-effective method for cleanup. Information from such pilots and projects are posted on LEAD's environmental Web site for dissemination to the regulators, RAB members, and the community in an effort to share lessons learned. Information is also shared through briefings, public meetings, and articles.

A screen shot from Letterkenny's Environmental Restoration/BRAC Web site.

Accomplishments

Fast-Track Cleanup

Fast-track cleanup and transfer objectives under BRAC included the following:

- 2001 The first limited depth transfer of BRAC parcels (Phase II Transfer). This effort represents a cooperative partnership between LEAD, LIDA, EPA, and PADEP that resulted in timely transfer of BRAC property and a win-win situation for all parties.
- 2002 (Phase II) transfer of land to LIDA representing a total of 330 acres. The Phase II transfer was unique in that the land was only transferred to a depth of eight feet below ground surface.
- 2002 Treat and remove lead-contaminated soil at Lot 48.

Innovative Technologies

In the summer of 2002, three presentations were made to the National Research Council (NRC) in Washington, D.C., on the innovative technologies piloted and used at LEAD. The unique geology and Karst solutions will help in answering questions about future technological cleanup in similar environments. The technology studies included:

- *In situ* chemical oxidation of dense non-aqueous phase liquid (DNAPL) in Karst topography using hydrogen peroxide (Fenton's chemistry) at site SE OU 3 (currently being used on an active restoration site).
- Enhanced bioremediation to treat dissolved-phase VOCs and semi-volatile organics at site SE OU 10 (currently in use at a BRAC site). This initiative is being implemented at a cost of $800,000.00. A Pump and Treat solution (also proposed) would have cost $4.1 million over 30 years.
- *In situ* chemical oxidation of DNAPL in Karst topography using peroxone (hydrogen peroxide and ozone) at site SE OU 11 (used at the solvent lagoon area, an active restoration site).

Wood shredder creating compost material.

- Pilot studies demonstrating the use of innovative technologies and approaches to address VOC–contaminated groundwater and destruction of DNAPL sources in a complex Karst geological setting.

Partnerships

LEAD has partnered extensively with federal and state regulators as well as the local community on the IRP. Partnering agencies include LIDA, EPA, and PADEP. LEAD, along with these agencies, jointly reviewed projects and studies as well as limited depth transfer initiatives. LEAD strongly believes in consensus building as a means to expedite cleanup and BRAC issues.

Opportunities for Small Businesses

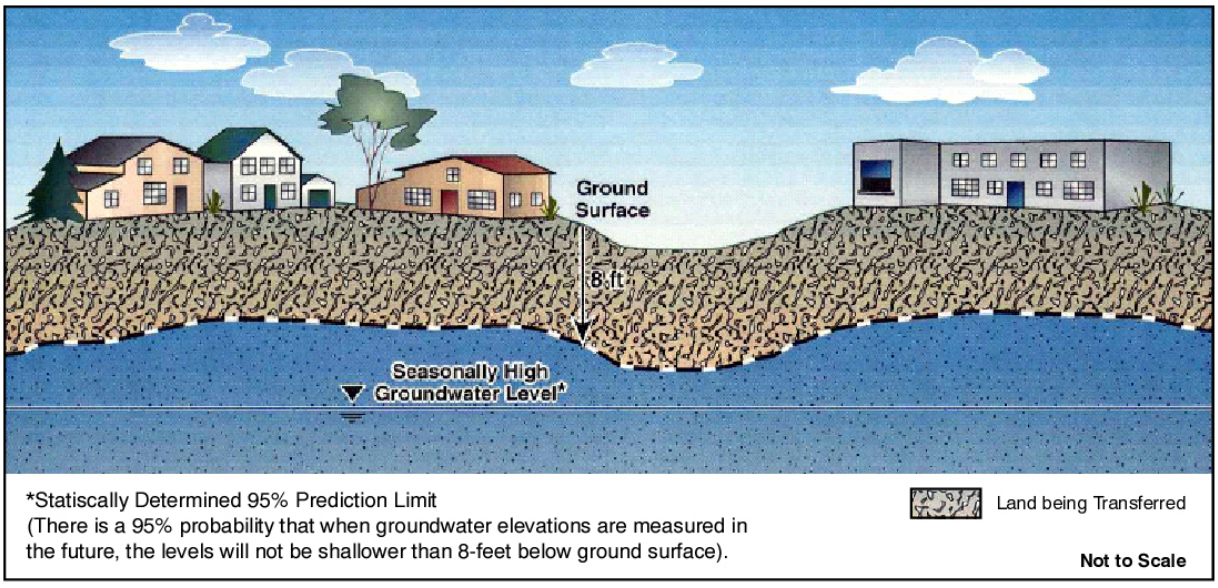
LEAD supports local small businesses through a variety of efforts:

1. Contracted Z-GeoInfo, Inc., a Towson, Maryland–based company, to develop and support the operations of a GIS, and to develop an Environmental Restoration Account/BRAC Web site, which includes LEAD's Administrative Record, GIS-Depot maps, milestones, signed IAG, IAPs, reports, presentations, DERP workshops, and EPA/PADEP (Region III) Internet links.
2. Developed an agreement to send shredded wood (43,000 cubic yards) to a local farmer to compost in lieu of land disposal at a cost savings of $313,000.
3. Purchased support services (drilling, soil removal, equipment rentals, and surveying) from local businesses.

Limited Depth Transfer

In a cooperative effort to facilitate land transfer in a manner acceptable to all parties, LEAD partnered with LIDA, EPA, and PADEP to develop options for transfer of the property. All organizations concerned agreed that the limited depth transfer would best meet the objective of all parties resulting in the most timely property transfer.

The final agreement was to transfer buildings, structures, and soil from the ground surface down to a depth of eight feet below ground surface, which is above the seasonal high groundwater table. The property transfer depth was ultimately based on a depth that allows for future tenants/owners to install and maintain utilities, and construct building foundations and docks without coming into contact with groundwater.



The Phase II transfer at LEAD is the first known limited depth transfer of federal property. In addition, the accompanying documentation, Proposed Plan, Record of Decision, and Finding of Suitability to Transfer were prepared in anticipation of a limited depth transfer. The successful completion of these documents involved extensive partnering and cooperation between members of the LEAD team. LEAD's success proves that a variety of needs and objectives can be met by working together as a team towards a mutually acceptable solution.

Reducing Risk to Human Health and the Environment

LEAD supports groundbreaking new technologies and continues to develop and pilot new means for cleanup at the installation. It reduced the risk to human health and the environment through a number of removal actions:

DRMO Scrap Yard—removal of PCB-contaminated soil	10,661 TN	2000
Landfill J—hot spot removal of contaminated soil	1,170 TN	2001
Open Truck Storage Area—removal of dioxins	300 CY	2001
Two Revetment Areas—woodpile shredding	43,000 CY	2002
Lead Ingot Storage Area—soil stabilized/hauled to approved landfill	2,085 TN	2002

LEAD's pioneering techniques in the Karst environment are paramount to the Army's environmental program. As an environmental steward, LEAD continues to research new technologies in combination with standard methods:

- **Contaminated groundwater technologies**
- ***In-situ* technologies**
- **Enhanced biodegradation**
- **Groundwater Treat and Pump lagoon area**
- **Groundwater dye studies**
- **Off-post—residential wells, long-term monitoring**

***In-situ* chemical oxidation using hydrogen peroxide, K-area pilot study.**

Innovative Technology Demonstration

In-Situ Chemical Oxidation Using Hydrogen Peroxide (2001–Present)

- LEAD conducted a pilot study to determine the effectiveness of *in-situ* chemical oxidation of DNAPL in Karst using hydrogen peroxide (Fenton's chemistry). The *in-situ* chemical oxidation pilot process utilized the injection of a 50% solution of hydrogen peroxide and a catalyst solution into the impacted media via a network of controlled, pressurized injection points.
- A total of 12,700 gallons of 50% hydrogen peroxide solution and 36,000 gallons of catalyst solution were injected into the bedrock aquifer beneath the former solvent lagoon.
- This evaluation was critical in characterizing the location, orientation, and degree of hydraulic connection between the fractures, joints, and solution features of the wells, and was used to finalize the design and injection approach for the pilot study.

Enhanced Bioremediation Pilot Study (2001–Present)

- LEAD partnered with the EPA and PADEP to implement a full-scale enhanced bioremediation pilot program which involved the introduction of a solution of sodium lactate, fluorescent tracer dyes, and potable water into a series of injection wells.

- Extensive study shows that the groundwater system beneath the site is an intricately folded and fractured limestone aquifer that exhibits wide variations in seasonal water levels, transmissivities, and retention time, and contains a well-developed epikarstic zone.
- Monthly on- and off-site groundwater samples are taken to determine flow paths and concentrations of the bioremediation amendments throughout the various seasonal groundwater conditions.
- Information gained is essential in tracking the progress of the cleanup program.

In Situ Chemical Oxidation Using Peroxone (2001–Present)

The objectives of the pilot test conducted at the former solvent lagoon area associated with site SE OU 11 were to:

- Determine the ability to displace aquifer water with oxidant solution via a multi-level injection system with specified well spacing and orientation.
- Determine the ability to deliver and sustain oxidant in the target zone.
- Test the generator and delivery system.
- Evaluate the potential that off-site migration of chlorinated solvents could be mitigated by injection of oxidant fluid.
- Collect design information for the full-scale system.

Sampling contaminants at Defense Reutilization & Marketing scrap yard.

The pilot test was initiated in September 2001 and concluded in January 2002. A dye study preceded the 30-day pilot test to support hydrogeologic characterization of the target zone and placement of injection and monitoring wells. A follow-up 30-day test was completed in late 2002 to determine the persistence of ozone in the aquifer. This data will be important to determining the optimal number and spacing of additional injection wells for the full-scale remediation. A video of the pilot test will be used to support communication of the pilot test and its results to the technical and local community during 2003.

Conclusion

LEAD leads the Army in the development of groundbreaking technologies, continuing to develop and pilot new means for cleanup at the installation. LEAD's commitment to reducing the risks to human health and the environment is evident in its innovative removal actions. The installation's IRP and BRAC programs have had considerable success the last two years while LEAD personnel have partnered extensively with regulators and the community to establish trend-setting policies, such as the fast-track limited depth transfer of land for reuse. The Letterkenny Army Depot continues to seek cost-effective, innovative methods for cleanup and strong relationships with all stakeholders.