

# **Installation Environmental Restoration Defense Logistics Agency, Defense Supply Center Richmond Narrative**

## **Introduction**

Defense Supply Center Richmond (DSCR), located along the I-95 corridor in southern Chesterfield County, Virginia, has been a consistent, dependable supplier of quality goods and services to those defending freedom around the world since it was activated in 1942.

Designated as the aviation demand and supply chain management team within the Defense Logistics Agency (DLA), the Center serves within the Department of Defense (DoD) supply chain as the primary source of supply for the nearly 1.2 million repair parts and operating supply items. DSCR's core mission is to supply products with a direct application to aviation. These items support over 1,300 major weapons systems utilized throughout the DoD.

With over 600 acres and approximately 120 warehousing, utility and administrative buildings totaling over 6.7 million square feet, DSCR is host for a number of other DoD, Federal and state organizations. The largest of these tenants are the 350-acre Defense Distribution Depot Richmond, Virginia; the Defense Distribution Mapping Activity; the Virginia Army National Guard vehicle maintenance activity; and the Defense Reutilization and Marketing Office.

The Center and its tenant activities employ nearly 3,000 civilians, service members, and contractor personnel, whose mission is to provide critical material support across the DoD and other Federal agencies.

## **Background**

DSCR's inclusion on the National Priorities List (NPL) of the Federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) also known as "Superfund" was promulgated in 1987. In 1990, DLA, DSCR, the U.S. Environmental Protection Agency (USEPA), and the Commonwealth of Virginia entered into a Federal Facilities Agreement (FFA), which directs restoration activities at the site. The FFA designated



DLA as the lead agency responsible for the evaluation, selection, and implementation of necessary, feasible, and reasonable response actions to ensure protection of human health and the environment. Thirteen operable units (OUs), which consist of both soil and groundwater impacted by past site operations, have been identified at the facility. Investigations have been ongoing at these OUs since the mid-1980s. Until recently, Records of Decision (RODs), which finalize the remediation actions, were signed for only four of the thirteen OUs, and an interim remedial action was

implemented for one additional OU. Over the past two fiscal years DSCR has advanced forward with several environmental restoration agreements coupled with dynamic and innovative remedial actions.



First, DSCR signed an Amendment to the Interim ROD for OU 9. OU 9 was a groundwater treatment system designed to reduce the toxicity and mobility of a volatile organic carbon groundwater plume emanating from a former landfill and existing vehicle maintenance shop. The ROD amendment allowed for the decommissioning of a legacy pump and treat groundwater system that studies demonstrated as inefficient because of decreased yield and contaminant capture despite ever increasing lifecycle costs of the system. DSCR worked with the regulatory agencies to develop a performance-based approach to remediating this site. As an innovative and significantly less expensive alternative of the inefficient pump and treat system, DSCR successfully tested an in-situ chemical reduction technology to lower contaminant concentrations by introducing edible oil into the



subsurface. This edible oil injection technology, which introduces a soybean oil substrate for anaerobic micro-bacteria to metabolize contaminants, has dramatically reduced legacy operations and maintenance costs by nearly \$750,000 dollars per year. The in situ bioremediation technology provides a highly effective low hazard bio-based remediation approach.

DSCR also signed a ROD for OU 2, a former landfill. This area was used for disposal of chemicals and construction debris from the late 1950's to the early 1970s. After multiple investigations including trench excavation, a ROD was signed by the USEPA, Virginia Department of Environmental Quality (VDEQ) and the DLA in 2008, which selected a semi-



permeable soil cover and institutional controls as the final remedy for the site. After the remedial design was completed, construction began on the landfill cap in July 2009. Approximately 17,000 cubic yards of clean soil was transported on site to complete the cap. The design called for a 1-2% grade soil cap to promote beneficial runoff and prevent infiltration into the former landfill. The new soil

cap extends 8 acres over the former landfill and provides a barrier to the landfill's contents. Major construction wrapped up in mid October 2009 and the site was hydro seeded to provide sufficient and timely erosion and sediment control.

In an effort to continually keep its neighbors up to date regarding remediation actions, DSCR established a monthly Restoration Advisory Board (RAB) in January 2002. The RAB usually consists of community members, a DSCR co-chair, a USEPA representative, and a VDEQ representative. The primary objectives of the RAB were to inform the community regarding the restoration activities at DSCR and to obtain community input regarding these activities and the proposed remedies for the OUs. DSCR was able to decrease the frequency of

RAB meetings from monthly to quarterly because of its effectiveness in educating the public, which costs less and allows program managers to focus their time on remediation actions.

### **Program Summary**

During the past two fiscal years, DSCR installation restoration personnel effectively accelerated its installation remediation program using cost-effective techniques without compromising potential risk to current and future DSCR employees and the neighboring community. The following highlight the accomplishments of this aggressive program management:



- Developed a comprehensive conceptual site model of the environmental conditions at DSCR the interdependence of soil and groundwater impacts to the contaminated site cleanup strategy.
- Developed an updated estimated of current and future risks to receptors based on current and anticipated future use of the facility
- Developed and implemented cost effective remedies at source area OUs
- Developed and implemented cost effective, sustainable remedies for the groundwater OUs that achieve the remedial objectives with minimal adverse impact to DSCR's mission and the environment.
- Improved communications with the community (RAB) to include providing training and technical sessions to help them better understand the restoration activities at DSCR

DSCR recently completed a site-wide conceptual remediation model. This strategy involved eliminating or reducing continuing sources (i.e., through removal or treatment), controlling constituent movement in the environment, and controlling exposure to compounds that could pose an unacceptable human health or ecological risk. Remedy decisions made under this strategy are based on the more efficient and risk-based development of remedial action objectives (RAOs) at individual OUs. As a result of these efforts, DSCR has signed RODs and implemented remedies for 9 OUs. DSCR anticipates to have signed RODs for 3 additional OUs within the upcoming calendar year. In addition, DSCR has completed the interim remedial actions at the remaining OU and no further activities have been planned for this OU. The schedule for the DSCR environmental restoration program has been considerably accelerated and DSCR expects to have Remedy in Place for all its OUs by FY13.



Over the past two fiscal years, DSCR provided several presentations to the RAB which described the ongoing restoration activities at DSCR including the landfill cap construction, in-situ bioremediation and results of the Permeable Reactive Barriers. Alternating RAB meetings were presented as “training” meetings in which the members are briefed on difficult technical

and regulatory concepts of the USEPA's Superfund. DSCR project managers frequently used simplistic geologic models and multimedia graphics to explain the complex theories of groundwater fate and transport. Between RAB meetings, community members receive additional information in order to sustain regular communication. A regularly updated Web site, a quarterly community-involvement newsletter with a wide circulation, fact sheets, and environmental fairs also provide interested community members with a wealth of information regarding the ongoing cleanup at DSCR.

### **Program Accomplishments**



Over these past two fiscal years, DSCR has achieved significant cost reductions, accelerated its remediation schedule and ensured minimal long term liability at all of their source area (soil) OUs. The remedies at these OUs are protective, require minimal long term maintenance and also incorporate ecological enhancements that are extremely beneficial to the environment, and subsequently to the installation. For example, at soil OUs 10 and 11, DSCR

recently constructed natural vegetative covers that are protective of human health yet also promote ecological and wildlife habitats. These two sites provide educational opportunities, enhanced natural resources, and aesthetic benefits to the installation.

DSCR has also evaluated and selected passive low cost yet effective treatment technologies such as in-situ bioremediation and monitored natural attenuation that have resulted in a considerable reduction in the costs to complete estimates for the groundwater OUs. DSCR estimates that upon implementation, these remedies will achieve a cost avoidance of over \$15 million. For example, at OU 7, DSCR implemented an innovative passive bio-barrier approach to treat dense nonaqueous phase liquids (DNAPL) concentrations of chlorinated solvent contaminated groundwater. This bio-barrier utilized bark mulch and other wastes obtained free of charge from the City of Richmond, thereby minimizing overall material costs. This remediation approach has been extremely successful in reducing the contaminant concentrations in groundwater by over two orders of magnitude within one year of its installation.

In 2009, the RAB agreed to reduce the RAB meeting frequency from monthly to quarterly because of the trust built between the installation and its neighbors from the



tremendous program progress demonstrated by the installation. "The relationship with the community and DSCR has been improved through the RAB," said Janet Moe, RAB community co-chair. Moe said she believes that for many years prior to the RAB, the communities around DSCR were misled by the governmental officials concerning the impact of the contamination on the land and on their lives. "I believe that the interaction of the RAB has improved that relationship," she said of

the relationship now. “The RAB has continually demanded that DSCR be accountable to the surrounding communities for the past contamination and to prevent any future contamination. We hold DSCR to be good stewards of the land and water on and surrounding DSCR.”

### **Judging Criteria**

**Program Management.** The Installation Restoration Program is an integral part of DSCR’s ISO 14001 externally registered Environmental Management System. This allows us to identify and effectively track program improvements and associated milestones. During this reporting period not only did the restoration program demonstrate environmental improvements by the signing of five additional RODs, implemented innovative environmental remedies, and saved the taxpayer, and in turn the warfighter, nearly \$16 million dollars. This effective program management allowed the employees on the installation, and their leaders, to focus their efforts toward supporting the warfighter.

**Technical Merit.** Through on-site testing and development, DSCR successfully implemented two cost effective and innovative remediation techniques, as well as removing an outdated and inefficient process. The first involved in-situ chemical reduction technology to lower contaminant concentrations. This was done by injecting non-hazardous and recyclable edible oil into the subsurface. This “food” excited the micro-bacteria and led to a faster natural breakdown of the contaminants. The outstanding success of this initiative allowed for the decommissioning and recycling of an outdated pump and treat system.

The second natural remedy involved the capping and subsequent vegetative planting of the installation’s former landfill. As part of the approved ROD, several thousand cubic yards of clean top soil was used to complete the cap. This area was then plant with Virginia native grasses and allowed to return to a more natural and sustainable state. Additional vegetative plantings and wildlife habitat improvement were also constructed as part of additional RODs.

**Orientation to Mission.** All aspects of DSCR’s installation restoration program are pursued in full compliance with all applicable Commonwealth of Virginia and Federal environmental regulators. This continual high level of environmental performance and the subsequent absence of any regulatory deficiency, allows installation management and their employees to more effectively focus on their mission support to the warfighter. The effectiveness of the remedies being implemented has also resulted in several acres of previously contaminated land being restored to a state where it can now be used to support the needs of the installation.

**Transferability.** A significant percentage of the remedies being pursued within DSCR’s installation restoration program, are natural and sustainable. They involve the relatively non-technical use of creative vegetative plantings, low impact landscaping, and the injection of edible and recyclable oil. The simplicity of these effective and low cost remedies, and the ease of their sustainment, facilitates their continued use long into the future. The broadness of these remedies also allows for their adoption by other DoD facilities.

DSCR has utilized two methods for promoting and potentially transferring these innovations to others outside of this installation. The first is the Restoration Advisory Board

where local community members are routinely informed as to the overall progress and initiatives of the restoration program. The other is the outreach capabilities of DSCR's EMS's external partnership known as the Virginia Regional Environmental Management System (V-REMS). This one of a kind partnership is comprised of more than eighty public and private organizations that routinely communicate and meet to address the environmental needs of its members and of the Commonwealth of Virginia. All DoD facilities within the Commonwealth are members of this partnership. DSCR routinely updates this partnership regarding the development, success, and potential transferability of our remediation initiatives. More specifically, as a result of our successful implementation of edible-oil injection at DSCR, Air Force installations working with AFCEE's Remedial Process Optimization are implementing similar technologies based on the DSCR model.

**Stakeholder Interaction.** DSCR's Restoration Advisory Board has proven to be an effective means of involving our surrounding community, state and local organizations, and non-governmental organizations. Each quarterly informational meeting is opened to the public and is often attended by individuals and businesses. DSCR's leadership of the V-REMS partnership has also benefited this program by the opportunity for individuals and organizations external to the installation to comment and assist on the workings and challenges of our restoration program. We have borrowed many lessons learned from the experience of others. DSCR has also pursued an aggressive educational program related to our restoration initiatives. We routinely make presentations at local schools, as well as to military installations (Earth Day at Furl Lee, VA), regarding the innovations being pursued on Center. We also routinely publish stories highlighting the accomplishment of these environmental initiatives to DSCR's employees through use of internal internet site. This helps keep our employees up date regarding the environmental challenges that we have faced, the progress being made, and anticipated future success.