Defense Supply Center Richmond

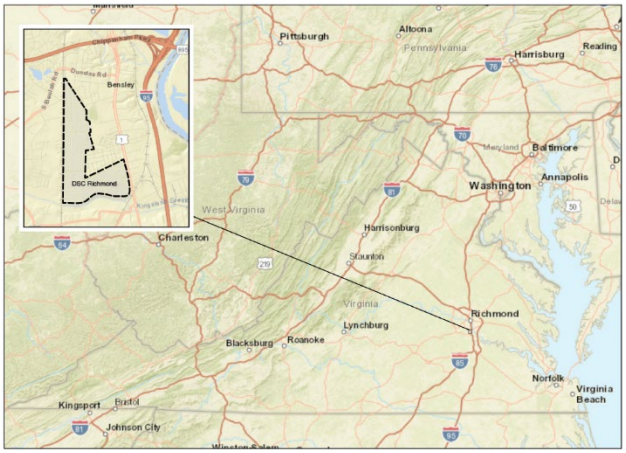
INSTALLATION ENVIRONMENTAL RESTORATION AWARDS SUBMITTAL

2020 Secretary of Defense Environmental Awards

INTRODUCTION

Defense Supply Center Richmond is the aviation demand and supply chain manager for the Defense Logistics Agency (DLA), and is the primary source of supplies for more than 1.2 million repair parts and operating supply items, supporting 2,200 major weapon systems across the Department of Defense (DoD).

The Installation occupies approximately 611 acres in southern Chesterfield County, Virginia, which is approximately 9 miles south of Richmond. The surrounding land use is primarily residential with commercial, industrial, and agricultural facilities in close proximity to the installation.



Defense Supply Center Richmond

The Army purchased the land, then called the Richmond General Depot, in 1942 from the Bellwood family. By 1962, the General Depot had evolved into the Defense Supply Agency and the mission expanded to managing over 30,000 general supply items. In 1985, the installation assumed management of aviation structural components, shifting the mission towards aviation. The installation changed its name to Defense Supply Center Richmond in 1996 and expanded the mission in the early 2000s by moving into consumer-level supply logistics.

Defense Supply Center Richmond is host to a number of other DoD, Federal and State organizations. The largest of these tenants are DLA Distribution Richmond, DLA Disposition Services Richmond, the DoD Ozone Depleting Substance Reserve, and the Virginia Army National Guard. Defense Supply Center Richmond and tenant organizations have a significant impact on the local community by employing more than 3,000 civilians, service members, and contractor personnel whose mission is "To provide the best value aviation weapon systems and environmental logistics support to American armed forces on land, sea and in the air."

Background

Before environmental awareness was widespread and the stringent environmental regulations in place today were enacted, routine activities which were commonplace at military installations resulted in soil and groundwater contamination. For example, in the 1960s and early 1970s, the Installation utilized a landfill in the central area of the facility to dispose of solid waste. Due to the contaminated soil and groundwater throughout the installation, Defense Supply Center Richmond was included on the National Priorities List (NPL) in 1987. In 1990, DLA, the U.S. Environmental Protection Agency, and the Commonwealth of Virginia entered into a Federal Facilities Agreement (FFA), which directs restoration activities at the site. DLA has worked for decades to build a collaborative relationship with the US EPA and Virginia Department of Environmental Quality (VADEQ). These agencies comprise the Tier I Restoration Planning Team.

Thirteen Operable Units were identified during early investigations.

In order to streamline and prioritize cleanup, the Tier I team divided the installation into 13 Operable Units (OUs) to split the contaminated areas into more workable zones.

Investigations of the OUs began in the mid-1980s. DLA was proactive in implementing remedial activities as early as the 1990s to limit migration of contamination even as the Conceptual Site Model (CSM) was developed and refined. As the CSM became defined, DLA worked with the US EPA and the VADEQ to evaluate and select remedies as documented in Records of Decision (RODs) for each of the sites. For transparency, the Defense Supply Center Richmond's Management Action Plan (MAP) is updated annually to outline the multi-year requirements and approach at each OU. The MAP tracks requirements, progress towards cleanup objectives, and schedules. This plan details the history and context of the studies conducted as a clear and concise reference for employees, regulators, and stakeholders. It also helps all stakeholders understand the budget formulation and program planning process. The MAP is available to the public on the Administrative Record internet site.

DLA has enacted a robust community involvement program. In 2002, DLA established a Restoration Advisory Board (RAB) with the primary objectives to inform the community on restoration activities at Defense Supply Center Richmond and to obtain community input regarding the activities and the proposed remedies for the OUs.

Based upon the effective community involvement, DLA decreased the frequency of the RAB meetings from monthly to every two months in 2008, and now holds quarterly meetings. The Community Involvement Plan (CIP), last updated in 2019, is updated every

two years with input from interested citizens of the surrounding community.

One particularly challenging site has been Operable Unit 8. OU-8 consists of a chlorinated volatile organic compounds (VOCs) groundwater plume contaminated by leaking acid neutralization pits associated with industrial metal working operations active in the 1960s and 1970s. While the OU-8 remedial approach was implemented, the ROD includes a contingency remedy of in-situ bioremediation if certain triggering criteria occur. During routine sampling and follow-up data gap sampling, DLA discovered contamination migration beyond the existing array of monitoring wells towards the installation boundary, triggering the contingency remedy of in-situ enhanced bioremediation (EBT). The contingency remedy was officially added through an Explanation of Significant Differences (ESD) signed in 2011. In 2013, DLA put the remedy in place by installing fifteen injection wells and injecting over 15,500 gallons of emulsified vegetable oil substrate and lactic acid into the wells.

In addition, DLA conducted a substantial amount of sampling, analysis and investigation to define the plume boundaries, to determine risk to potential receptors, and to revise the CSM. It was discovered that naturally occurring preferential pathways were influencing the aquifer in the area in a manner inconsistent with the CSM initially developed in 2005. DLA installed new sentry wells in 2012, which then produced samples with results above acceptable levels creating concerns about the definition of the northern boundary. Working with multiple stakeholders and regulatory agencies, DLA successfully characterized the full extent of contaminated groundwater.

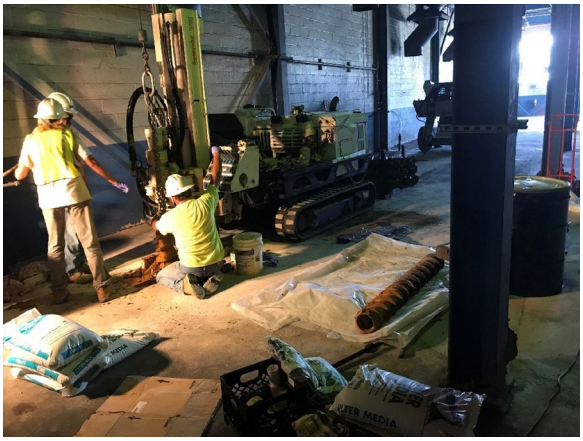
Thousands of gallons of emulsified vegetable oil substrate and lactic acid were injected into the wells.

Summary of Accomplishments

As described in the background, DLA conducted a robust monitoring program at OU-8 to ensure the nature and extent of the groundwater plume remained understood. In 2016, contaminated groundwater was not only migrating off-site but was anticipated to extend beneath a neighboring elementary school. DLA acted expeditiously to address migration and contain the groundwater plume.

Technical Success

As described previously, EBT was being conducted to treat contaminated groundwater to enhance naturally occurring attenuation (decomposition). The team designed and implemented a second round of injections adding six wells inside the source area and expanding the down gradient flow treatment network by six wells. To implement this system within an operating warehouse, drillers with limited access rigs to enter the tight space were engaged to install the injection wells with no interruption to mission activities.

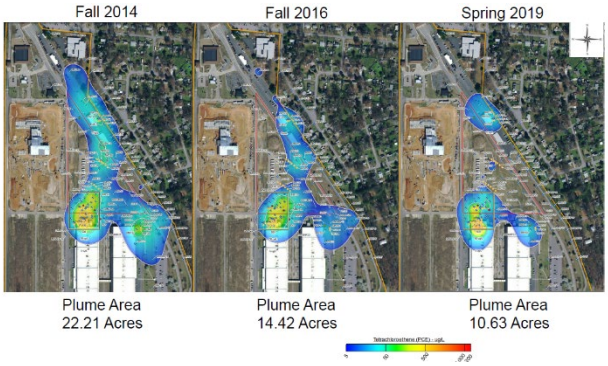


Drillers with limited access rigs installing injection wells in Building 65.

Nearly 130,000 gallons of sodium lactate solution were injected beneath and downgradient of the source area. Additionally, DLA installed a groundwater recirculation system to work in concert with the EBT. The recirculation utilized a series of wells to extract contaminated down gradient groundwater, pump to the surface for treatment, and inject the treated groundwater upgradient of the source area. This approach for re-injection avoids a common failure of traditional pump and treat systems wherein system efficiency declines due to extended groundwater extraction. Using this more effective method, the injected groundwater is forced through the source zone, keeping levels at equilibrium throughout treatment as well as flushing contamination towards the extraction points for faster cleanup.

Over 100,000 gallons of sodium lactate solution were injected into the plume during the reporting period.

The results of using this two pronged approach of in-situ bioremediation and groundwater recirculation have been impressive, with 2019 results showing a reduction in total area covered by the tetrachloroethene (PCE) plume by over 80% and the trichloroethene (TCE) plume by over 70% since the maximum area was established in 2014. As of June 2019, the plume was successfully eradicated from beneath the school and limited to within the installation boundaries.

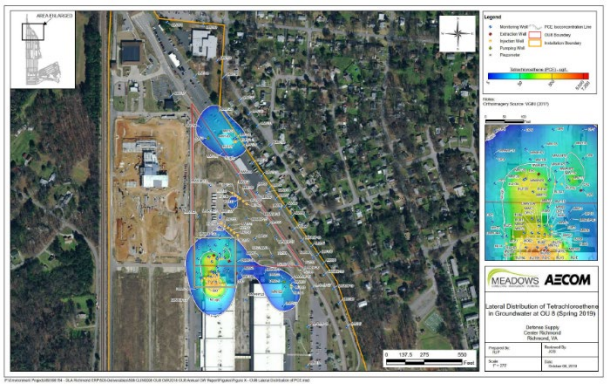


Almost 12 acres of the plume was eliminated by 2019.

During the reporting period, this Bioenhanced Directed Groundwater Recirculation (BDGR)

system extracted, cleaned and injected over 4,000,000 gallons of groundwater. The team also bolstered an existing vapor mitigation system installed in the warehouse by adding an additional four extraction points to protect the workforce from any additional vapors that the pilot test could cause underneath the building itself.

DLA Installation Management Richmond shifted its focus from managing and monitoring the contamination to actively combating the source areas. The additional treatment of source areas coupled with the significant reduction of groundwater contamination will result in a substantial reduction of total remediation time required for OU-8.



By the end of the reporting period, OU-8 had decreased significantly.

Mission Support

Over the last several years, the installation has seen an increase in tenants and mission activities. By effectively remediating and controlling the contamination on-site, increased acreage on the installation is usable for mission functions. Passive remediation, such as monitored natural attenuation and land use controls, has been coupled with other green and sustainable remedies such as vegetative covers and bioremediation. These are low profile actions that minimize disruption of mission activities and promote maximum use of the installation to support the warfighter. The Installation Restoration Program Manager works diligently with Defense Supply Center Richmond's community planner to integrate protective Land Use Controls into the Installation's Master Plan. During the award period, DLA finalized its Visioning Plan and Area Development Plans for the functional areas of the installation. Each area carefully considered courses of action based upon environmental factors such as remediation and land use controls.

Cost Effectiveness

All aspects of Defense Supply Center Richmond's Installation Restoration Program are pursued in full compliance with all applicable Commonwealth of Virginia and Federal environmental regulations. Innovative technologies were evaluated to address the best value for remedial efficiency considering the need to meet an aggressive schedule. DLA implemented a streamlined approach to characterization, which allowed for dynamic planning and field-based decision making through on-site testing and development. Making real-time decisions while in the field allowed for efficiencies to be realized relative to mobilization and laboratory costs, with stakeholders having vital field-based environmental sampling test results, allowing for quick, well informed decisions.

DLA strives to implement green and sustainable remedies within Defense Supply Center Richmond's Installation Restoration Program. These involve sustainable native vegetable plantings, low-impact landscaping, and the injection of edible oil substrate or sugars. The simplicity of these proven, effective, 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. The BDGR system can be adopted where there is a similar concern with a growing

contaminant plume or a need to accelerate cleanup efforts without resorting to cost prohibitive pump and treatment methods.

Community Outreach

The reporting period was full of progress that was highly-interesting to the public as it pertained to off-site contamination. The RAB was invaluable when the off-site contamination was discovered. Throughout the past several years, the installation has achieved a friendly rapport with the local RAB members that allows for casual and transparent discussions regarding concerns and project status. The public has a better understanding of DLA's restoration program and efforts. The transparency offered by DLA during its interactions with the public has led to a level of trust on both sides of the fence.

The impact of having a community that works with the Defense Supply Center Richmond to understand the challenges resulted in positive outcomes. Over the past 15 years, DLA Installation Management Richmond has turned an Installation Restoration Program that previously received negative press into a program that is able to focus its resources on the cleanup of these sites. The positive relationship with the community also reduced government commitments and obligations to address negative publicity. The BDGR system implemented during the reporting period has expedited the cleanup of the installation and will result in a reduction of the overall remediation time for OU-8.

The restoration of the Defense Supply Center Richmond has been a long process to clean up decades of contamination. A remedy is in place for each of the 13 OUs and testing will continue until the contamination has met remedial cleanup goals and the Installation is removed from the NPL.