

**Fiscal Year 2010 Office of the Under Secretary of Defense Environmental Awards
Environmental Restoration – Installation
Defense Logistics Agency
Defense Supply Center Richmond**

Introduction

Defense Supply Center Richmond, 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 nearly 1.3 million repair parts and operating supply items. More than 444,000 of the items we manage are aviation parts, including spares for engines on fighters, bombers, cargo aircraft and helicopters; aircraft and helicopters; airframe and landing gear parts; flight safety equipment; and propeller systems. Defense Supply Center Richmond'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 that total over 6.7 million square feet, Defense Supply Center Richmond is host for a number of other DoD, Federal and state organizations. The largest of these tenants are the 350-acre DLA Distribution Richmond Virginia, DLA Distribution Mapping; the Virginia Army National Guard Vehicle Maintenance Shop. 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

Defense Supply Center Richmond'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, Defense Supply Center Richmond, 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 ground water impacted by past site operations, have been identified at the facility. Investigations have been ongoing at these OUs since the mid-1980s. The complex properties of the local alluvial sediments coupled with the entrenched dense volatile contaminants make environmental restoration challenging at the installation. Heavy organic clays retard and sequester contaminants making them difficult to assess, contact, and remediate in the long term. Yet, the installation has managed to reduce contamination and resulting risk by using remediation technologies that take advantage of the innate physical and chemical properties of the soils.

While previous investigations were stalled, recent years have brought about focused studies and construction of long term sustainable remedies. During the first two decades of program execution, four Records of Decision (RODs), which document the negotiated remediation actions, were signed. Over the past two fiscal years, Defense Supply Center Richmond has advanced forward with several environmental restoration agreements coupled with dynamic and innovative remedial actions. Even with sluggish progress during the initial investigatory phases, Defense Supply Center Richmond is now on track to meet Department of Defense goals in achieving “Remedy in Place (RIP)” status by fiscal year 2013.

Rather than addressing the individual operable units as independent undertakings, the installation has focused on addressing contamination from a holistic approach which ensures that larger issues are tackled in the right priority, preventing or eliminating the persistent sources of long term liabilities. The priorities are clearly listed, for transparency’s sake, in the installations Management Action Plan (MAP). This Plan gives the stakeholders a clear concise document which details the history, context, and studies conducted. It also helps stakeholders understand the budget formulation, and program planning which takes place.

Defense Supply Center Richmond completed a major program milestone when, with concurrence from the US EPA Region III, it completed the Feasibility Study (FS) for Operable Unit 7 (OU-7). The site, located in the south-central region of the Installation, consists of impacted ground water underneath and downgradient of a former fire training area. At the fire training area, three separate, unlined pits were used for firefighting purposes. Seepage of flammable liquids resulted in degradation to the ground water beneath the area.

Defense Supply Center also issued a proposed remedial action plan for OU-13. OU-13 consists of soils impacted by a spill from an above-ground storage tank in 1978. The proposed plan issued by Defense Supply Center Richmond presented the lead Agency’s preferred remedy, which consisted of a removal action of contaminated soils and institutional controls. The project manager worked with the local natural resources and master planners to ensure that the removal action design was respectful of the installation’s only remaining natural ecological preserve.



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Defense Supply Center Richmond also completed a Remedial Action Construction for OU 2, a former landfill. This area was used for disposal of materials from the late 1950's to the early 1970's. After multiple investigations, including trenching excavation that revealed unexploded ordnance, a ROD was signed by the USEPA, Virginia Department of Environmental Quality (VDEQ) and the DLA in 2008, which selected a semi-permeable graded 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, Defense Supply Center Richmond established a monthly Restoration Advisory Board (RAB) in January 2002. The RAB usually consists of community members, a Defense Supply Center



Richmond 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 Defense Supply Center Richmond and to obtain community input regarding these activities and the proposed remedies for the OUs. Defense Supply Center Richmond 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. The Community Involvement Plan (CIP) was updated with input from interested citizens of the surrounding community

Program Summary

Defense Supply Center Richmond’s environmental restoration program strives to attain timely and cost effective risk reduction. To accomplish this goal, we must ensure that our selected remedies are *performing as designed* and will achieve cleanup goals and a “response complete” status in a reasonable time - frame. Therefore, Defense Supply Center Richmond periodically assesses the performance of a given remedy against clearly established metrics.

These metrics may include decreases in contaminant concentration or mass flux, changes in ground water geochemical conditions, or similar environmental parameters. When the remedy is performing as designed, the cleanup goals should be met within the design’s time frame. Failure to meet the performance metrics suggests that the remedy is not performing as designed, and that alternative courses of action should be considered.

The installation has a prescribed analytic decision making process to evaluate prudent



courses of action when a remedy is not performing adequately. First, the installation evaluates techniques to optimize the current remedial technology. Optimization begins with a review of system performance and design and an analysis of the root causes of sub-optimum performance, followed by design or operational changes intended to overcome the adverse, site-specific conditions. If the current technology proves technically non feasible, which has occurred in practice many times, selection of a substitute technology or approach is evaluated.

The installation has replaced several ineffective highly engineered remedial technologies with more passive less energy consumptive remediation solutions. Recently, an ineffective ‘Pump and Treat’ system was replaced by an in-situ bioremediation technology which augments the natural attenuation processes already lessening contaminants in place. Once the ineffective

technology has been replaced, the performance goals and expectations are revised so that the installation has the means to evaluate the new technology from a baseline perspective.

Program Accomplishments

Defense Supply Center Richmond has designed and implemented a performance-based remedy for OU-8 concerning the impacted ground water beneath, and downgrade of, the former acid neutralization pits (ANPs). These ANPs were concrete settling tanks in the northern part of the facility that received wastewater from metal-cleaning and -degreasing activity from 1958 to the early 1980's.

The performance-based remedy for ground water is unique because it is intended to be less rigid than conventional decision documents. It is part of Defense Supply Center Richmond's results-based cleanup strategy that uses improving knowledge to iteratively check and refine decisions about remediation. This ultimately expedites cleanup and protects human health and the environment. The



OU-8 remedy relies partially on Monitored Natural Attenuation (MNA) to achieve

restoration goals. This is the treatment approach of allowing natural processes to reduce contaminant concentrations to acceptable levels over time. Monitored natural attenuation involves physical, chemical, and biological processes that act to reduce the mass, toxicity, and mobility of subsurface contamination. This passive, less engineered remedy is unobtrusive and allows for maximum mission capability. The area is being currently used as both a critical mapping facility and, downgradient, as a recreational field.

The remedy, however, contains certain flexibilities which allow for contingency remediation technologies. The planning team studied the results of the first three years of remedial action operation and determined that current technology, natural attenuation, was not sufficient to meet restoration goals in a reasonable timeframe. In March of 2010 in-situ bioremediation was instituted to supplement the current remediation technology. Approximately 5,000 gallons of edible oil substrate was injected into the source zone of contamination through injection wells. The edible oil substrate provides fodder for microbes to biochemically reduce chlorinated volatile organic compounds concentrations in the area. The MNA approach, coupled with the bioremediation contingency process, will allow Defense Supply Center Richmond to find the smartest and fastest way to achieve cleanup goals.



The installation also installed a photovoltaic powered subsurface depressurization system at Operable Unit 5. The system was implemented to maintain worker safety and to satisfy vapor intrusion borne regulatory requirements. The performance of innovative, efficient, and sustainable barometrically-driven and solar-powered sub slab depressurization systems were directly compared to traditional electrically-driven systems to develop the most effective and cost-effective short-term and long-term management approach.



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A three year Treatability Study proved the efficacy of using in-situ bioremediation technology to remediate chlorinated solvents in the ground water. In-situ bioremediation uses native microorganisms to decompose contaminant chemicals into innocuous end products. DLA's restoration team has successfully pilot tested a remediation system which nourishes these native bugs so that they can knock down chemical concentrations by many orders of magnitude. The biowall treatability system, installed in 2007, has proven highly effective at reducing contaminant concentrations.

Other notable program accomplishments during the period included:

- Developed and refined a comprehensive conceptual site model of the environmental conditions at Defense Supply Center Richmond which recognizes the interdependence of soil and ground water impacts to the contaminated site cleanup strategy.
- Installed a green and sustainable subsurface depressurization system which, using solar power, mitigates vapor intrusion risks from an impacted ground water site which lies below a critical mapping facility.
- Worked with the Installation's Planning Department to integrate environmental Land Use Controls into the current edition of the installation's Master Plan. These controls help guide our installation's engineers as to the constraints of current and planned projects and subsequently prevent any unnecessary interface with contaminated lands.
- Developed and implemented cost effective, sustainable remedies for the ground water OUs that achieve the remedial objectives with minimal adverse impact to Defense Supply Center Richmond's mission and the environment.
- Improved communications with the community (RAB) to include providing training and improved communications with the technical sessions to help them better understand the restoration activities at Defense Supply Center Richmond.
- 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 Defense Supply Center Richmond 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 Defense Supply Center Richmond 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 Defense Supply Center Richmond be accountable to the surrounding communities for the past contamination and to prevent any future contamination. We hold Defense Supply Center Richmond to be good stewards of the land and water on and surrounding Defense Supply Center Richmond.”

Judging Criteria

Program Management. The Installation showed tremendous improvement by implementing low cost sustainable remedies at its high risk sites. These remedies replaced highly engineered ineffective campaigns which were providing ineffective risk reduction. By eliminating the systems, the Agency was able to save on O&M contracts totaling over \$700,000 per year. Restoration Program is an integral part of Defense Supply Center Richmond’s ISO 14001 externally registered Environmental Management System. This allows us to identify and effectively track program improvements and associated milestones. The Installation Restoration Program worked diligently with the base Community Planner to integrate protective Land Use Controls (LUCs) in the Master Plan in a transparent and easily recognizable manner. The Installations solar powered subsurface depressurization system was designed to work in concert with the utilities chief’s mandate to reduce the installation’s energy demand. 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, Defense Supply Center Richmond successfully implemented cost effective and innovative remediation techniques. The installation uses the TRIAD approach to characterization which allows for dynamic planning and field based decision making. The stakeholders are privy to nearly instantaneous vital field based test environmental sampling results which helps them make quick well informed decisions.

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. The effectiveness of the remedies being implemented has 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. In addition, the green and sustainable remedies, like Natural Attenuation and Bioremediation, are installed as low profile actions which promote military readiness and civil works mission. 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 regulators.

Transferability. A significant percentage of the remedies being pursued within Defense Supply Center Richmond’s installation restoration program, are natural and sustainable. They involve the relatively non-technical use of sustainable native vegetation plantings, low impact landscaping, and the injection of edible oil substrate. 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.

Defense Supply Center Richmond 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 Defense Supply Center Richmond'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. Defense Supply Center Richmond 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 Defense Supply Center Richmond, Air Force installations working with AFCEE's Remedial Process Optimization are implementing similar technologies based on the Defense Supply Center Richmond model.

Stakeholder Interaction. Defense Supply Center Richmond's Restoration Advisory Board has proven to be an effective means of involving our surrounding community, state and local organizations, and non-governmental organizations since 2002. Each quarterly informational meeting is opened to the public and is often attended by individuals and businesses. The Installation gives regular briefings detailing the ongoing projects at each of the relevant restoration sites. The installation has, throughout the past several years, achieved a friendly rapport with the local RAB members which allows for casual and transparent discussions regarding concerns and project status. We have borrowed many lessons learned from the experience of others. We also routinely publish stories highlighting the accomplishments of the environmental restoration projects in a "Community Newsletter" that is distributed to four thousand local residents. The newsletter and helps keep our neighbors and employees up date regarding the environmental challenges that we have faced, the progress being made, and anticipated future success.