Secretary of Defense Environmental Award Fiscal Year 2010
Joint Expeditionary Base Little Creek-Fort Story, Virginia Beach, Virginia
Environmental Restoration – Installation

INTRODUCTION

On October 1, 2009, Hampton Roads' first Joint Base, Joint Expeditionary Base Little Creek-Fort Story (JEBLCFS), was established. JEBLCFS comprises the former Naval Amphibious Base (NAVPHIBASE) Little Creek and former Army Garrison of Fort Story *(Figure 1)*. The Joint Expeditionary Base Little Creek-Fort Story (JEBLCFS) Family Team contributes to maximum military readiness by providing sustained superior service. NAVPHIBASE Little Creek, now known as JEB Little Creek (JEBLC), was commissioned in 1945 and the Army Garrison of Fort Story, now known as JEB Fort Story (JEBFS), was established in 1914. Together, the Joint Expeditionary Base is the major east coast operating base supporting Overseas Contingency Operations. Resident commands provide front line support personnel [Such as Sea, Air, Land (SEAL) Teams, Explosive Ordnance Disposal (EOD), and Riverine Squadrons], and the training venues that hone the skills of those front line operators. JEBLCFS provides support and services to 155 shore-based resident commands and 18 home ported ships. JEBLCFS consists of nearly 4,000 acres of land and more than seven-and-a-half miles of beachfront training area with 58 piers. It is the only bare-beach JLOTS (Joint Logistics Over-The-Shore) training site within the Department of Defense (DoD); is home to the only east coast Advanced EOD Training facility; and meets nearly all Navy Special Warfare training requirements.

JEBLCFS is located in Virginia Beach, Virginia and lies within the Chesapeake Bay watershed *(Figure 2)*. JEBLCFS and the surrounding area are used for industrial, recreational, commercial, and residential purposes. The terrain within and adjacent to the facility is low-lying and relatively flat and contains several freshwater lakes and saltwater bodies. JEBLCFS is adjacent to the Chesapeake Bay, a substantial source of recreational opportunities and commercial industry, which is also North America's largest and most biologically diverse estuary. Recreational and commercial fishing are vital activities within the bay.

BACKGROUND

The goal for the Navy Environmental Restoration Program (NERP) is to implement innovative, site-specific remedial actions (RAs) to protect human health and the environment. Comprehensive environmental restoration (ER) activities at JEBLC began in 1984 under the Navy Assessment and Control of Installation Pollutants (NACIP) and Installation Restoration (IR) programs, later termed NERP. The NACIP program was changed in 1986 to reflect the requirements of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act. On May 10, 1999, JEBLC was placed on the National Priorities List (NPL) with the U.S. Environmental Protection Agency (USEPA) as the lead regulatory agency and a Federal Facilities Agreement (FFA) was finalized in October 2003. JEBFS was not placed on the NPL; however, an IR program was developed in 1987 to address contamination from past waste management practices. Actions taken by the NERP at JEBFS are conducted under CERCLA with the Virginia Department of Environmental Quality (VDEQ) as the lead regulatory agency.

With the joining of the facilities in 2009, the Navy assumed responsibility for managing both properties. The primary challenge was how to administer the two separate ER Programs, given that JEBLC is listed on the NPL, and JEBFS is not listed. Naval Facilities Engineering Command (NAVFAC) team members met with supporting members to review implications of merging the two programs, and concluded the programs would be maintained separately, but community involvement activities regarding the ER programs would be

merged. With thorough planning and coordination, NAVFAC was able to facilitate seamless transfer of appropriate documents and actions to support joint community involvement efforts prior to the transition date, October 1, 2009.

Program management for the NERP at JEBLCFS is through the Hampton Roads Integrated Product Team within NAVFAC, Mid-Atlantic Division (NAVFAC MIDLANT). Mr. Bryan Peed, the Remedial Project Manager, is supported by technical, acquisition, and legal professionals across the NAVFAC MIDLANT organization, and Tier I partnering teams comprised of personnel from the Navy, USEPA, VDEQ, and environmental consulting firms *(Table 1)*. The Tier I partnering teams work under the guidance and tutelage of the Tier II partnering team, which consists of representatives of their respective agencies. The partnering teams' decision to concentrate on innovative remedial techniques and restoration has resulted in maximum protection of human and ecological resources while minimizing impacts to military readiness and civil works missions.

Community involvement and education in the decision making process regarding the Navy's restoration progress at JEBLCFS is supported by the Restoration Advisory Board (RAB). The Navy publishes notices for public and RAB meetings and document reviews in the local newspaper.

PROGRAM SUMMARY

The objectives of the JEBLCFS NERP are provided below and the successes in reaching these objectives are detailed in the following section.

- Prevent unacceptable risks to human health and the environment
- Meet Department of DoD, state, and other federal policy and guidance requirements
- Institute innovative technologies and management approaches for use across the facility and Navy
- Close sites and establish beneficial land use opportunities to support mission requirements
- Maintain community trust and confidence in support of the environmental efforts at JEB Little Creek-Fort Story
- Encourage small business involvement in the cleanup efforts at JEBLCFS

ACCOMPLISHMENTS

Accelerated Environmental Cleanup

Following placement on the NPL and finalization of the JEBLC FFA in October 2003, 10 sites were identified as requiring investigation and potential RA. As a result of the transfer of the former Army Garrison of Fort Story to the Navy, the NERP acquired 11 additional IR sites. Today, only 3 of the 10 sites listed in the JEBLC FFA remain under investigation. All IR sites at JEBFS have signed decision documents [9 with no further action and 2 with long-term monitoring (LTM) as the final remedy].

Separately, under the Military Munitions Response Program (MMRP) for JEBLC, five sites requiring further investigation were identified following completion of preliminary assessments. One MMRP site was identified at JEBFS. In Fiscal Year (FY) 2007 the five JEBLC MMRP sites were added to the facility Site Management Plan (SMP) to establish investigation schedules. Before moving forward with sampling and investigation, NAVFAC coordinated with facility personnel, the Coast Guard, the National Archives, and the Virginia Institute of Marine Science to acquire historic records to develop comprehensive conceptual site models (CSMs) *(Figure 3)*. Based on the extensive detail provided by the CSMs and subsequent discussions between the Navy, USEPA and VDEQ, the JEBLC Tier I partnering team (Team) agreed that four of the sites (comprising 1,800 acres of land/water) did not pose a threat, or potential threat to public health, welfare, or the environment and should be removed from further study. This decision saved more than 2 years of investigation and a minimum of $50,000 in sample analysis and reporting costs for

terrestrial sites and inestimable costs associated with underwater investigation. The development of the CSM for the fifth site, the Morale, Welfare, and Recreation (MWR) Skeet Range, facilitated the joint scoping of a significantly reduced sampling plan by the Team; thereby, saving the Navy approximately $30,000. A strong understanding of historical and current land uses along with sampling data resulted in Team agreement that the site does not pose a threat, or potential threat to public health, welfare, or the environment and should be removed from further study, marking the completion of the MMRP at JEBLC within 3 years of inclusion in the SMP and 1 year ahead of schedule. The MMRP site at JEBFS, a vast water range encompassing approximately 258,510 acres, remains under investigation.

As a whole, the NERP at JEBLCFS established no further action for 13 sites, remedy in place for 2 sites, an action decision document for 2 sites, and developed a Feasibility Study (FS) at one site between October 1, 2008 and September 30, 2010. During this timeframe approximately 1,864 acres have been made available for potential reuse.

Of the 1,864 acres, 25.75 acres have no land use restrictions and 38 acres have land use controls to restrict intrusive activities. The additional 1,800 acres are within the Chesapeake Bay and were verified to require no usage restrictions. The successes in achieving accelerated cleanup can be attributed to the cooperative involvement of the Team, other DoD entities, and the community, while taking mission requirements and cost into consideration.

Innovative Technology Demonstration/Validation and Implementation

Based on an evaluation of site characteristics of Site 11, the School of Music Plating Shop, and Site 13, the Former Public Works Pentachlorophenol (PCP) Dip Tank and Wash Rack, and the successful implementation of an RA in 2007 to treat volatile organic compounds (VOCs) in groundwater at Site 12, the Former Exchange/Laundry/Dry Cleaning Facility via enhanced reductive dechlorination (ERD), the Team selected ERD as the remedy for Sites 11 and 13. Reductive dechlorination is a naturally occurring, microbially mediated, anaerobic process which requires very specific site conditions to facilitate optimal degradation of the contaminants. To implement the RA at Sites 11 and 13, emulsified vegetable oil, sodium bicarbonate, and potable water were pumped into the aquifer *(Figure 4)* to enable the naturally occurring microbes to accelerate the degradation of contaminants within the groundwater.

Following the implementation of the RA at Site 12 in 2007, a second injection was completed in 2009 to optimize system performance. The RA for Site 11 was implemented in 2009 to treat VOCs in groundwater, and the RA for Site 13 was implemented in 2010 to treat VOCs and PCP in groundwater. The logistical considerations and lessons learned from each RA implementation were used to streamline and improve the process for subsequent injections. Similar to Site 12, permanent wells were installed at Sites 11 and 13 instead of temporary injection points as a long-term solution, enabling repeat injections with minimal disruption to the mission. The use of permanent wells resulted in a savings of approximately $140,000 per re-injection by eliminating the need for reconstruction of the injection system. Measures were taken at each site during remedy implementation to minimize impacts to the facility. At Site 12, re-injections were completed during overnight hours to minimize impact to the daytime commissary patrons. Site 11 encompasses the parking lot used by the School of Music, the Public Works Department (PWD), Base Environmental, and Facility Engineering Acquisition Division. To minimize impacts to the parking lot, well installation was strategically coordinated to maintain unobstructed ingress and egress to the parking lot and maximize available parking. Site 13 encompasses the PWD facility and parking area. To minimize impact to PWD personnel and the civil works mission, work at Site 13 was completed in the evening hours.

Following remedy installation at Sites 11 and 12, the data indicate that degradation of the contaminants of concern (COCs) is occurring. Although COC concentrations remain above the regulatory risk-based

screening values, the presence of breakdown products and innocuous end products, and supporting field and geochemical parameters, indicate that ERD is successfully treating site COCs in groundwater. Based on a comparison of groundwater data collected from the monitoring wells in the source zone before the remedy was implemented, the COC concentrations decreased by an average of 30% at Site 11 following 1 year of post-injection monitoring and the total COC concentrations decreased by approximately 70% at Site 12 following the second injection. The preliminary performance monitoring data from two rounds of post injection monitoring at Site 13 indicates the ERD system is also functioning as designed and is degrading site COCs.

LTM of COCs in groundwater is required as part of the remedy to ensure protection of human health and the environment until remediation goals are achieved. To develop the post-Record of Decision (ROD) LTM program, the Team collaborated to prepare a sampling and analysis plan (SAP) in a format that would apply to all ER sites at JEBLC for which ERD has been selected as the RA. The LTM SAP, initiated for LTM at Site 12, was developed with optimization components that apply to all sites using ERD as the selected remedy at JEBLC. The LTM SAP provides the criteria used to evaluate remedy performance, establish sampling location and frequency, decide when additional substrate application is warranted, and determine when to conclude the LTM program. The decision logic in the LTM SAP allows the number of samples and the sampling frequency to decrease over time; thereby, decreasing the overall sampling and analysis cost associated with the LTM program for each site as the footprint of impacted groundwater decreases while maintaining protection of human health and the environment. As a living document, Sites 11 and 13 LTM components, and potentially other sites, will be captured in the decision logic of the LTM SAP. The additional sites will be added following the rationale developed for Site 12, which provides the added benefit of not only one document for consistency and optimization in the ERD LTM program, but has the potential to recognize cost savings in the long-term for developing multiple sampling plans to meet a single objective over time.

Partnerships Addressing Environmental Restoration Issues Between DoD and Other Entities

NAVFAC, in partnership with USEPA and VDEQ, collaborates with PWD to ensure NERP is being successfully implemented at JEBLCFS while maintaining military readiness. JEBLC NERP weekly updates are provided to PWD and subsequently to the mission command to ensure open communication. The Commander, Deputy Commander, Executive Officer, and the Public Affairs Officer actively support the NERP, are briefed on a routine basis of ongoing restoration activities, and are active participants of the RAB.

In an effort to develop a site-specific LTM SAP for CERCLA landfill sites lacking COCs, the Team identified a much larger issue with developing optimization strategies for unpermitted, un-engineered landfills with respect to the Virginia Solid Waste Management Regulations for post-closure groundwater monitoring requirements at landfills. The Team elevated the issue to enable the Tier II partnering team to collaborate on the development of a uniform approach to establish groundwater LTM monitoring requirements, including frequency and cessation of sampling activities. The guidance developed by Tier II will be disseminated for use at DoD facilities in Virginia.

Land Use Controls (LUCs) are required at sites where contaminants remain in place. Inspections of the LUCs are routinely conducted to ensure that NERP sites are protective of human health and the environment. During inspection of Site 9, the Driving Range Landfill, and Site 10, the Sewage Treatment Plant Landfill, bare and low-lying areas were observed on the soil cover. Coordination with PWD and MWR golf course personnel resulted in joint implementation of an operations and maintenance (O&M) action which included installation of an irrigation system at Site 9 and placement of additional cover, followed by

re-vegetation at Sites 9 and 10. The repairs to the driving range promoted continued growth of newly planted grasses, providing a protective cover over waste to meet NERP objectives, while enhancing approximately 6 acres for recreational opportunities and an increased quality of life for JEBLC sailors and military retirees.

Communication with military construction, dry dock, harbor, and MWR personnel has been ongoing during the development of remedial alternatives for Solid Waste Management Unit 3, the Pier 10 Sandblast Yard *(Figure 5)*. This continued collaboration ensures that the alternatives evaluated will reduce risks to the environment to the greatest extent practicable, are cost-effective, and will cause minimal to no impact to military readiness. Through this open communication, the Team has been made aware of scheduled facility activities, including maintenance dredging in FY 2010 and dry dock rehabilitation in FY 2012 that have direct impacts on site progress and alternative evaluation. Within a year of learning of the scheduled maintenance dredging, the Team worked aggressively to develop a SAP for the collection of benthic invertebrate samples vital to measuring the achievement of RA objectives for the site. The Team also recognized that completing RA activities during the upcoming dry dock rehabilitation will result in a cost savings of approximately $1.5 million, eliminate the need for NERP coordination with the Federal Aviation Administration for temporary closure of the Norfolk Airport during movement of the dry dock, and eliminate the potential for a CERCLA action to cease dry dock operations; thus, alleviating a temporary decline in military readiness. As a result, the site schedule was revised to include the completion of a non-time-critical removal action before development of an FS, Proposed Plan, and ROD.

The Team actively collaborates with other Navy departments and at times other ER teams to develop the appropriate approach to unique circumstances and relatively new technologies being implemented. The JEBLCFS Team collaborated with another partnering team to effectively establish an approach for evaluating vapor intrusion in the tidewater area. The teams, including core team members and technical representatives from the Navy, USEPA, and VDEQ, jointly scoped an SAP to maintain consistency between the facilities and ensure environmental data collected are scientifically sound, of known and documented quality, and suitable for intended uses. Because the investigation impacted base housing residents and scheduled housing rehabilitation, the Team coordinated with the housing management office to communicate the investigation activities to the residents and expedite sampling efforts *(Figure 6)*. The expedited sampling efforts also ensured indoor air data were not indirectly affected by vapors resulting from new construction materials.

RABs

The JEBLC RAB was formed in 1994. The Navy's forthright conveyance of site status information through annual RAB meetings has fostered a positive relationship with the community. As the RAB has evolved, acquiring new membership in 2008, the commitment of the community to environmental stewardship has remained constant, with two of the original RAB members still serving as active participants over the last sixteen years.

Open communication with the RAB is particularly important to the Team. JEBLC served as a pilot for development of the new NAVFAC public website. This new and innovative form of communication was presented to the RAB during the FY 2009 meeting. The Navy led a virtual tour of the website and provided a community link for RAB members to view public meeting and document review announcements. The RAB members embraced the new website and provided positive feedback that was incorporated into the template. During the FY 2010 meeting, the Team held an open discussion with the RAB to solicit feedback and to ensure that meeting schedules provide ample opportunity for community participation.

In alignment with joint basing, the Navy initiated shared JEBLC and JEBFS RAB meetings in FY 2010. The RAB members were informed of the history of the separate restoration programs, current site status, and planned activities for the upcoming fiscal year.

The relationship between the public members and government members of the RAB is exceptional. Public RAB members vocalize their support and have provided positive feedback on the Navy's initiative to implement RAs in protection of human health and the environment, use innovative management approaches, and institute better business management processes. The Navy is grateful for the continued support of the RAB members. During the FY 2010 RAB meeting, the RAB members were presented with a letter of appreciation from the Commander thanking them for their continued support and involvement in facilitating the continued progress of the NERP at JEBLC.

NERP Opportunities for Small and Small Disadvantaged Businesses

Small businesses work with the JEBLCFS NERP through both prime contractor and subcontractor opportunities. The Navy compensated more than $700,000 in FY 2009 and FY 2010 for RA construction and O&M activities to the small disadvantaged Alaskan Native Corporation (AGVIQ), an environmental contractor for the Navy working in a mentor-protégé relationship with a large business *(Figure 7)*. In addition to prime contract opportunities, the Navy's large business contractor, CH2M HILL, awarded subcontracts for JEBLC of more than $350,000 to small businesses during FY 2009 and FY 2010 in support of the Navy meeting its small business goals.

Reducing Risk to Human Health and the Environment

Protecting human health and the environment is at the forefront of all decision making when remediating sites at JEBLCFS. When selecting site remedies, the Navy collaborates with the Team to evaluate the needs of the community, the NERP, and the mission to apply the most economical, environmentally sound, and sustainable methodologies to the issues under examination.

The assessment of vapor intrusion at Site 11a demonstrates the Navy's commitment to assuring barracks residents are not exposed to potentially harmful contaminants associated with the underlying VOC groundwater plume. In partnership with VDEQ and USEPA, the Navy reviewed Site 11a PCP data, including completing an additional round of sampling at all site monitoring wells to assess the extent to which PCP was present at the site and associated potential unacceptable risk. PCP was not detected in site samples, demonstrating that CERCLA-related activities did not result in a PCP plume at the site. This decision resulted in an overall decrease in the footprint of the area requiring RA.

The O&M action to address the bare and low-lying areas in the soil cover at Sites 9 and 10 is an additional example of the Navy's dedication to selecting innovative sustainable solutions that both meet the Team goals and provide benefit to JEBLC. To ensure the sites remained protective and in compliance with the ROD and LUC Remedial Design, NAVFAC collaborated with PWD and MWR golf course personnel to select a sustainable solution for the continued protection of human health and the environment.

Implementation of the remedial actions at Sites 11 and 13, and the continued maintenance of the ERD treatment system at Site 12, demonstrate the Navy's willingness to work with the Team to identify the most appropriate action for each site, to implement the action in a timely manner, and to continue the maintenance of the action to ensure the continued success of the remedy.

The commitment to protect HH&E extends beyond the selection of a remedy. At a minimum, the Navy conducts quarterly site inspections at all active ER sites to ensure that potential risks to human health and the environment are properly managed.

Green Remediation

The JEBLCFS NERP has sought to implement sustainable remedial solutions by using green remedial technologies and available resources. The ERD RAs at Sites 11, 12, and 13 utilize a vegetable oil substrate to enhance the natural microbial populations in groundwater, resulting in the enhanced degradation of COCs. The system treats the contaminants in situ and, with the exception of the material for injection system construction and the injections themselves, the system does not require additional energy consumption to further degrade contaminants.

During RA implementation at Site 13, the Team collaborated to identify a sustainable solution for the reuse of development water generated remedy construction. Instead of offsite transport and disposal, development water was re-injected as a part of the substrate mixture delivered to the groundwater. The reuse of the development water eliminated the need to consume 4,000 gallons of available potable water.

A sustainable solution, including the reuse of available resources, was also recognized during O&M activities to repair the bare and low-lying areas observed in the Sites 9 and 10 soil covers *(Figure 8)*. The installation of the irrigation system at Site 9 supplies the necessary water to maintain vegetation on the soil cover; reducing soil erosion and eliminating the need for continued maintenance of the cover. This provides a long-term sustainable solution for the continued protection of human health and the environment. The Team collaborated with PWD and MWR golf course personnel to use existing excess soil from a nearby base construction project for additional cover. Reuse of the approximately 8,200 cubic yards of material eliminated the facility's need to dispose of the material and NERP's need to import soil from outside the facility, reducing the overall carbon footprint and saving the Navy more than $1,000,000.

The NERP at JEBLCFS illustrates what can be achieved when the various divisions of the military work together, as well as with the regulators and the public, to support military readiness and civil missions while also protecting human health and the environment.