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Explanation of Significant Difference

Record of Decision—Site 12
Former Exchange Laundry/Dry Cleaning Facility

Naval Amphibious Base Little Creek
Virginia Beach, Virginia

August 2006

1 Introduction and Statement of Purpose

Site 12 Former Exchange Laundry/Dry Cleaning Facility
Naval Amphibious Base (NAB) Little Creek
Virginia Beach, Virginia

EPA ID# VA5170022482

This Explanation of Significant Difference (ESD) presents the rationale and description of changes to the Selected Remedy described in the Record of Decision (ROD) for Site 12, the former Exchange Laundry/Dry Cleaning Facility, at Naval Amphibious Base (NAB) Little Creek, Virginia Beach, Virginia. This ESD is issued jointly by the United States Navy (Navy), the lead agency for site activities, and the United States Environmental Protection Agency (EPA) Region III in consultation with the Virginia Department of Environmental Quality (VDEQ), the support agency. The Navy is issuing this ESD to fulfill public participation responsibilities as required under Section 117(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and Section §300.435(c)(2)(I) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). NAB Little Creek was placed on EPA's National Priorities List (NPL) in May 1999. Site 12 is one of eight Installation Restoration Program (IRP) sites being addressed under CERCLA at NAB Little Creek and the selected remedy, or this ESD for Site 12, does not include or affect any other sites at the facility.

The ROD, signed September 30, 2005, presents alternatives for remediating ground water contamination at Site 12. The Remedy selected for ground water treatment is in-situ chemical/bio-stimulation [enhanced reductive dechlorination (ERD)] and post-injection monitoring of the natural degradation of chlorinated volatile organic compounds (VOCs). Land use controls (LUCs) have been imposed on Site 12 to prevent exposure to VOCs in groundwater.

The Navy and EPA in consult with VDEQ are eliminating one component of the remedy, in-situ chemical oxidation, as well as groundwater monitoring of metals associated with in-situ chemical oxidation. The in-situ chemical component of the selected remedy involved the injection of a chemical oxidizing agent (sodium permanganate) within the area of highest VOC concentrations at Site 12. The elimination of this in-situ chemical oxidation component and select metals monitoring associated with in-situ chemical oxidation (ISCO) is based on the following considerations:

- Recent studies of Site 12 groundwater indicate that in-situ chemical oxidation would require 11 times more oxidizing agent than originally estimated in the ROD (80,500 pounds as opposed to 7,300 pounds);
- Injection of additional oxidizing agent may cause metals concentrations in groundwater to increase, due to impurities inherent to the oxidizing agent, and due to dissolution of metals naturally present in the aquifer soils; and
- The groundwater monitoring program will need only to address metals released into groundwater by the ERD component of the selected remedy.

Based on the above considerations, the Navy prepared this ESD to provide information to the public regarding the change to the selected remedy for Site 12 cleanup actions at NAB Little Creek. This ESD will become part of the Administrative Record file for the site in accordance with NCP Section 300.825(a)(2). The Navy continues to inform and involve the public through the community relations

Location of Information Repository

Virginia Beach Central Library
4100 Virginia Beach Boulevard
Virginia Beach, VA, 23452
Phone: 757.431.3001

Naval Facilities Engineering Command Atlantic
6506 Hampton Blvd
Norfolk, Virginia 23508-1278
Phone: (757) 322 8005
Public Affairs Officer: NFECL_PMO@navy.mil
Hours of availability: Workday's between 9:00 A.M. and 4:00 P.M

program, including a Restoration Advisory Board (RAB) formed in 1994, public meetings, the Administrative Record file for the site, the information repository, and announcements published in the local newspapers. This ESD and previous investigation reports for Site 12 are available to the public in the information repository for the Administrative Record maintained at:

Naval Facilities Engineering Command
6506 Hampton Boulevard
Norfolk, Virginia 23508-1278
Phone: (757) 322 8005
Public Affairs Officer: NFECL_PMO@navy.mil
Hours of availability: Workdays between 9:00 A.M. and 4:00 P.M.

2 Site History, Contamination, and Selected Remedy

NAB Little Creek is located in the northwest corner of Virginia Beach, Virginia, along the Chesapeake Bay's southern shore. The western boundary of the Base borders the City of Norfolk, Virginia (Figure 1). Site 12, the Exchange Laundry/ Dry Cleaning Facility, was located in former Building 3323 on Third Street, in the eastern portion of NAB Little Creek (Figure 2). The Exchange Laundry / Dry Cleaning Facility operated from 1973 until it was demolished in 1987 for the construction of the existing commissary (Building 3445). An estimate of 1,320 gallons of waste, including tetrachloroethene (PCE), a chlorinated VOC, soap, sizing, and dyes from Site 12 was reportedly dumped into a storm sewer. Of this total, approximately 200 gallons were estimated to be PCE sludge. When the new commissary was constructed, a passive subsurface venting system was installed under the commissary floor to prevent the possibility of VOC vapors in shallow groundwater from entering into the new building. Site 12 is currently covered by buildings, a self-serve car wash, and asphalt or concrete (Figure 2).

Site-related contamination is limited to VOCs in shallow groundwater (Columbia Aquifer), principally PCE and its breakdown products (Table 1). The VOC shallow groundwater plume is confined to the area of the parking lot for the commissary and the self-serve car wash. While the plume extends as far west as the car wash, it does not extend to the canal drainage west of the car wash. Shallow groundwater ranges seasonally between 6 and 8 feet below ground surface and flows toward the west. A clay layer (Yorktown Confining Unit) separates the underlying Yorktown Aquifer from the Columbia Aquifer. VOCs are not present in the Yorktown Aquifer. Groundwater flow in the Yorktown Aquifer is north, toward the Chesapeake Bay.

Selected Remedy in the ROD

The Remedy employs sequential chemical treatment, injecting oxidizing reagents into the source zone, followed by bio-stimulation (ERD), injecting a product, e.g., emulsified vegetable oil, and lactate to promote biological

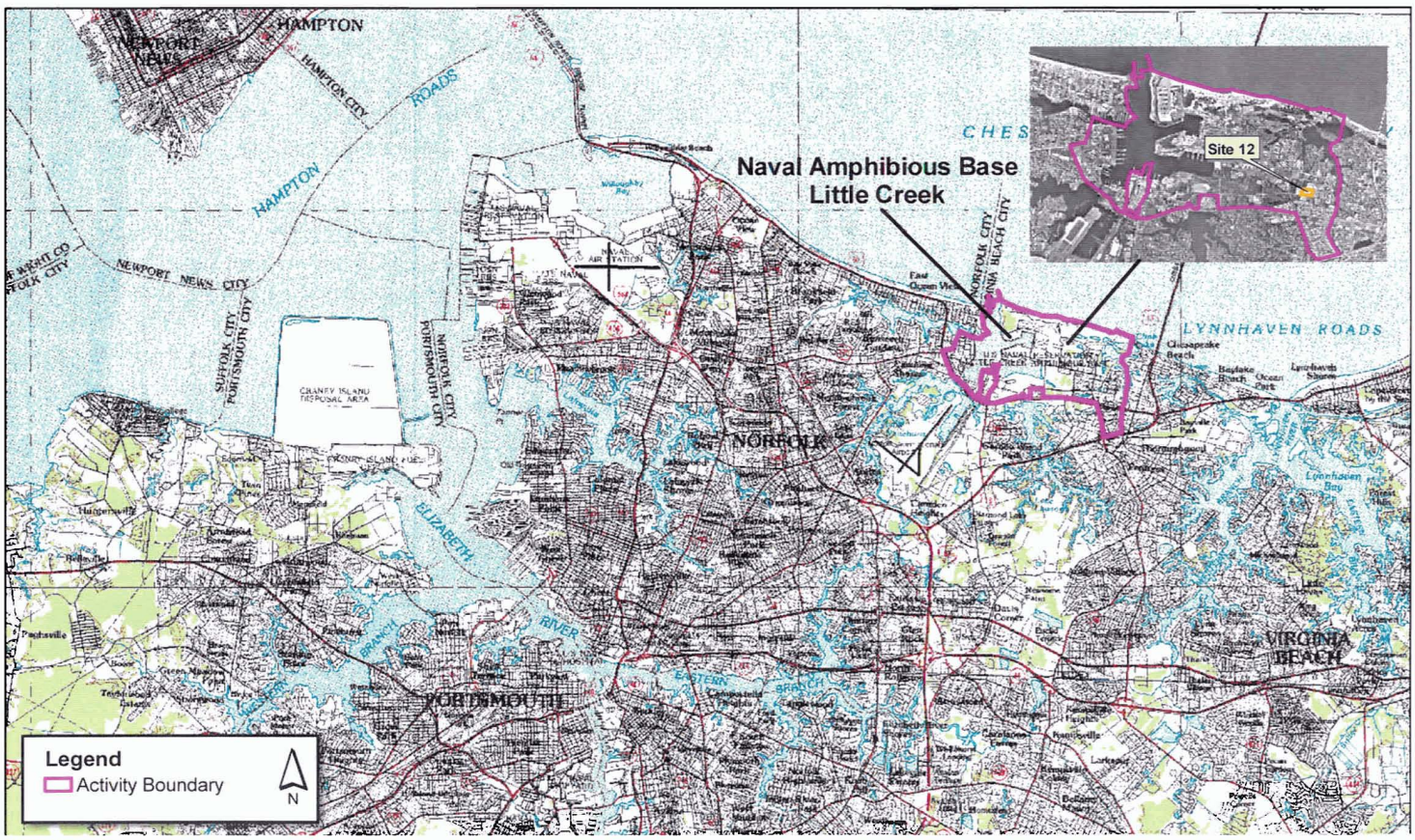

Figure 1 - NAB Little Creek Location

Figure 2 -Site 12 Location

degradation throughout the plume. LUCs prevent unacceptable risks to humans from exposure to ground water contaminants during the remediation process. Ground water monitoring assesses the Remedy's effectiveness.

Injection of the oxidizing agent sodium permanganate into temporary wells was the Remedy's chemical treatment technology for the source zone. The oxidizing agent would be injected into ground water using potable water to distribute the chemicals. ERD also was, and remains, the treatment technology for the entire VOC plume. This process also requires potable water to disperse the ERD product within the aquifer under low pressure.

Ground water monitoring for VOCs and total and dissolved metals (including Chromium VI) would be conducted at periodic intervals, and would continue following completion of in-situ treatment. The duration of monitoring will be assessed during prescribed 5-year reviews.

LUC objectives for Site 12 are:

- Prohibit the withdrawal of groundwater except for environmental monitoring and testing
- Prohibit the use of the site for residential, child care, elementary or secondary school, or playground facilities
- Maintain the integrity of any current or future remedial or monitoring system

Detailed implementation actions for the LUCs will be documented in a LUC Remedial Design (RD). The LUC RD provides implementation actions, including periodic inspections and reporting. The Navy will implement, maintain, monitor, report on and enforce the LUCs according to the RD.

Chemical	Maximum Concentration (µg/L)
Tetrachloroethene (PCE)	23,000
Trichloroethene (TCE)	4,286
1,1-Dicholoethene	2.2
Cis-1,2-Dichloroethene	4,900
Trans-1,2-Dichloroethene	0.47
Vinyl Chloride	460

Table 1 - Maximum Concentration of VOCs in Groundwater

3 Basis for the Document

Additional data collected during the remedial design included natural oxidant demand (NOD), and saturated soil VOC data (Table 2) to verify permanganate loading requirements. It was determined that 80,500 lbs of 40% sodium permanganate would be required to overcome the NOD of the aquifer and effectively treat VOCs whereas only 7,300 lbs of sodium permanganate were estimated in the ROD.

This significant permanganate loading requirement would increase the oxidation reduction potential and decrease pH of the aquifer, resulting in the mobilization of naturally occurring metals sorbed to the saturated soil. Additionally, metals impurities naturally occurring in sodium permanganate would further increase the potential for elevated metals in groundwater. To assess the potential impacts from increased metals concentrations in groundwater associated with the loading requirement, two vendor samples of 40% sodium permanganate were analyzed for metals content and a metals concentration in groundwater was estimated (Table 3).

Although naturally occurring metals are expected to return to original dissolved concentrations as the aquifer re-equilibrates, metals introduced to the aquifer as impurities associated with the sodium permanganate may result in metals concentrations in groundwater that exceed the Safe Drinking Water Act maximum contaminant levels (MCLs). Therefore, the Navy in partnership with the EPA and VDEQ determined that the accelerated mass reduction in the source zone associated with implementing the chemical oxidation component and metals monitoring of the selected remedy does not outweigh the risk of increased metals concentrations in groundwater exceeding MCLs, and that use of the ERD alone would achieve the Remedial Action Objective (RAO) described in the ROD for Site 12. Monitoring of metals will be modified to address select metals potentially mobilized under reduced environments associated with ERD.

Location	Sample Depth (ft bgs)		NOD (g/kg)	Total VOCs (µg/kg)
LS12-GP01	Upper Columbia	6-8	1.1	327
	Lower Columbia	20-22	4.5	3501
	Yorktown Clay	24-26	1.6	4061
LS12-GP02	Upper Columbia	13-15	1.2	ND
	Lower Columbia	21-23	4.6	24
	Yorktown Clay	25-27	1	ND
LS12-GP03	Upper Columbia	6-8	NS	ND
	Lower Columbia	22-24	NS	122
	Yorktown Clay	24-26	NS	ND
LS12-GP24	Upper Columbia	6-8	NS	ND
	Lower Columbia	22-24	NS	ND
	Yorktown Clay	26-28	NS	ND
LS12-GP25	Upper Columbia	11-13	NS	ND
	Lower Columbia	21-23	NS	ND
	Yorktown Clay	25.9-27.9	NS	ND
LS12-GP27	Upper Columbia	6.5-8.5	NS	ND
	Lower Columbia	22.5-24.5	NS	ND
	Yorktown Clay	24.5-26.5	NS	ND

Notes: ND - Not Detected, NS - Not Sampled, NOD - Natural Oxidant Demand, VOC - Volatile Organic Compound

Table 2 - Remedial Design Natural Oxidant Demand and VOC Concentration

4 Description of Significant Differences or New Alternatives

The significant difference between the Remedy and the changes described above is twofold: one, elimination of the in-situ chemical oxidation component; and two, corresponding modification of the ground water monitoring component. In lieu of chemical oxidation in the source zone, ERD alone will be used in the source area and throughout the plume. With the exception of using ERD

Metal	MCL (mg/L)	Vendor 1		Vendor 2	
		40% NaMnO4 Maximum Detected Concentration (mg/kg)	Estimated Groundwater Concentration (µg/L)	40% NaMnO4 Maximum Detected Concentration (mg/kg)	Estimated Groundwater Concentration (µg/L)
Arsenic	10	0.41	15	0.77	29
Chromium	100	4.20	156	1.51	56
Lead	15	0. 45	17	ND	ND

Notes: MCL – Maximum Contaminant Level

Table 3 - Summary of Sodium Permanganate Metals Content Project Groundwater Concentration

in the source zone, the scope of the Remedy is unchanged. Implementation of ERD will involve the injection of an emulsified vegetable oil product into the aquifer under low pressure as originally described in the ROD. The performance of the Remedy, as modified by this ESD, is not anticipated to change, because chemical oxidation to accelerate mass reduction in the source zone does not alter use of ERD throughout the plume. Eliminating chemical oxidation in the source zone does not change the overall cost of, remedial timeframe for (30 years), or expected outcome of the Remedy.

5 Support Agency Comments

The Navy, EPA, and VDEQ agree to the proposed change to the remedy selected in the ROD as described in this ESD.

6 Statutory Determinations

The selected remedy as modified in this ESD is protective of human health and the environment, complies with State and Federal environmental requirements that are legally applicable or relevant and appropriate to this remedial action, and utilizes permanent solutions or alternative treatment technologies to the maximum extent practicable.

7 Public Participation Compliance

A copy of the Final ROD and this ESD is available at the following location:

Virginia Beach Central Library
4100 Virginia Beach Blvd
Virginia Beach, Virginia 23452
(757) 431-3001

And

Public Affairs Officer, NAB Little Creek
2600 Tarawa Court
Norfolk, Virginia 23521
757-462-8425
scott.mohr@navy.mil
Hours of availability: Workday's between 9:00 A.M. and 4:00 P.M

In accordance with the NCP [300.435 (C)(2)(ii)], a notice of availability to review this ESD was published in the Virginian Pilot on October 30, 2006. Comments or questions regarding this ESD should be directed to the NAB Little Creek Public Affairs Office at (757) 462-8425, NAVFAC Project Manager Scott Park at (757) 444-4154, or EPA Region III Project Manager Jeffrey Boylan at (215) 814-2094.

8 Authorizing Signatures

G.E. Cooper — 11 Oct 06

Cooper, CAPT, CEC, USN — Date
By direction of the Commander
Navy Region Mid-Atlantic

James Burke — 25 Oct 06

James Burke, Director — Date
Hazardous Site Cleanup Division
EPA (Region III)