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**ACTION MEMORANDUM
OPERABLE UNIT 1
SITE 16 - LANDFILL AT SANDY BRANCH
FOR
MARINE CORPS AIR STATION
CHERRY POINT, NORTH CAROLINA**

**COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT**

**Submitted to:
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Environmental Restoration Branch, Code 1823
Naval Facilities Engineering Command
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CONTRACT TASK ORDER 0265**

APRIL 1997

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1.0 PURPOSE

The purpose of this Action Memorandum is to document the removal action described herein for the Site 16, Landfill at Sandy Branch, within Operable Unit (OU) 1, located at Marine Corps Air Station (MCAS) Cherry Point, North Carolina.

The proposed removal action will consist of construction of an Air Sparging/Vapor Extraction (AS/VE) system at Site 16. A Focused Remedial Investigation (RI)/Feasibility Study (FS) was prepared for Site 16 in February, 1996. This Action Memorandum provides a summary of the results from the RI as well as the process for selection of the proposed removal alternative as described in the FS. The Focused RI/FS will serve as the Engineering Evaluation/Cost Analysis (EE/CA) for this action.

This Action Memorandum follows the suggested format and guidance contained in the U.S. Environmental Protection Agency (USEPA) Action Memorandum Guidance Document (EPA/540/P-90/004).

2.0 SITE CONDITIONS AND BACKGROUND

Based on the investigation conducted for the Focused RI/FS, groundwater contamination was identified at Site 16. The AS/VE alternative was selected to remediate groundwater contamination. Prior to implementation of the AS/VE technology at Site 16, the Focused RI/FS recommended that predesign activities be performed to determine the necessary system design parameters.

Predesign activities included the performance of a treatability study at Site 16 to evaluate and determine design requirements for a full scale system. During the treatability study, it was determined that the proposed action for Site 16 would be conducted as an interim action to eliminate offsite discharges of contaminated groundwater. Final action at the site would be addressed in an upcoming comprehensive OU1 Remedial Investigation/Feasibility Study (RI/FS). The interim action will be performed as a non-time critical removal action. The USEPA Action Memorandum Guidance recommends that an Engineering Evaluation/Cost Analysis (EE/CA) be prepared as part of the non-time critical removal action. A written comparison of the Focused FS, for Site 16, to the requirements of an EE/CA has been prepared. Based on that comparison, the Focused FS for Site 16 essentially complied with the requirements of, and will therefore, serve as the EE/CA for the site. In addition, a Fact Sheet describing the proposed action and a Public Notice were prepared. The Public Notice requested public review and comment on the proposed interim removal action by March 21, 1997. Copies of the Focused RI/FS, Focused FS vs EE/CA evaluation, and the Fact Sheet for Site 16 are located in the information repository.

2.1 Site Description

MCAS Cherry Point is a military installation located north of the town of Havelock in southeastern Craven County, North Carolina (see Figure 2-1). The air station covers approximately 11,485 acres. Its boundaries are the Neuse River to the north, Hancock Creek to the east, North Carolina Highway 101 to the south, and a boundary approximately 1 mile west of Slocum Creek.

2.1.1 RI/FS Activities

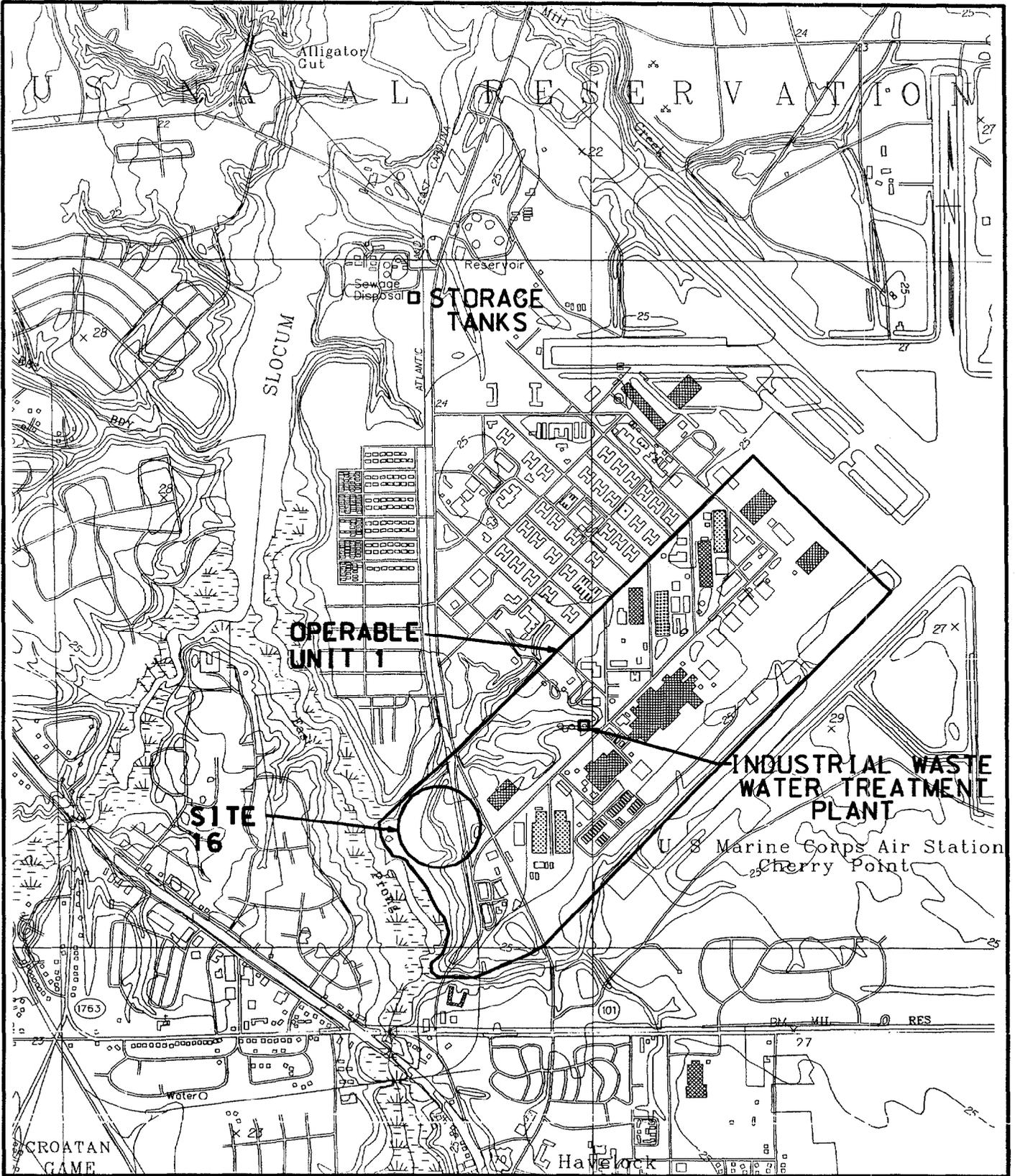
In February of 1996, B&R Environmental submitted a Focused RI/FS Report for the OU1 groundwater at MCAS Cherry Point. This document included the results of the RI performed at four groundwater "hot spot" areas within OU1. One of the groundwater "hot spots" addressed was at Site 16.

The RI Report presented the analytical results for groundwater samples collected from the shallow/surficial aquifer at Site 16. These samples indicated the presence of elevated concentrations of chlorinated volatile organic compounds (VOCs) including vinyl chloride (maximum 140 µg/L), 1,2 dichloroethene (1,2-DCE, maximum 4800 µg/L) and trichloroethene (TCE, maximum 5000 µg/L). Minimal concentrations of the chlorinated VOCs (1,2-DCE at 8 µg/L, TCE at 16 µg/L) have been detected in groundwater samples collected from the underlying Yorktown aquifer. The source of these groundwater contaminants in the Site 16 aquifers has not yet been identified but is suspected to be associated with the upgradient OU1 areas.

Based on the results of the RI, a FS was prepared to identify remedial alternatives for the groundwater at each of the four "hot spots". The FS identified AS/VE as the preferred alternative for Site 16. B&R Environmental is currently performing a treatability study to evaluate the efficiency of an AS/VE System on the site contaminants.

2.1.2 Physical Location and Characteristics

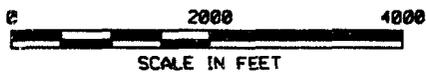
Operable Unit 1 (OU1), which includes the Sandy Branch Landfill (Site 16), is located in the southwestern portion of the Air Station (Figure 2-1). OU1 is comprised of the industrial portions of the air station. The western and northern edges of the Sandy Branch Landfill are bounded by the East Prong of Slocum Creek and Sandy Branch, respectively. Between 1946 and 1948, the landfill was used as a disposal site for miscellaneous wastes generated at the Air Station including asbestos, steel storage tanks, and drums containing petroleum products. Historical information from Site 16 does not indicate that the landfill or its contents are a source of contamination to the groundwater.



OU1 LOCATION MAP

**SANDY BRANCH LANDFILL - SITE 16
MCAS, CHERRY POINT, NORTH CAROLINA**

FIGURE 2-1



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Site 16 was previously used as a landfill for miscellaneous wastes. Currently, Site 16 is used for storage of construction materials and also contains a recycling center. Off base residential areas are located approximately 1 mile west of Site 16 across Slocum Creek. The immediate areas surrounding Site 16 are the property of the Federal government and are currently occupied by the air station.

Slocum Creek is a major tributary of the Neuse River and is used by military personnel and local residents for boating and other recreational purposes. The North Carolina Department of Environment Health, and Natural Resources (NCDEHNR) has classified Slocum Creek as an estuarine water body suitable for fish and wildlife propagation, secondary recreation (i.e., recreational activities not involving whole-body contact), and other uses applicable for waters of lower quality (except for shellfishing for market purposes).

Sandy Branch is an intermittent stream and a tributary of Slocum Creek. Sandy Branch flows along the northern edge of the landfill before meeting Slocum Creek at the northwestern edge of the landfill. The NCDEHNR has classified Sandy Branch to be a fresh water body suitable for fish and wildlife propagation, agriculture, secondary recreation (i.e., recreational activities not involving whole-body contact), and other uses except primary recreation or as a source of water supply for drinking, culinary, or food processing purposes.

Groundwater and the chlorinated VOCs in the surficial aquifer generally flow to the west toward the East Prong Slocum Creek. However, groundwater to the northwest of the Site 16 Landfill flows locally northwest toward the Sandy Branch.

The forested wetlands that are present in the Site 16 Landfill area have been delineated as part of a previous investigation conducted at the site.

2.1.3 Release or Threatened Release into the Environment of a Hazardous Substance, or Pollutant or Contaminant

The Focused RI/FS presented a description and an evaluation of site contaminants. The contamination identified in the Focused RI/FS is migrating from upgradient sources through Site 16 and is potentially being discharged to either the East Prong of Slocum Creek or Sandy Branch.

2.1.4 National Priorities List Status

In 1989, the Navy entered into a RCRA Administrative Order of Consent with the USEPA. MCAS Cherry Point was also scored and ranked by the USEPA to be included on the National Priorities List (NPL) as a CERCLA Superfund site. MCAS Cherry Point scored sufficiently and was formally included as a Superfund site on December 16, 1994. As such the ongoing Installation Restoration(IR) investigations at MCAS Cherry Point are being conducted to meet the requirements of both RCRA and CERCLA. A Federal Facilities Agreement (FFA) between the USEPA and the Navy is pending. The proposed action consists of an AS/VE system installed along the downgradient perimeter of the site to clean up the groundwater as it passes through the system.

2.2 Other Actions To Date

2.2.1 Previous Actions

No remediation activities have previously been undertaken to address groundwater contamination at Site 16. However, a debris pile containing asbestos, steel storage tanks, and soil contaminated with petroleum products was removed in the spring of 1996. As stated above, a Focused RI/FS was performed to address groundwater at Site 16 by B&R Environmental in February 1996.

2.2.2 Current Actions

Prior to design of a full scale system, a treatability study was required to determine final design parameters. The treatability study system was installed in November of 1996 and was intended to operate for a minimum of 3 months. Design of the full scale system was initiated in February of 1997 and is currently underway. The full scale system is scheduled for installation in the fall of 1997.

2.3 State And Local Authorities' Roles

Site 16 is located on property owned and operated by the Federal government. Since MCAS Cherry Point is listed on the NPL, all work is being conducted to meet the requirements of RCRA and CERCLA where the USEPA and NCDEHNR are vital participants in the process. As such a Focused RI/FS was performed for Site 16 which selected AS/VE as the preferred remedial alternative for groundwater contamination. It is anticipated that the USEPA and the NCDEHNR will remain actively involved in the process.

3.0 THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

The chlorinated VOCs currently contained within the shallow aquifer underlying Site 16 could potentially infiltrate into the East Branch of Slocum Creek and the Sandy Branch. Both streams are used by the local population for recreational purposes. Therefore, it is possible that the public could be exposed to contaminants from Site 16. However, due to the relatively low concentrations and the dilution which would occur when the contaminants mix with the water in the streams, it is likely that the risks associated with the surface water would be minor. The groundwater has been impacted at levels exceeding the drinking water standards. Therefore, if the groundwater is consumed, it poses a potential threat to the public.

Slocum Creek and Sandy Branch also support ecological receptors. Therefore, due to the migration of chlorinated VOCs to the surface water bodies, the potential exists for ecological receptors to be exposed to the contaminants from Site 16. However, due to the relatively low concentrations and the dilution which would occur when the contaminants mix with the water in the streams, it is likely that the risks associated with the surface water would be minor.

4.0 ENDANGERMENT DETERMINATION

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this Action Memorandum, may present an imminent endangerment to public health, welfare, or the environment. However, as proposed in the Focused RI/FS, the AS/VE system will effectively remove contamination from the groundwater.

5.0 PROPOSED ACTIONS AND ESTIMATED COSTS

The Focused RI/FS presented information on the groundwater contamination at Site 16. Based on that information, the report also performed an evaluation of potential remedial action alternatives for groundwater remediation. The evaluation selected AS/VE as the preferred method for groundwater cleanup at Site 16. The proposed action is discussed further in the following sections.

5.1 Proposed Action

5.1.1 Proposed Action Description

The proposed AS/VE system combines two treatment technologies, (1) air sparging and (2) vapor extraction. The system would include air sparging and vapor extraction wells placed in the path of the volatile organic plume migrating towards Sandy Branch to remove the volatile organics of concern before

the groundwater reaches Sandy Branch or the east prong of Slocum Creek. The preliminary conceptual design of the AS/VE system would consist of two rows of air injection wells and vapor extraction wells placed at 40 to 70 foot intervals, with off-gas treatment as necessary. Figure 5-1 shows the conceptual location of the AS/VE system.

Air injected into each injection well would be dispersed into the aquifer through the screen, as bubbles, that would volatilize the chlorinated VOCs in the water. The chlorinated-VOC-laden vapors would enter the vadose zone to be captured by the vapor extraction wells. The vapor extraction flow rate would be higher than the air injection rate so that effective capture of the vapor-phase VOCs may be achieved. If necessary, off-gas treatment would be performed using a vapor-phase granular activated carbon (GAC) adsorption system to remove high concentrations of chlorinated VOCs. The GAC system will be used as necessary to reduce VOCs in the offgas to acceptable levels based on OSHA Standards. Alternatively, the GAC system may be replaced by a 20-foot stack to disperse the VOCs away from the breathing zone as an added measure of safety, although none of the chlorinated VOCs, including 1,2-DCE, TCE, PCE, or vinyl chloride, are expected to be emitted at concentrations exceeding their respective TWA-TLV limits.

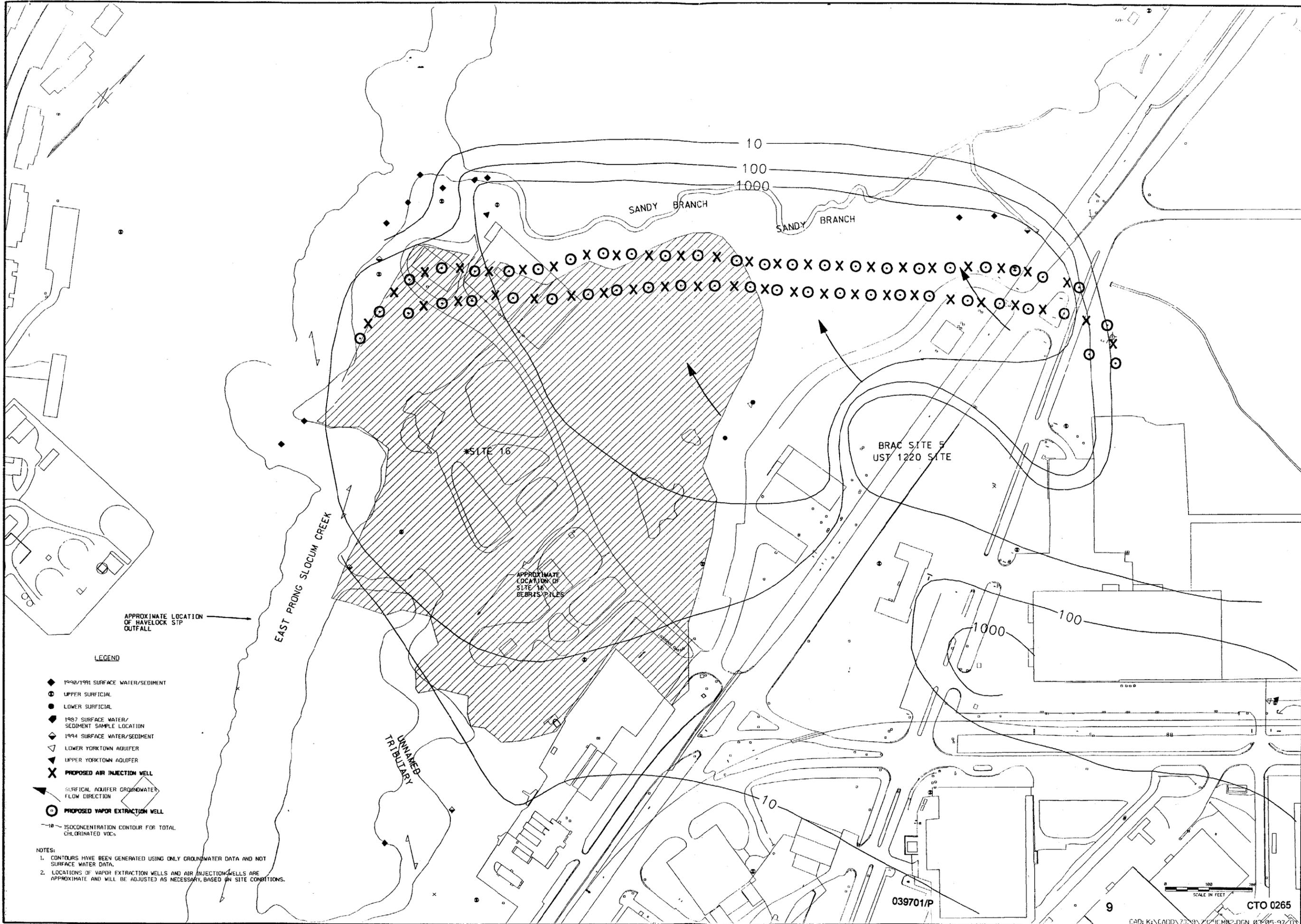
Specific numbers of air injection and air extraction wells, well spacing intervals, and air flow rates through the air injection and air extraction networks will be determined as part of the full scale system design. Supporting documentation will be included with the Basis of Design Report for the full scale system.

Monitoring of the AS/VE system would consist of semi-annual sampling of approximately 10 existing or proposed groundwater monitoring wells, followed by analysis for Target Compound List (TCL) volatiles. In addition, samples of the off-gas would be collected for fixed based laboratory analysis of TCL volatiles as well as field measurements using Draeger tubes and a photoionization device (PID).

5.1.2 Contribution to Remedial Performance

The proposed AS/VE treatment process is intended to provide an interim action for addressing the minimization of imminent contamination to Sandy Branch and East Prong of Slocum Creek due to contaminated surficial groundwater in the vicinity of the landfill. Contamination contained in the other Site 16 media as well as the final remedial alternative for the Site 16 groundwater will be addressed as part of the comprehensive OU1 RI/FS. However, it is expected that the AS/VE system will minimize contaminant migration and reduce impacts to human health and the environment by removing contamination from the groundwater prior to discharge into the East Prong of Slocum Creek or Sandy Branch. A review of the monitoring data generated during operation of the AS/VE system would be needed on regular intervals to provide direction for further remedial activity.

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APPROXIMATE LOCATION OF HAVELOCK STP OUTFALL

LEGEND

- ◆ 1990/1991 SURFACE WATER/SEDIMENT
- UPPER SURFICIAL
- LOWER SURFICIAL
- ◆ 1987 SURFACE WATER/SEDIMENT SAMPLE LOCATION
- ◆ 1994 SURFACE WATER/SEDIMENT
- ▲ LOWER YORKTOWN AQUIFER
- ▲ UPPER YORKTOWN AQUIFER
- X PROPOSED AIR INJECTION WELL
- ▲ SURFICIAL AQUIFER GROUNDWATER FLOW DIRECTION
- PROPOSED VAPOR EXTRACTION WELL
- 10- ISOCONCENTRATION CONTOUR FOR TOTAL CHLORINATED VOCs

NOTES:
 1. CONTOURS HAVE BEEN GENERATED USING ONLY GROUNDWATER DATA AND NOT SURFACE WATER DATA.
 2. LOCATIONS OF VAPOR EXTRACTION WELLS AND AIR INJECTION WELLS ARE APPROXIMATE AND WILL BE ADJUSTED AS NECESSARY, BASED ON SITE CONDITIONS.

DEPARTMENT OF THE NAVY ATLANTIC DIVISION NAVAL FACILITIES ENGINEERING COMMAND NORFOLK, VIRGINIA CHERRY POINT, NORTH CAROLINA		PROJECT NO. 039701/P SHEET NO. 5-1 SCALE: AS SHOWN DATE: 03-95-97	
PROJECT MANAGER BRANCH MANAGER SECTION DIRECTOR	PROJECT MANAGER BRANCH MANAGER SECTION DIRECTOR	DATE DATE DATE	REVISIONS
NAVAL STATION MARINE CORPS AIR STATION CHERRY POINT IN-SITU AIR SPARGING SITE 16 LANDFILL HOT SPOT AREA PROPOSED GENERAL LAYOUT			

SCALE IN FEET

CTO 0265

02165A017

5.1.3 Description of Alternative Technologies

Four alternatives were evaluated in the Focused FS for remediation of groundwater at Site 16. The alternatives are as follows:

- Alternative 1: Air Sparging/Vapor Extraction
- Alternative 2: In-Situ Permeable Treatment Wall
- Alternative 3: Extraction/Pretreatment/Discharge to STP
- Alternative 4: Extraction/Pretreatment/Discharge to Slocum Creek

During the evaluation performed in the Focused FS, Alternative 2: In-Situ Permeable Treatment Wall was eliminated from further consideration because of the high uncertainty of its effectiveness and implementability. Alternatives 1, 3, and 4, were determined to be acceptable for groundwater remediation, however, Alternatives 3 and 4 were determined to be less cost effective than Alternative 1. In addition, Alternative 1 was also determined to be more effective in the short term at reducing VOC concentrations in the groundwater. Therefore, AS/VE was selected as the preferred alternative.

5.1.4 EE/CA

No EE/CA has been prepared for Site 16. The Focused RI/FS prepared for OU1 hot spot remediation, which contains Site 16, will serve as the EE/CA for Site 16. A memo, providing a comparison of the contents of the Focused FS to the requirements of an EE/CA, indicated that the FS provides additional detail than that required by the EE/CA guidance. A copy of the memo is included in the information repository for Site 16.

5.1.5 Applicable or Relevant and Appropriate Requirements (ARARs)

The definition of ARARs is provided below:

- Applicable Requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal or state law that directly and fully address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site.
- Relevant and Appropriate Requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal

or state law, which while not "applicable", address problems or situations sufficiently similar (relevant) to those encountered at the CERCLA site, that their use is well suited (appropriate) to the particular site. Requirements must be both relevant and appropriate to be an ARAR.

- To be Considered criteria (TBC) are a category created by the USEPA that includes non-promulgated criteria, advisories, and guidance issued by Federal or state government that are not legally binding and do not have the status of potential ARARs. However, pertinent TBCs will be considered along with ARARs in determining the necessary level of cleanup or technology requirements.

Federal ARARs

The Federal ARARs identified for the contaminant plume contained in the shallow aquifer underlying Site 16 are presented in Table 5-1.

State ARARs

The state ARARs identified for the contaminant plume contained in the shallow aquifer underlying Site 16 are presented in Table 5-2.

5.1.6 Project Schedule

The proposed schedule for implementation of the removal action at Site 16 is as follows:

Treatability Study Operation	November 1996 through March 1997
Public Comment Period	February 20, 1997 through March 21, 1997
Full Scale System Design	February 1997 through May 1997
Full Scale System Installation	October 1997 through March 1998
Full Scale System Operation	March 1998 - Until attainment of cleanup criteria

6.0 EXPECTED CHANGE IN THE SITUATION SHOULD THE ACTION BE DELAYED OR NOT TAKEN

Delays in implementing a remedial action for the Site 16 groundwater may result in the potential migration of unacceptable levels of chlorinated VOCs from the shallow aquifer into Sandy Branch and the East Prong Slocum Creek.

TABLE 5-1
FEDERAL ARARS
SITE 16 LANDFILL AT SANDY BRANCH
MCAS CHERRY POINT, NORTH CAROLINA

Description	Regulation/Reference	Status
The Safe Drinking Water Act (SDWA)	40 CFR Part 141 40 CFR Part 143	Applicable
USEPA Ambient Water Quality Criteria	Section 304(a)(1) of the Clean Water Act	TBC
The Clean Air Act (CAA) (42 USC 7401): National Ambient Air Quality Standards (NAAQS) National Emissions Standards for Hazardous Air Pollutants (NESHAPs) New Source Performance Standards (NSPS)	40 CFR Part 50 40 CFR Part 61 40 CFR Part 60	TBC Relevant and Appropriate Relevant and Appropriate
Threshold Limit Values (ACGIH)	American Conference of Governmental Industrial Hygienists (ACGIH)	TBC
Federal Protection of Wetlands Executive Order	E.O. 11990	Applicable
The Endangered Species Act of 1978	16 USC 1531 40 CFR Part 502	TBC
The Fish and Wildlife Coordination Act	16 USC 661	TBC
The Fish and Wildlife Improvement Act of 1978	16 USC 742a	TBC
The Fish and Wildlife Conservation Act of 1980	16 USC 2901	TBC
USEPA's Groundwater Protection Strategy	EPA, 1984	TBC
RCRA Subtitle C	40 CFR Part 260 through Part 268	Potentially Applicable
DOT Rules for Hazardous Materials Transport	49 CFR Parts 107 and 171-179	Potentially Applicable
The Clean Water Act (CWA)	40 CFR Part 122	Potentially Applicable
The Occupational Safety and Health Administration (OSHA)	29 CFR Parts 1910, 1926, and 1904	Applicable
RCRA Land Disposal Restrictions (LDR)	40 CFR Part 268	Potentially Applicable
National Environmental Policy Act (NEPA)	42 USC 4321 40 CFR Part 6	Applicable

TBC - To Be Considered

TABLE 5-2

**STATE ARARS
SITE 16 LANDFILL AT SANDY BRANCH
MCAS CHERRY POINT, NORTH CAROLINA**

Description	Regulation/Reference	Status
North Carolina Air Pollution Control Requirements	North Carolina Administrative Code (NCAC), Title 15A, Chapter 2	Potentially Relevant and Appropriate
North Carolina Water Quality Standards	NCAC, Title 15A, Subchapter 2B	Potentially Applicable
North Carolina Water Quality Standards	NCAC, Title 15A, Chapter 18	Potentially Relevant and Appropriate
North Carolina Oil Pollution and Hazardous Substances Control Act	General Statutes of North Carolina, Chapter 143, State Department, Institution and Commission, Article 21A: Oil Pollution and Hazardous Substances Control	TBC
North Carolina Water Pollution Control Regulations	NCAC, Title 15, Chapter 2	Potentially Applicable
North Carolina Hazardous Waste Management Regulations	NCAC, Title 10, Department of Human Resources, Subchapter 10F	Potentially Applicable
North Carolina's Coastal Area Management Act	NCAC, Title 15A, Subchapter 7H	Potentially Applicable
North Carolina Groundwater Quality Standards	NCAC, Title 15A, Subchapter 2L	Relevant and Appropriate
State of North Carolina Administrative Code	NCAC, Title 15A, Chapter 13A	Potentially Applicable
State of North Carolina Solid Waste Management	NCAC, Title 15A, Chapter 13	Potentially Applicable
North Carolina Water Pollution Control Regulations	NCAC, Title 15A, Chapter 2	Potentially Applicable
North Carolina Erosion and Sedimentation Control	NCAC, Title 15A, Chapter 4	Potentially Applicable
North Carolina Well Construction Standards	NCAC Title 15A, Chapter 2	Potentially Applicable

TBC - To Be Considered

7.0 OUTSTANDING POLICY ISSUES AND ENFORCEMENT

There are no known outstanding policy issues or enforcement actions being implemented at this time for Site 16.

8.0 RECOMMENDATION

This decision document recommends AS/VE as the selected removal action for Site 16, the Landfill at Sandy Branch, Operable Unit 1, MCAS Cherry Point, North Carolina, developed in accordance with CERCLA as amended by SARA, and consistent with the NCP. This decision is based on the administrative record for the site.

Conditions at the site meet the NCP Section 300.415(b)(2) criteria for removal. This proposed remediation action alternative (AS/VE) is recommended for approval.