Department of the Navy

Proposed Plan for Site 49 - "TCE Groundwater Plume in the 400 Area"

In-situ Chemical Oxidation of Groundwater

Former Naval Surface Warfare Center – White Oak—Silver Spring, Maryland

NAVY ANNOUNCES PROPOSED PLAN

This **Proposed Plan** recommends in-situ chemical oxidation along with monitoring and institutional controls to address **groundwater** contamination at Site 49, "Trichloroethene (TCE) Groundwater Plume in the 400 Area". Site 49 is located in the north central portion of the former Naval Surface Warfare Center, Dahlgren Division Detachment, White Oak (NSWC-White Oak) in Silver Spring, Maryland. The location of Site 49 is shown in Figure 1.

Site 49 consists of the area of groundwater contaminated with TCE that originates in the vicinity of Building 427 at the eastern end of the 400 area of the former NSWC White Oak. The area is currently operated by the Arnold Engineering Development Center (AEDC). The area where the groundwater is impacted by TCE encompasses approximately 5 acres. The specific source of the TCE has not been identified but it is considered to be due to past activities at Building 427. Investigation activities focusing on the groundwater, as well as on the soil, surface water and sediment that may have been impacted at the site, have concluded that remedial action is needed in this area only to address groundwater contamination that represents a potential future risk to human health.

Site 49 groundwater data indicate that concentrations of TCE and its breakdown products, cis-1,2-dichloroethene (cis-DCE) and vinyl chloride would present unacceptable risks to people if groundwater were used as a potable source. Other potentially impacted media (soil, and the surface water and sediment in Paint Branch) were found not to pose a risk to people, plants or animals.

This Proposed Plan recommends in-situ chemical oxidation, combined with monitoring and institutional controls, as the preferred alternative to mitigate the potential unacceptable risks from exposure to site groundwater.

The US Department of the Navy (Navy) has completed its investigation at Site 49 at the former NSWC-White Oak. The Navy has also removed the Building 427 leaching well/neutralization pit that may have served as the source TCE in the groundwater.

LEARN MORE ABOUT THE PROPOSED PLAN

The Navy solicits written comments from the community on the preferred alternative for Site 49, as identified in this Proposed Plan. The Navy has set a public comment period from July 1 through July 30, 2004 to encourage public participation in the remedy selection process for Site 49. A public meeting has been scheduled for July 13, 2004. During the public meeting, representatives of the Navy, EPA, and MDE will be available to answer questions and accept public comments on the Proposed Plan for Site 49. In addition, an overview of the site characterization will be presented.

Important Information to Remember

Public comment period begins July 1, 2004.

Public Meeting: July 13, 2004 at 6:30 PM

The Village Square
Riderwood Village
3110 Gracefield Road
Silver Spring, Maryland 20904
(301)572-8319

Public comment period ends July 30, 2004

The relevant environmental documents for the former NSWC-White Oak Site 49 are available for review by the public at the following locations:

Montgomery County Public Library, White Oak Branch
11701 New Hampshire Avenue
Silver Spring, MD 20904
(301) 622-2492

Hours of Operation:
Mon. – Thurs.: 10:00 AM – 8:30 PM
Fri.: 10:00 AM – 5:00 PM
Sat.: 9:00 AM – 5:00 PM
Sun.: Closed

Engineering Field Activity Chesapeake
1314 Harwood Street, SE
Washington Navy Yard, D.C. 20374-5018
(202) 685-0061

Hours of Operation:
Mon. – Fri.: 8:00 AM – 4:00 PM
Sat.: Closed
Sun.: Closed

The investigation and removal were completed as part of the Navy's Installation Restoration Program (IRP) and in response to the requirements of the **Resource Conservation and Recovery Act (RCRA)** and the **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)**. The investigation completed for Site 49 (see Site Background for a detailed description) meets the requirements of both a CERCLA **remedial investigation (RI)** and a **RCRA facility investigation (RFI)**. This Proposed Plan summarizes the findings of the investigation, discusses the rationale for preferred alternative, and explains how the public can participate in the decision-making process.

A glossary of key words used in this Proposed Plan is attached. Words included in the glossary are identified in bold print the first time they appear in the plan.

The Navy and the U.S. Environmental Protection Agency (EPA), with regulatory support and guidance from the Maryland Department of the Environment (MDE), will select a remedy for Site 49 after reviewing and considering any comments on this proposal submitted during the public **comment period**. The Navy and EPA may modify the preferred alternative or select another alternative based on new information or public comments. Therefore, the public is encouraged to review and comment on the Proposed Plan.

This Proposed Plan is issued pursuant to the public participation requirements under Section 300.430(f)(2) of the **National Oil and Hazardous Substances Pollution Contingency Plan (NCP)** and Section 117(a) of CERCLA. This Proposed Plan summarizes information that can be found in greater detail in the **Administrative Record** file and the **information repository** for the former NSWC-White Oak. The Administrative Record for Site 49 is maintained by the Navy at the Engineering Field Activity Chesapeake office at the Washington Navy Yard in Washington, DC. The information repository, which contains key documents from the Administrative Record on which this proposal is based, is located at the Montgomery County Public Library, White Oak Branch. The Navy, EPA, and MDE encourage the public to review this information and to comment on the Proposed Plan during the public comment period. All comments received will become part of the Administrative Record. Information regarding when and how to comment is provided later in this Proposed Plan.

A final remedy for Site 49 will be documented in a **Record of Decision (ROD)**, which will be issued after all public comments on this Proposed Plan are considered.

SITE BACKGROUND

The former NSWC-White Oak was originally established in 1946 as the Naval Ordnance Laboratory, with a mission to carry out research on military guns and explosives. The facility is located in Prince George's and Montgomery Counties, approximately five miles north of Washington, DC, off New Hampshire Avenue in Silver Spring, Maryland.

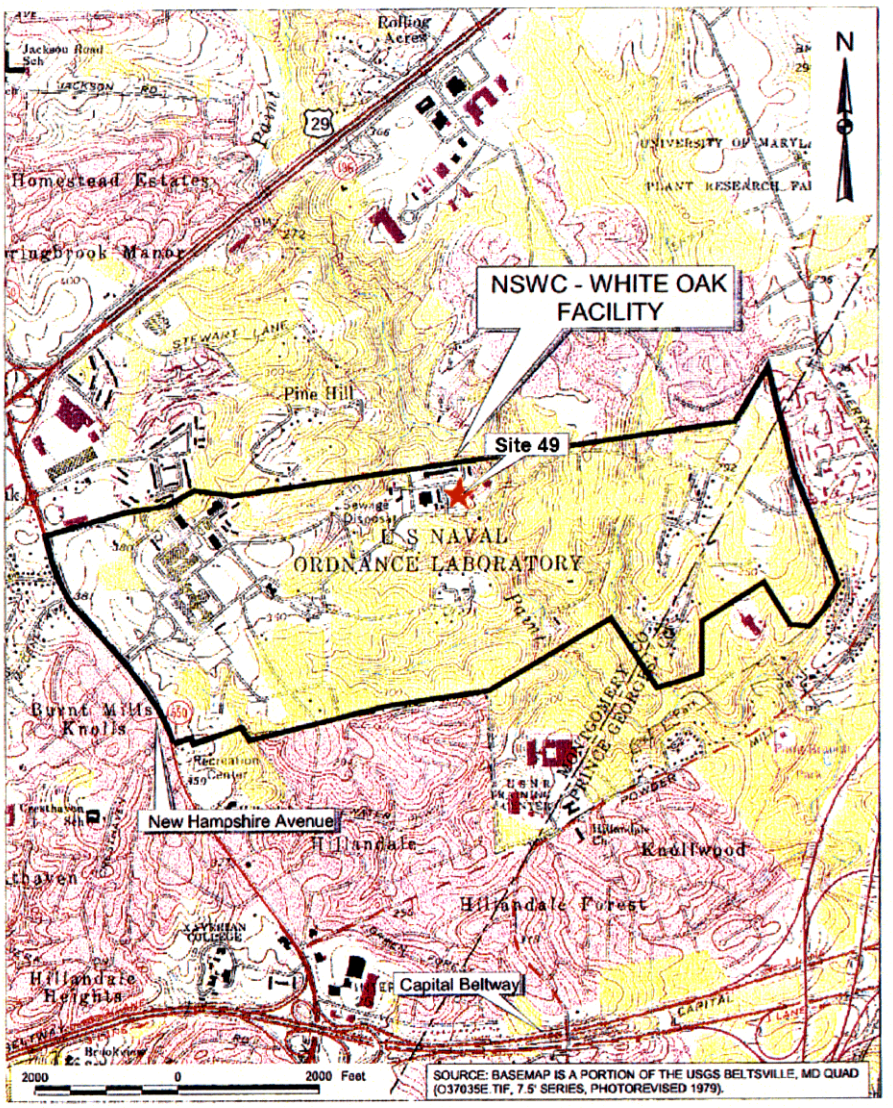

Figure 1 - White Oak Vicinity Map

Through the years, the former NSWC-White Oak's mission was expanded to include research involving torpedoes, mines, and projectiles. In September 1974, the facility combined with the Naval Weapons Laboratory, Dahlgren, Virginia to become the Naval Surface Weapons Center, which was renamed the Naval Surface Warfare Center, Dahlgren Division, in 1988. After that time, the facility functioned as the principal Navy research, development, test, and evaluation center for surface warfare weapon systems, ordnance technology, strategic systems, and underwater weapons systems.

NSWC-White Oak was closed in 1997 in response to the Base Realignment and Closure (BRAC) Act. The approximately 712-acre property was transferred in two parcels to the General Services Administration (GSA) and to the U.S. Army. Approximately 662 acres were transferred to the GSA in the fall of 1997 and the remaining area in the southeastern portion of the facility was transferred to the U.S. Army in February 1998. The location of Site 49 was part of the property transferred to the GSA. The GSA has plans to reuse and develop the property related to Site 49, however the plans have not been finalized. The AEDC, an organization of the U.S. Air Force, currently leases, and controls access to, the land around Building 427 which overlies the western portion of the Site 49 TCE groundwater plume. Before and after its closure, areas of potential contamination at the former NSWC-White Oak have been investigated under the Navy's IRP.

On June 2, 1998, EPA issued an Administrative Order (the Order) to the Navy, pursuant to Section 7003 of the RCRA, requiring the Navy to:

Undertake Interim Measures (IM) at the facility to prevent or mitigate threats to human health and/or the environment.

Perform an RFI (or RI) to determine fully the nature and any release of hazardous wastes, solid wastes, and/or hazardous constituents at and/or from the facility.

Perform a Corrective Measures Study (CMS) [or **Feasibility Study (FS)**] to identify and evaluate alternatives for corrective action necessary to prevent or mitigate migration or releases of hazardous wastes, solid wastes and/or hazardous constituents at and/or from the facility.

The Order provides the framework for completing the investigation and remediation of the former NSWC-White Oak facility. The Order also recognizes that "EPA and the Navy intend to integrate the Navy's CERCLA response obligations and RCRA corrective action obligations" at the facility. EPA and the Navy recognize that, if the preferred alternative is selected for Site 49, the Navy will have completed requirements related to Site 49 under the RCRA Section 7003 Administrative Order.

As part of closing the facility, the Navy assembled a BRAC Clean-Up Team (BCT) to expedite the work required to comply with this order. The BCT for NSWC-White Oak includes representatives of the Navy, EPA, and MDE. GSA, while not a formal member of the BCT, actively participates as an adjunct member.

SITE CHARACTERISTICS

Site 49 is considered the area of groundwater contaminated with TCE that originates in the vicinity of Building 427 at the eastern end of the AEDC in the north-central portion of the former NSWC White Oak. The site (as measured by the extent of the groundwater plume) is approximately 5 acres and is perched on the side of a steep stream valley (See Figure 2). The western portion of Site 49, which includes the area controlled by AEDC, as well as Building 427, is a relatively flat and open hill top. The central and eastern portions of Site 49 consist of a heavily wooded steep-sided ravine formed by Paint Branch. The total elevation drop from west to east across Site 49 is approximately 100 feet over a distance of about 450 feet. The east side of the site is bounded by Paint Branch, which flows north to south.

The source of the TCE was apparently within or near Building 427, a nine-story hydrostatic testing facility that includes a 35-ft by 100-ft by 75-ft-deep interior water tank. Much of Building 427 (4 floors, 50 feet) is below ground. Building 427 was built in the mid 1960's and used by the Navy up until the mid 1990's. It has since been abandoned and is slated for demolition within the next few years.

The Navy used the tank and building for hydrostatic testing of underwater weapons. Discussions with personnel who had knowledge of the activities that took place in Building 427 indicated that there was no known use of TCE in the building. A 2002 site inspection of the interior of the abandoned Building 427 found two 2 empty five-gallon cans labeled "solvent, dry-cleaning type" in a storage room.

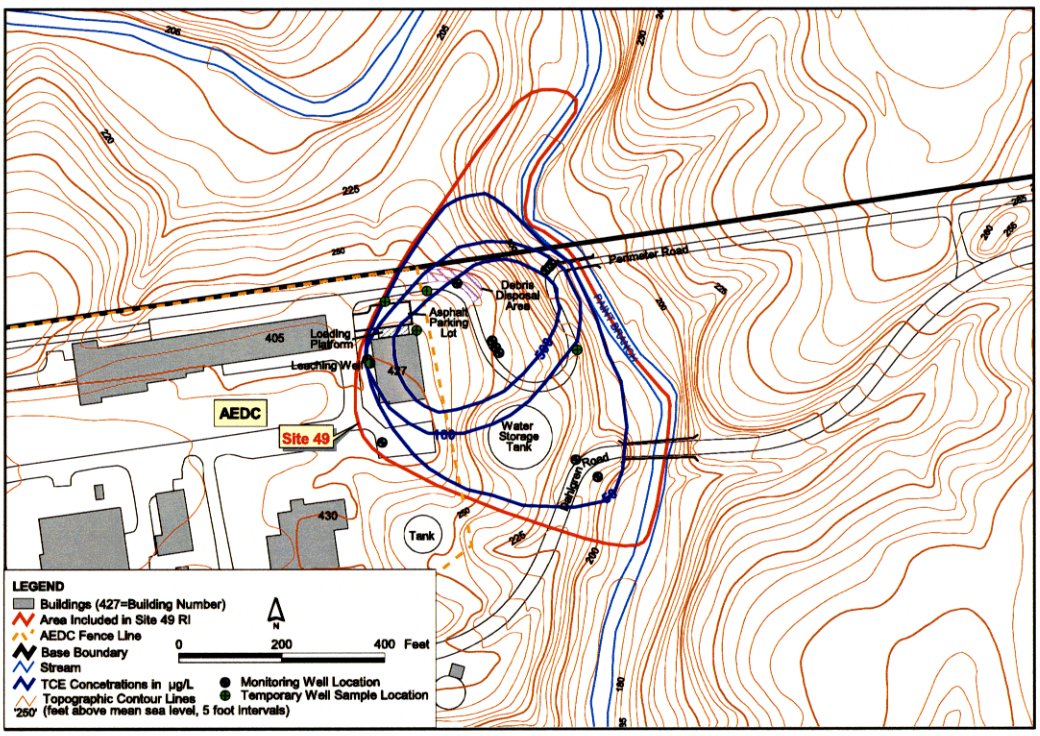

Figure 2 - Site 49

A "limestone pit" or leaching well was present on the exterior of the west side of the building and, according to construction drawings, was to be used for disposing of acidic waste water from the water treatment system used to pre-treat water before filling the testing tank. Former building personnel stated that the leaching well was never used for its designed purpose and that the wastewater lines leading to the leaching well were reportedly connected to sinks in rooms that were initially designed to be laboratories but were in actuality used as offices. The leaching well was excavated in 2002 as part of the Site 49 remedial investigation.

It was also noted that a small area northeast of Building 427 along the perimeter road was used for debris disposal and may conceivably have been used for dumping of wastes because it is relatively remote and hidden from view. This area is designated as the Debris Disposal Area on Figure 2.

Construction drawings also indicate that a subsurface foundation drain runs along the perimeter of the building about 17 to 27 feet below grade. The drain consists of 6-inch perforated clay pipe draining to two manholes, one at the northwest corner of the building and one near the southeast corner of the building. The northwest manhole is a sump that collects and pumps water to the southeast manhole. The southeast manhole also receives water from two interior basement sumps. Water was discharged from the southeast manhole to Paint Branch by a pipe and open channel.

The geology in the Site 49 area consists of a layer of saprolite (decayed rock) which grades to competent rock consisting of gniess and schist. The depth at which the saprolite changes to rock varies but can be roughly approximated as 25 feet at the west side of the site near Building 427 and 10 feet or less along Paint Branch at the far east side of the site.

Groundwater flow is from west to east, mimicking the topography. The depth to groundwater is approximately 35 feet near Building 427 and zero feet at Paint Branch. As such, the water table is encountered below the saprolite/bedrock transition at the top of the hill near Building 427 and above the transition in the stream valley. There appears to be a strong downward component of groundwater flow in the west and central portion of the site and an upward component of flow in the east, indicating groundwater discharge to Paint Branch.

Investigation History

Site 49 was initially identified during an unrelated investigation that the Navy conducted in 1999 through 2002 at the request of the Washington Suburban Sanitation Commission (WSSC) to identify potential environmental impacts from the former NSWC White Oak property to the WSSC sanitary sewer line that traverses the property through the Paint Branch valley. TCE was detected in groundwater samples collected along the bedding of the WSSC sewer that runs along Paint Branch at a point adjacent to the current AEDC (Site 49). Follow-up sampling identified that the TCE was originating on the former Navy property in the area of the current AEDC. The area was designated as Site 49 and the origin of the TCE and the nature and extent of the contamination in groundwater, surface water, and soil was then fully investigated and characterized in the Site 49 RI dated May 2004. An FS, dated June 2004 was subsequently performed to identify and evaluate remedial alternatives.

Groundwater Characterization

The groundwater investigation portion of the Site 49 RI involved the installation and sampling of 14 monitoring wells

and the collection of seven shallow groundwater samples along Paint Branch using drive-points. The following conclusions regarding groundwater were presented in the RI:

The primary contaminants found in the groundwater at Site 49 are chlorinated solvents: TCE and its likely degradation products, cis-1,2-dichloroethene (cis-DCE) and vinyl chloride (VC). The contaminant plume extends 450 feet from a source in the area of Building 427 on the west, to Paint Branch on the east.

The northern side of the TCE plume extends approximately 100 to 200 feet off federal government property onto property owned by the Maryland National Capital Park and Planning Commission (Montgomery County, Maryland).

The contaminated groundwater is primarily in the fractured bedrock, and TCE was encountered to a maximum depth of 200 feet.

The maximum concentration of TCE was 4,400 ug/L which was encountered at the downgradient edge of the plume (near Paint Branch) at a depth of about 40 feet.

Shallow groundwater, immediately below the Paint Branch stream bed, does not contain any detectable concentrations TCE or other volatile organic compounds (VOCs) .

Surface Water and Sediment Characterization

The surface water investigation portion of the Site 49 RI involved the collection of samples from four locations along Paint Branch. No VOCs were detected in any of the four samples, and the concentrations of other compounds (metals) in the water are consistent with background data for Paint Branch. The RI concluded that there are no adverse impacts to Paint Branch from Site 49.

The sediments in Paint Branch were evaluated in an RFI performed in 2000, and no adverse impacts were identified.

Soil Characterization

Samples were collected from the soil at two general locations at Site 49 in order to identify potential past or continuing sources of the groundwater contamination. These two areas were the former location of the leaching well and the area referred to as the Debris Disposal Area.

While very low concentrations of several VOCs were detected in soil samples collected from the Debris Disposal Area, all concentrations were well below risk-based screening levels and TCE was not detected in any of the samples.

The only compound that was detected above the residential risk-based screening level was benzo-(a)-pyrene, a semivolatile organic compound typically associated with the burning of organic material. It was detected in only one sample.

The soil sampling was unable to identify a likely past or continuing source of the TCE found in the groundwater. The Debris Disposal Area does not appear to have been the source of TCE in the groundwater because TCE is detected in groundwater both upgradient and side gradient of this area.

PRINCIPAL THREATS

There are no principal threat wastes in the soil or groundwater at Site 49. Principal threats are explained in the box on this page.

What is a "Principal Threat?"

The National Contingency Plan establishes an expectation that EPA will use treatment to address "principal threats" posed by a site wherever practicable [National Contingency Plan Section 300.430 (a)(1)(iii)(A)]. The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for migration of contamination to groundwater, surface water, or air or acts as a source for direct exposure. Contaminated groundwater generally is not considered to be a source material; however, non-aqueous-phase liquids (NAPLs) in groundwater may be viewed as a source material. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur. The decision to treat these wastes is made on a site-specific basis through a detailed analysis of the alternatives using the nine remedy selection criteria. This analysis provides a basis for making a statutory finding that the remedy uses treatment as a principal element.

SCOPE AND ROLE OF THE ACTION

This Proposed Plan summarizes several remedial alternatives evaluated for Site 49 at the former facility. Given the levels of groundwater contamination and subsequent risks to potential site users, it is recommended that in-situ chemical oxidation with monitoring and institutional controls be implemented to mitigate possible site risks. The purpose of this Proposed Plan is to present the preferred alternative that the Navy and EPA, with MDE concurrence and, based on public input, plan to select in a ROD for the site.

To date, six RODs have been signed and five others are pending for sites at the former NSWC-White Oak. Proposed Plans and RODs for other sites at the former NSWC-White Oak will be issued in the future.

SUMMARY OF SITE RISKS

Human Health Risks

The human health **risk assessment** for Site 49 focussed on the site groundwater and on the surface water in Paint Branch at the point where site groundwater discharges to the stream. The risk estimates for groundwater and surface water were developed by the Navy based on current conditions and under potential future land-use scenarios. For an explanation of the human health risk assessment process, see the text box on this page.

Soil was sampled at the site but was not evaluated in the risk assessment because Site 49 was initially identified as a groundwater contamination site and, during subsequent sampling, none of the contaminants of potential concern (COPC) in groundwater could be found in the soil. With the concurrence of the BCT for NSWC White Oak, potential risks associated with soil were not quantified. Furthermore, no discernable area of waste disposal has been identified in the soil at the site (based on site data and historic records searches) that could be the source of the VOCs found in groundwater. Concentrations of compounds found in soil were compared to background soil levels and risk-based guidance criteria and, with one exception, were all found to be below either background levels or levels considered acceptable for soil in a residential setting. Benzo(a)pyrene, a semi-volatile organic compound typically associated with the by-products of burning organic material, was detected above these levels in one of the seven samples.

Sediment in Paint Branch was not sampled in the RI or evaluated in the risk assessment for Site 49 because

WHAT IS RISK AND HOW IS IT CALCULATED?

A human health risk assessment estimates "baseline risk." This is an estimate of the likelihood of health problems occurring if no clean-up action were taken at a site. To estimate baseline risk at a site, the Navy undertakes a four-step process:

Step 1: Analyze Contamination
Step 2: Estimate Exposure
Step 3: Assess Potential Health Dangers
Step 4: Characterize Site Risk

In Step 1, the Navy looks at the concentrations of contaminants found at a site as well as past scientific studies on the effects these contaminants have had on people (or animals, when human studies are unavailable). Comparisons between site-specific concentrations and concentrations reported in past studies help the Navy to determine which contaminants are most likely to pose the greatest threat to human health.

In Step 2, the Navy considers the different ways that people might be exposed to the contaminants identified in Step 1, the concentrations that people might be exposed to, and the potential frequency and duration of exposure. Using this information, EPA calculates a "reasonable maximum exposure" (RME) scenario, which portrays the highest level of human exposure that could reasonably be expected to occur.

In Step 3, the Navy uses the information from Step 2, combined with information on the toxicity of each chemical, to assess potential health risks. The Navy considers two types of risk: cancer risk and non-cancer risk. The likelihood of any kind of cancer resulting from a site is generally expressed as an upper-bound probability; for example, a "1 in 10,000 chance." In other words, for every 10,000 people that could be exposed, one extra cancer may occur as a result of exposure to site contaminants. An extra cancer case means that one more person could get cancer than would normally be expected to from all other causes. For non-cancer health effects, the Navy calculates a "hazard index (HI)." The key concept here is that a "threshold level" (measured usually as a hazard index of less than 1) exists below which non-cancer health effects are no longer predicted.

In Step 4, the Navy determines whether site risks are great enough to cause health problems for people at or near the site. The results of the three previous steps are combined, evaluated, and summarized. The Navy adds up the potential risks from the individual contaminants to determine the total risk resulting from the site.

a separate RFI and HHRA had already been conducted specifically on Paint Branch in 2000. The 2000 RFI did not detect any VOCs (the Site 49-related contaminants) in the sediment or surface water at, or downgradient of, Site 49, and the accompanying HHRA indicated no unacceptable risks from exposure to Paint Branch sediment from any chemicals.

Surface Water

Surface water data collected from Paint Branch as part of the Site 49 RI was screened against human health screening criteria, however no COPCs were retained for Paint Branch surface water, and, therefore, no unacceptable risks are associated with this medium.

Groundwater

Quantitative risk estimates were developed by the Navy for current groundwater use conditions and under potential future land-use scenarios. The people evaluated in this risk assessment included present and/or future industrial workers, child and adult residents, and future construction workers. The risk assessment is provided in the Site 49 RI. For this risk assessment, it was assumed that all people were exposed to groundwater either through dermal contact or through the use of groundwater as a primary water supply. This latter scenario is conservative because groundwater is not currently used as a water supply. Furthermore, the area surrounding the former NSWC-White Oak is serviced by a public water supply and local ordinances prevent the installation of new private potable supply wells.

The risk estimates for each group of people were calculated for those chemicals identified as COPCs in groundwater at Site 49, based on the results of the samples collected during the Site 49 RI. COPCs are those chemicals that are identified as a potential threat to human health via a preliminary screening process and are evaluated further in the baseline risk assessment.

The COPCs identified for Site 49 groundwater are:

tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (cis-DCE), trans-1,2-DCE, vinyl chloride, chloroform, 1,2-dibromoethane, aluminum, chromium, iron, manganese, nickel, and vanadium.

Chemicals of Concern (COCs) are a subset of the COPCs; they are those chemicals identified in the FS as needing to be addressed by a response action. COCs that have subsequently been identified in the FS for Site 49 groundwater are:

TCE, cis-DCE, vinyl chloride, and iron.

Potential cancer and non-cancer risks from groundwater were evaluated for people in the groups discussed above, and risks are summed across all applicable exposure routes. The risk assessment determined that the groundwater contamination at Site 49 poses unacceptable risks to future construction workers who might be exposed to the groundwater in an excavation, and hypothetical future on-site residents that would use the groundwater as a primary water supply. Under the construction worker scenario, the HI is 4 and the incremental lifetime cancer risk (ILCR) is 1 in 10,000, which is at the upper limit of the acceptable risk range. Under the residential use scenario, the HI is 34 for a future adult resident and 79 for a future child resident. The ILCR under the same scenario is 1 in 8, which is greater than the upper risk range.

Ecological Risks

The Navy has completed a three-phase base-wide ecological risk assessment (ERA) for the former NSWC-White Oak between 1999 and 2001 that included an evaluation of surface water and sediment in Paint Branch, including the area of the stream near Site 49. The ERA concluded that the surface water and sediment in Paint Branch did not pose any unacceptable risks to plants and animals. The surface water data that were subsequently collected as part of the Site 49 RI were all less than the screening levels established as part of the base-wide ERA process.

As groundwater exposure is not associated with ecological receptors, no ecological risks are posed by Site 49 groundwater. Soil data collected at Site 49 was limited to subsurface soil (greater than four feet) because of the anticipated nature of any releases. No ecological risks are posed by subsurface soil because there are no exposure routes for plants and animals at those depths.

Summary of Risks

Contaminants found in Site 49 groundwater present an unacceptable risk to human health under a future construction worker and future residential-use exposure scenario. Based on the risk assessment, it is the Navy's and EPA's current judgement that action is necessary to remediate groundwater and mitigate these potential future risks.

SUMMARY OF THE PREFERRED ALTERNATIVE

The preferred alternative for Site 49 groundwater is in-situ chemical oxidation along with monitoring and institutional controls. MDE and EPA concur with the preferred alternative.

SUMMARY OF REMEDIAL ACTION OBJECTIVES

The remedial action objectives (RAOs) for Site 49 groundwater are:

Prevent unacceptable risks to people from exposure to contaminants in the groundwater.

Where practicable, to restore contaminated groundwater to a quality amenable to beneficial use (i.e. meet the PRGs).

COC	PRG (µg/L)
TCE	5
Cis-1,2-DCE	70
Vinyl Chloride	2
Iron	4,700

SUMMARY OF REMEDIAL ALTERNATIVES FOR GROUNDWATER

Five remedial alternatives and two sub-alternatives were developed in the Site 49 FS to address the COCs in groundwater. Each is identified and summarized below.

Groundwater Alternative 1 – No Action

No action would be taken under this alternative. In addition, no monitoring would be performed. Costs are associated with 5-year reviews.

Groundwater Alternative 1—Estimated Cost	
Capital Cost	$0
Annual Operation and Maintenance (O&M) Cost	$0 - $6,000
Present-Worth Cost	$20,000
Remediation Time Frame	30-100 years

Groundwater Alternative 2 – Institutional Controls (ICs) with Long-Term Monitoring (LTM)

Alternative 2 consists of implementing a Land Use Control Remedial Design which would prohibit installation of water supply wells into the contaminated aquifer thus eliminating the human exposure pathway to the contaminants left in-place. Groundwater would be monitored once every 9 months to determine if contamination is spreading or receding and if restrictions need to be revised.

Groundwater Alternative 2—Estimated Cost	
Capital Cost	$65,000
Annual O&M Cost	$13,000
Present-Worth Cost	$310,000
Remediation Time Frame	30-100 years*

*assuming a continuing source is present

Groundwater Alternative 3 – Groundwater Extraction and Treatment

Alternative 3 involves a groundwater extraction and treatment system installed to capture the contaminant plume and remove dissolved contaminants from the aquifer. A network of an estimated nine pumping wells would deliver water to a treatment system (air stripper) to remove the contaminants from the groundwater prior to discharge to a surface water body. ICs described in Alternative 2 would be put in place until RAOs are achieved.

Groundwater Alternative 3—Estimated Cost	
Capital Cost	$720,000
Annual O&M Cost	$83,000
Post-Closure Cost	$80,000
Present-Worth Cost	$1,500,000
Remediation Time Frame	10 years

Groundwater Alternative 3A – Groundwater Extraction and Treatment with Rock Fracturing

Alternative 3A is similar to Alternative 3 except that the fractures in the rock around each of the nine extraction well would be expanded by injecting high pressure nitrogen gas during well construction in order to obtain greater flow out of each well and reduce overall cleanup times.

Groundwater Alternative 3A—Estimated Cost	
Capital Cost	$1,100,000
Annual O&M Cost	$89,000
Post-Closure Cost	$80,000
Present-Worth Cost	$1,700,000
Remediation Time Frame	6 years

Groundwater Alternative 4 – In-situ Chemical Oxidation with LTM and ICs

Alternative 4 consists of injecting a chemical (potassium permanganate) into the groundwater in the fractured rock to oxidize the TCE. The chemical would be injected in a system of 25 injection wells aligned in two rows, one near Building 427 and one at the bottom of the hill along Paint Branch.

Groundwater Alternative 4—Estimated Cost	
Capital Cost	$590,000
Annual O&M Cost	$21,000
Post-Closure Cost	$68, 000
Present-Worth Cost	$830,000 - $980,000
Remediation Time Frame	5 years

Groundwater Alternative 4A – In-situ Chemical Oxidation with LTM and ICs with Rock Fracturing

Alternative 4A is similar to Alternative 4 except that the fractures in the rock around the injection borings would be expanded by injecting high pressure nitrogen gas immediately prior to the chemical injection in order to increase the radius of distribution for each boring and reduce the number of injection borings needed from 25 to 13.

Groundwater Alternative 4A—Estimated Cost	
Capital Cost	$940,000
Annual O&M Cost	$22,000
Post-Closure Cost	$57, 000
Present-Worth Cost	$1,200,000 - $1,300,000
Remediation Time Frame	5 years

Groundwater Alternative 5 – Enhanced Anaerobic Bioremediation with LTM and ICs with Rock Fracturing

Under Alternative 5, the naturally occurring process of biodegradation would be enhanced through injection and distribution of a compound (such as sodium lactate) to increase the biodegradation rates of the contaminants. As with Alternative 4A the fractures in the rock around the injection borings would be expanded by injecting high pressure nitrogen gas immediately prior to the injection in order to increase the radius of distribution for each boring and reduce the number of borings needed from 25 to 13.

Groundwater Alternative 5—Estimated Cost	
Capital Cost	$1,000,000
Annual O&M Cost	$43,000
Post-Closure Cost	$50, 000
Present-Worth Cost	$1,300,000
Remediation Time Frame	5 years

EVALUATION OF GROUNDWATER ALTERNATIVES

Each alternative was evaluated with respect to threats to people and the environment posed by contamination at the site. The National Contingency Plan (NCP) requires that the remedial alternatives be evaluated against the nine criteria listed below, as defined therein.

Protection of human health and the environment
Compliance with ARARs
Long-term effectiveness and permanence
Reduction in toxicity, mobility, or volume
Short-term effectiveness
Implementability
Cost
State Acceptance
Community Acceptance

A comparison of the alternatives is presented in Table 1. The FS provides a more detailed analysis and evaluation. The last two alternatives listed above, State and Community acceptance, are not evaluated here. They are evaluated in the ROD after comments are received on the Proposed Plan.

COMMUNITY PARTICIPATION

The Navy and EPA provide information regarding the cleanup of the former NSWC-White Oak to the public through public meetings, the Administrative Record file for the site, the information repository, and announcements published in the Washington Post (County Extras), Silver Spring Gazette, College Park Gazette, and Burtonsville Gazette. The Navy and EPA encourage the public to gain a more comprehensive understanding of the site and the BRAC activities that have been conducted at the site. The dates for the public comment period are July 1 through July 30, 2004. The public meeting will be held on July 13 at 6:30 p.m. at the Village Square at Riderwood Village in Silver Spring, Maryland. The location of the Administrative Record and Public Repository

are provided on the front page of this Proposed Plan.

Minutes of the public meeting will be included in the Administrative Record file. All comments received during the public meeting and comment period will be summarized and responses will be provided in the Responsiveness Summary section of the ROD. The ROD is the document that will present the selected remedy and will be included in the Administrative Record file.

Written comments can be submitted to Mr. Walter Legg via mail, e-mail, or fax.

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CERCLA Criteria		ALT-1 No Action	ALT-2 Institutional Controls	ALT-3 Groundwater Extraction	ALT-3A Groundwater Extraction with Fracturing	ALT-4 ISCO	ALT-4A ISCO with Fracturing	ALT-5 Enhanced Anaerobic Bioremediation with Fracturing
Threshold Criteria	Protection of Human Health and the Environment	No	Yes	Yes	Yes	Yes	Yes	Yes
	Compliance with ARARs	No	No	Yes	Yes	Yes	Yes	Yes
Balancing Criteria	Long-term Effectiveness and Permanence	L	M	M	M	M-H	M-H	M
	Reduction in Toxicity, Mobility, or Volume	L	L	M	M-H	H	H	M-H
	Short-term Effectiveness	L	L-M	M	M	M-H	H	M
	Implementability	L	H	M	M	M	M	M
	Cost	$17,000	$310,000	$1,500,000	$1,700,000	$830,000	$1,100,000	$1,300,000
RELATIVE TOTAL RANKING		L	M	M	M	M-H	H	M

Yes - Meets Threshold Criteria No - Does Not Meet Threshold Criteria L- Low Ranking M - Moderate Ranking H- High Ranking

Table 1 - Relative Ranking of Remedial Alternatives

GLOSSARY OF TERMS

This glossary defines the terms used in this Proposed Plan. The definitions apply specifically to this Proposed Plan and may have other meanings when used in different circumstances.

Administrative Record File: A record made available to the public that includes all information considered and relied on in selecting a remedy for a site.

Baseline Risk Assessment: A study conducted as a supplement to an RI to determine the nature and extent of contamination at an NPL site and the risks posed to human health and/or the environment.

Comment Period: A time for the public to review and comment on various documents and actions taken, either by the Navy, EPA, or MDE. A minimum 30-day comment period is held to allow community members to review the Administrative Record file and review and comment on the Proposed Plan.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): A federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act (SARA). The act created a special tax that goes into a trust fund to investigate and clean up abandoned or uncontrolled hazardous waste sites.

Contaminant: Any physical, biological, or radiological substance or matter that, at a high enough concentration, could have an adverse effect on human health or the environment.

Groundwater: Water beneath the ground surface that fills spaces between materials such as sand, soil, or gravel to the point of saturation. In aquifers, groundwater occurs in quantities sufficient for drinking water, irrigation, and other uses. Groundwater may transport substances that have percolated downward from the ground surface as it flows towards its point of discharge.

Hazard Index (HI): The ratio of the daily intake of chemicals from on-site exposure divided by the reference dose for those chemicals. The reference dose represents the daily intake of a chemical that is not expected to cause adverse health effects.

Hazardous Substance: Any material that poses a threat to public health and/or the environment. Typical hazardous substances are materials that are toxic, corrosive, ignitable, explosive, or chemically reactive.

Information Repository: A file containing information, technical reports, and reference documents regarding an NPL site. This file is usually maintained in a place with easy public access, such as a public library.

National Oil and Hazardous Substances Pollution Contingency Plan (NCP): The purpose of the NCP is to provide the organizational structure and procedures for preparing for and responding to discharges of oil and releases of hazardous substances, pollutants, or contaminants.

National Priorities List (NPL): The EPA list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial response.

Organic Compounds: These are naturally occurring or man-made chemicals containing carbon. Volatile organics can evaporate more quickly than semivolatile organics. Other organics associated with RI/FS activities include pesticides and polychlorinated biphenyls (PCBs). Some organic compounds may cause cancer; however, their strength as a cancer-causing agent can vary widely. Other organics may not cause cancer but may be toxic. The concentrations that can cause harmful effects can also vary widely.

Preliminary Remediation Goals (PRGs): Regulation-based or risk-based contaminant concentrations that have been selected as preliminary clean-up targets for a given media (i.e., groundwater or soil). PRGs for Site 49 groundwater are federal drinking water standards (if they exist for a COC) or human health risk-based concentrations (if drinking water standards do not exist for a contaminant).

Proposed Plan: A public participation requirement of SARA in which the lead agency summarizes for the public the preferred clean-up strategy and rationale for preference and reviews the alternatives presented in the detailed analysis of the FS. The Proposed Plan may be prepared either as a fact sheet or as a separate document. In either case, it must actively solicit public review and comment on all alternatives under consideration.

Resource Conservation and Recovery Act (RCRA): RCRA was enacted in 1976 to address the huge volumes of municipal and industrial hazardous waste generated nationwide. After several amendments, the Act as it stands today governs the management of solid and hazardous waste and underground storage tanks. RCRA focuses on active and future facilities and does not address abandoned or historical sites (see CERCLA).

RCRA Facility Investigation (RFI): An RFI is conducted at a site to evaluate thoroughly the nature and extent of the release of hazardous waste and hazardous constituents and to gather necessary data to support the Corrective Measures Study and/or interim/stabilization measures. This study is one of the four components of the Corrective Action Plan for a site under RCRA. The study is similar to a Remedial Investigation that is completed under CERCLA.

Record of Decision (ROD): An official public document that explains which clean-up alternative(s) will be used at NPL sites. The ROD is based on information and technical analysis generated during the RI/FS and consideration of public comments and community concerns. The ROD explains the remedy selection process and is issued by the Navy following the public comment period.

Remedial Investigation/Feasibility Study (RI/FS): Investigation and analytical studies usually performed at the same time in an interactive process and together referred to as the "RI/FS." They are intended to gather data needed to determine the type and extent of contamination, establish criteria for cleaning up the site, identify and screen clean-up alternatives for remedial action, and analyze in detail the technology and costs of the alternatives.

Remedial Response: A long-term action that stops or substantially reduces a release or threatened release of hazardous substances that is serious but does not pose an immediate threat to public health or the environment.

Response Action: As defined by Section 101(25) of CERCLA, means remove, removal, remedy, or remedial action, including related enforcement activities.

Responsiveness Summary: A summary of oral and written public comments received by the lead agency during a comment period and the responses to these comments prepared by the lead agency. The responsiveness summary is an important part of the ROD, highlighting community concerns for decision makers.

Risk Assessment: Evaluation and estimation of the current and future potential for adverse human health or environmental effects resulting from exposure to contaminants.

Superfund: An informal name for CERCLA.

Superfund Amendments and Reauthorization Act (SARA): The public law enacted to reauthorize the funding provisions and amend the authorities and requirements of CERCLA and associated laws. Section 120 of SARA requires that all federal facilities be subject to and comply with this act in the same manner and to the same extent as any non-federal entity.

EVALUATION CRITERIA FOR REMEDIAL ALTERNATIVES

In selecting a recommended remedial alternative under CERCLA, EPA requires the use of the following nine criteria to evaluate each of the alternatives developed in the FS. The evaluation criteria fall into three types as identified below. Each type is used differently in the evaluation process to help select the preferred remedy.

Threshold Criteria

The first two criteria are threshold criteria that must be met to a certain degree in order for an alternative to be considered in the FS.

1. Protection of Human Health and the Environment: The protection of human health and the environment provides an overall evaluation of the remedial alternatives. This standard considers the extent to which the remedial alternative mitigates potential short- and long-term exposure to residual contamination and how the remedy protects human health and the environment from unacceptable risks both during and after implementation of the alternative. In addition, the levels and characterization of contaminants remaining on-site, potential exposure pathways, potentially affected populations, the level of exposure to contaminants, and the associated reduction of exposure over time are considered.

2. Compliance with ARARs: This criteria considers whether the remedial alternative would meet all of the chemical-, action- and location-specific regulations that are applicable, relavent or appropriate. These include the PRGs established for each media, as well as Federal, state, and local environmental and public standards, regulations, guidance, advisories, ordinances, or community relations on the design, operation, and timing of each alternative.

Primary Balancing Criteria

The next five criteria are the primary balancing criteria. They are used to determine which alternative provides the best combination of attributes. These criteria consist of:

3. Long-term Effectiveness: Long-term reliability and effectiveness evaluation includes an evaluation of the corrective measure alternative's performance. Performance considerations include the effectiveness and useful life of the corrective measure. The reliability of a corrective measure includes the operation and maintenance requirements and demonstrated reliability.

4. Reduction in Toxicity, Mobility, or Volume: This factor includes the ability of the corrective measure to reduce the toxicity, mobility, or volume of the contaminants and/or media through treatment.

5. Short-Term Effectiveness: This factor includes an evaluation of the corrective measure effectiveness in the short-term (< 6 months), in comparison to the long-term effectiveness, and in particular potential risks to human health and the environment during implementation.

6. Implementability: This factor includes the relative ease of installation (constructability) and the time required to achieve a given level of response.

7. Cost: A cost estimate of the corrective measure includes both estimated capital and operation and maintenance costs. Capital costs include both direct and indirect costs. Operation and maintenance costs are post-construction activities which may be necessary to ensure the continued effectiveness of a corrective measure.

Modifying Criteria

Based on feedback obtained during the Proposed Plan comment period, the alternatives are evaluated further against the following two modifying criteria.

8. State Acceptance: This criteria considers whether the state agrees with the Navy's and EPA's analyses and recommendations, as described in the RI/FS, RFI/CMS, and Proposed Plan.

9. Community Acceptance: This criteria considers whether the local community agrees with the Navy's analysis and recommended alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

MAILING LIST

If you are not on the mailing list and would like to receive future publications pertaining to Site 49, or other sites at the former NSWC-White Oak as they become available, please call or complete, detach, and mail a copy of this form to the point of contact listed below:

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BRAC Environmental Coordinator
Engineering Field Activity Chesapeake
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Name: _____

Address: _____

_____

Telephone: _____

Affiliation: _____

USE THIS SPACE TO WRITE YOUR COMMENTS

Your input on the Proposed Plan for Site 49 at the former NSWC-White Oak is important to the Navy. Comments provided by the public are valuable in helping the Navy select a final cleanup remedy for this site.

You may use the space below to write your comments, then fold and mail. Comments must be postmarked by July 30, 2004. Comments can be submitted via mail, e-mail, or fax and should be sent to the following addressee:

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Name_____

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State_____ **Zip**_____