DEPARTMENT OF THE NAVY

Proposed Plan for Site 11 Groundwater —Industrial Wastewater Disposal Area 100
Hot-Spot In-situ Bioremediation and Source Removal with Long-Term Monitoring and Institutional Controls
Former Naval Surface Warfare Center—White Oak
Silver Spring, Maryland

NAVY ANNOUNCES PROPOSED PLAN

This Proposed Plan recommends Hot-spot In-situ Bioremediation and Source Removal with long-term monitoring and institutional controls to address groundwater contamination at Site 11, Industrial Wastewater Disposal Area 100. Site 11 covers approximately 16 acres and is located in the western portion of the facility. The site contained 14 leaching wells that were used for wastewater disposal from laboratory activities. The wells were used for liquid waste disposal into the subsurface until 1976. Wastes that are believed to have been disposed at Site 11 include metals, acids, chlorinated and non-chlorinated solvents, alcohols, lead, and organic explosive compounds. It has been reported that an estimated 20,000 gallons of wastewater were disposed in these leaching wells. Five leaching wells and associated soils were removed from Site 11 during 1996 to address contaminant sources that have been impacting groundwater; a sixth leaching well and associated soils were removed during 2002. Soil associated with Site 11 has been evaluated separately, and the decision for this media is documented in a separate Proposed Plan and Record of Decision.

This Proposed Plan recommends Hot-spot In-situ Bioremediation and Source Removal with long-term monitoring and institutional controls as the preferred alternative to mitigate any potential risks from exposure to site groundwater. The prior removal of the sources for the existing groundwater contamination combined with active groundwater bioremediation and institutional controls on the use of the site groundwater will effectively mitigate risk associated with exposure to groundwater at Site 11 and restore the groundwater quality within an acceptable timeframe. Long-term monitoring will be performed to verify the effectiveness of the preferred alternative. The location of the former NSWC-White Oak is shown on Figure 1, and the location of Site 11 is shown on Figure 2.

The Department of the Navy (Navy) has completed its investigation of Site 11 at the former Naval Surface Warfare Center, Dahlgren Division Detachment, White Oak (NSWC-White Oak) in Silver Spring, Maryland. The investigations 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 investigations completed for Site 11 (see Site Background for a detailed description) collectively meet the requirements of both a CERCLA remedial investigation (RI) and a RCRA facility investigation (RFI). This Proposed Plan summarizes the findings of the investigations.

LEARN MORE ABOUT THE PROPOSED PLAN

The Navy solicits written comments from the community on the proposed alternative for Site 11 Groundwater, as identified in this Proposed Plan. The Navy has set a public comment period from May 9, 2003 through June 8, 2003 to encourage public participation in the remedy selection process for these sites. A public meeting has been scheduled for May 22, 2003. 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 11 Groundwater. In addition, an overview of the site characterization will be presented.

Important Information to Remember

Public comment period begins May 9, 2003
Public Meeting: May 22, 2003 at 7:00 PM
Centers for the Handicapped
10901 New Hampshire Avenue
Silver Spring, MD 20902-1049
Telephone: (301) 344-1147 or (301) 344-1145
Public comment period ends June 8, 2003

The relevant environmental documents for the former NSWC-White Oak Site 11 Groundwater 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, Washington D.C. 20374-5018
(202) 685-0061

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

A glossary of key words used in this Proposed Plan is attached.

This document is issued by the Department of the Navy (Navy) and the U.S. Environmental Protection Agency (EPA). The Navy and EPA, with regulatory support and guidance from the Maryland Department of the Environment (MDE), will select a remedy for Site 11 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. All documents on which the preferred remedy identified for Site 11 groundwater was based (i.e., documents that comprise the Administrative Record) and other documents regarding RCRA/CERCLA activities at the former NSWC-White Oak can be found in both the Administrative Record file and the information repository. The Administrative Record 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 that are 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 11 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 former Naval facility is located in Prince George's and Montgomery Counties, approximately 5 miles north of Washington, DC, off New Hampshire Avenue in Silver Spring, Maryland.

Through the years, 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,

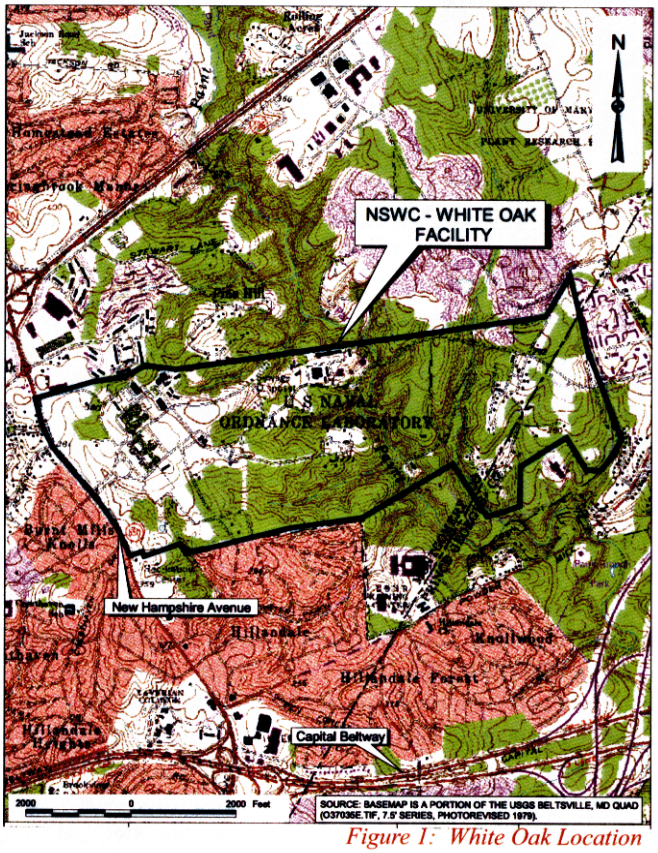

Figure 1: White Oak Location

development, test, and evaluation center for surface warfare weapon systems, ordnance technology, strategic systems, and underwater weapons systems.

In response to the Base Realignment and Closure (BRAC) Act, NSWC-White Oak was closed in 1997. 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 GSA has plans to reuse and develop the subject property for commercial purposes. The location of Site 11 is part of the property transferred to the GSA. The property transferred to the U.S. Army will be used in conjunction with ongoing activities at the Army's adjacent Adelphi Research Laboratory.

Before and after its closure, areas of potential contamination at the former NSWC-White Oak have been investigated under the Navy's Installation Restoration Program (IRP). On June 2, 1998, EPA issued an Administrative Order (the Order) to the Navy, pursuant to Section 7003 of the Resource Conservation and Recovery Act (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 to determine fully the nature and extent

of any release of hazardous wastes, solid wastes, and/or hazardous constituents at and/or from the facility.

- Perform a corrective measures study (CMS) 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 long-term monitoring with institutional controls alternative is selected for Site 11 groundwater, the Navy will have completed requirements related to this site under the RCRA Section 7003 Administrative Order.

As part of the closure of the facility, the Navy assembled a BRAC Clean-Up Team (BCT) to expedite the work required to comply with this order. The BCT for 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 11, the Industrial Wastewater Disposal Area 100, covers approximately 16 acres and is located in the western portion of the facility, within a developed area. Site 11 contained 14 leaching wells that were used for wastewater disposal from laboratory activities. The leaching wells were concentrated in nine areas. The wells were used for liquid waste disposal into the subsurface until 1976, when NSWC-White Oak was connected to the public sewer system. At that time, all the leaching wells and associated soils were either removed from the site or were removed from use and backfilled. Supply lines are believed to be in place, but they were disconnected from the wastewater source. Two leaching wells were backfilled and capped with concrete. Five wells were removed in 1996 to eliminate potential sources for volatile organic groundwater contamination; a sixth well was removed in 2002 to eliminate a potential source of hexavalent chromium groundwater contamination. Subsurface soil sampling was performed following the completion of waste removal activities to verify the removal of contaminated soil. The original construction of the wells generally consisted of an 8-foot-diameter brick or concrete well, approximately 9 feet in depth. Each well was accessible through a 24-inch-diameter manhole cover. One supply line transported wastewater to each well. Wastes that were reportedly disposed at Site 11 included metals, acids, chlorinated and non-chlorinated solvents, alcohols, lead, and organic explosive compounds. It has been estimated that a combined total of 20,000 gallons of wastewater were disposed in these leaching wells (Kearney/Centaur, 1990). Both listed and characteristic hazardous wastes are believed to have been disposed. The site was identified as an IR site by the Navy with individual or groups of leaching wells identified as Solid Waste Management Units (SWMU) by EPA during the RCRA

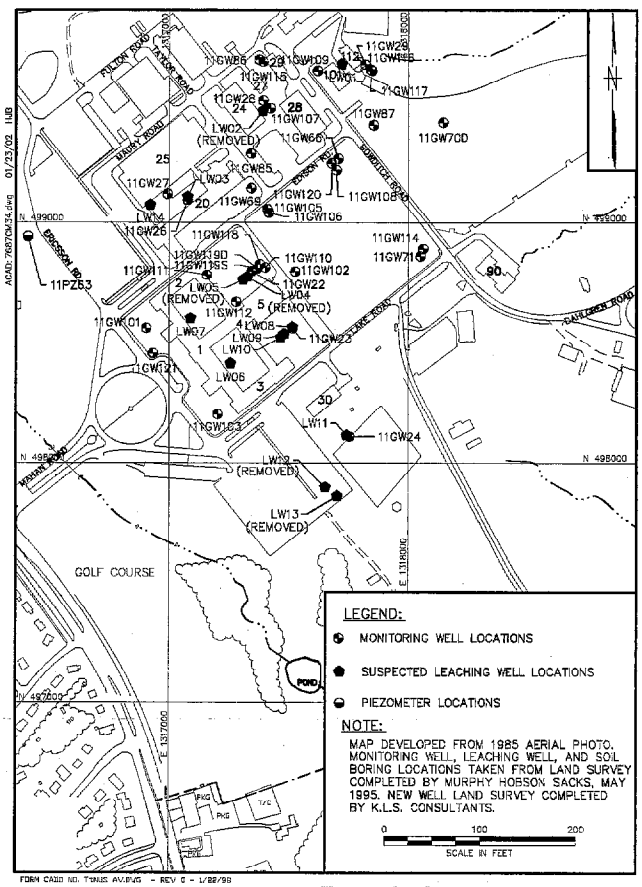

Figure 2: Site 11 Leaching Wells

facility assessment (RFA) in 1990. Figure 2 depicts Site 11 surface features and topography.

Contaminants are primarily present in the surficial aquifer at Site 11. However, the highest volatile organic compound (VOC) concentrations have been detected in the bedrock aquifer. The most commonly detected compound was trichloroethene (TCE), which was detected at concentrations ranging from 1.9 to 190 micrograms per liter (μg/L). Chloroform, acetone, cis-1,2-dichloroethene (1,2-DCE), tetrachloroethene (PCE), and 1,2-dichloroethane (1,2-DCA) were also detected in the Site 11 groundwater.

The inorganics arsenic, manganese, and hexavalent chromium were found to be significantly higher than background in statistical comparisons. The manganese detections were primarily attributable to high turbidity in the samples. Review of analytical data from filtered samples indicated that manganese concentrations were not significantly greater than background, and manganese was not evaluated in the risk assessment. Although arsenic was detected at concentrations greater than its US EPA Region III Risk-Based concentration, it was not detected at a concentration greater than its Maximum

Contaminant Level (MCL).

Perchlorate was also detected in groundwater at concentrations ranging from 5.0 to 130 µg/L. No explosives compounds were detected at significant concentrations in the groundwater.

The Navy has conducted a baseline ecological risk assessment (BERA) at the former NSWC-White Oak (January 2003) that included an evaluation of the risk to plants and animals. No risks to plants and animals are related to Site 11 groundwater or its discharge to surface water.

PRINCIPAL THREATS

There are no principal threat wastes in Site 11 groundwater. 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 the preferred alternative for Site 11 Groundwater at NSWC-White Oak. Given the levels of contamination and risks to existing or theoretical site users, it is recommended that Hot-Spot In-Situ Bioremediation and Source Removal with institutional controls and long-term monitoring of attenuation processes be performed to mitigate 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

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. These are referred to as potential contaminants of concern (PCOCs).

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 some instances, EPA calculates a "central tendency exposure" (CTE), which portrays an average level of human exposure.

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" or a risk of 10^{-4}. 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 an HI of less than 1) exists below which non-cancer health effects are no longer predicted. If the cumulative HI is greater than one, an HI for each target organ that a chemical can potentially impact is calculated. The "threshold level" concept applies specifically to each target organ.

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.

Record of Decision for the site.

This Proposed Plan is the sixth to be issued for the former NSWC-White Oak; five earlier Records of Decision have been signed. Proposed Plans and Records of Decision for other sites at the former NSWC-White Oak will be issued in the future.

SUMMARY OF SITE RISKS

A risk assessment was prepared for Site 11 groundwater. The goal of the risk assessment was to determine the current and future effects of contaminants in groundwater at Site 11 on human health and the environment. Based on the risk assessment, it is the Navy's and EPA's current judgment that the preferred alternative (i.e., Hot-Spot In-Situ Bioremediation and Source Removal with institutional controls and long-term monitoring) identified in this Proposed Plan is appropriate to protect public health, welfare and the environment from actual or threatened releases of hazardous substances into the environment.

Human Health Risks

An evaluation of health risk was performed for Site 11 following the completion of the RI. For an explanation of the human health risk, see the text box on the previous page. The receptors evaluated in this risk assessment were full-time workers, maintenance and utility workers, construction workers, adult recreational users, adolescent trespassers, daycare center children, and child and adult residents. The residential exposure scenario, which is the most conservative, was evaluated for informational purposes and to identify the potential for future risk. Further, for this risk assessment, the Navy assumed that all receptors were exposed to groundwater. Land use at the site is currently limited to commercial/industrial use through GSA's Master Plan for the FDA site and is expected to be limited in the future.

The Navy developed quantitative risk estimates for potential human receptors for those chemicals identified as potential chemicals of concern (PCOCs) at Site 11, based on the site investigations. The risk assessment contains an evaluation of all PCOCs and exposure pathways, including those that do not pose unacceptable risks to human health at this site. PCOCs are those chemicals that are identified as a potential threat to human health and are evaluated further in the baseline risk assessment. Chemicals of concern (COCs) are a subset of the PCOCs; they are those chemicals that are identified in the RFI as needing to be addressed by a response action. Refer to the box on this page for a description of the risk estimating process.

The PCOCs are summarized below:

- 1,1-DCE, 1,2-DCA, benzene, acetone, chloroform, cis-1,2-DCE, PCE, TCE, vinyl chloride, unfiltered arsenic, hexavalent chromium, nitrate, and perchlorate were identified as groundwater PCOCs.

The COCs for Site 11 groundwater include:

- 1,2-DCA, cis-1,2-DCE, PCE, TCE, chloroform, vinyl chloride and hexavalent chromium were identified as groundwater COCs.

At this time there is no established ARAR for perchlorate and the human health risk-based screening level is strictly associated with drinking water consumption. Because of these considerations and given the fact that the Site 11 groundwater is not currently used as a source of drinking water, will not be used for this purpose in the foreseeable future, and its use will be restricted through institutional controls, perchlorate is not considered a COC for Site 11 groundwater. However, long-term monitoring will be performed to assess perchlorate contamination until an ARAR is established and the need for a response action is determined.

Potential noncarcinogenic and carcinogenic risks were developed for all receptors under the reasonable maximum exposure (RME) and central tendency exposure (CTE) scenarios. The RME represents the highest level of human exposure that could reasonably be expected to occur, and the CTE scenario portrays the average exposure. Risks for each receptor are summed across all applicable exposure routes.

Unacceptable risks [i.e., Hazard Indices (HI) greater than unity (one) and Incremental Lifetime Cancer Risks (ILCRs) in excess of the EPA target risk range] were estimated for the residential exposure pathways. The HI for the adult and child residents were 160 and 370, respectively. The carcinogenic risk for residents was 2×10^{-3} (2 in one thousand). These risks are primarily associated with drinking the groundwater. For the other exposure pathways (industrial use, construction worker, etc.) the risks were determined to be acceptable.

Ecological Risks

As stated above, the Navy completed additional sampling for the BERA in August 2000. Concentrations of chemicals in surface water and sediment near Site 11 were determined not to be harmful to plants and animals.

Summary of Risks

Based on the conservative assumptions utilized in performing the risk assessment, concentrations of contaminants present in the Site 11 groundwater may present a threat to human health if used as a potable source for residential conditions. Based on the findings above, Hot-Spot In-Situ Bioremediation and Source Removal with institutional controls and long-term monitoring of attenuation processes is the preferred alternative that would be protective of human health.

SUMMARY OF THE PREFERRED ALTERNATIVE

The preferred alternative for Site 11 groundwater is Hot-Spot In-Situ Bioremediation and Source Removal with institutional controls and long-term monitoring of attenuation processes to mitigate unacceptable risks associated with risks to future site residents.

SUMMARY OF REMEDIAL ACTION OBJECTIVES

The corrective action objectives for Site 11 groundwater are as follows.

- Prevent human exposure (through ingestion, inhalation, and dermal contact) to groundwater having contaminants at concentrations in excess of Media Cleanup Standards (MCSs).
- Restore contaminated groundwater quality to MCSs.
- Comply with contaminant-, location-, and action-specific ARARs and TBCs.

The MCSs developed for Site 11 groundwater are:

COC	MCS[1] (µg/L)
1,2-DCA	5
cis-1,2-DCE	70
PCE	5
TCE	5
Chloroform	80
Vinyl Chloride	2
Hexavalent Chromium	100

NOTE:
[1] USEPA MCL

SUMMARY OF CORRECTIVE MEASURES

The preferred alternative for Site 11 groundwater includes Hot-Spot In-Situ Bioremediation and Source Removal with institutional controls restricting use of groundwater and long-term monitoring of attenuation processes. Four remedial alternatives were developed and considered for Site 11 groundwater in the CMS. Alternative 1 is no action. An evaluation of this alternative is required by the NCP as a baseline for comparison. Alternative 2 is institutional controls and natural attenuation. Alternative 3 includes hot-spot in-situ bioremediation, institutional controls and monitoring. The fourth option included groundwater extraction and treatment. A summary of each alternative follows:

Alternative 1 – No action

Estimated Capital Cost: $0
Estimated Total Monitoring and Operation and Maintenance (O&M) Costs: $0
Estimated Present-Worth Cost: $0
Estimated Construction Time Frame: None

No action would be taken under this alternative, nor would any monitoring be performed.

Alternative 2 – Institutional Controls and Monitoring

Estimated Capital Cost: $507,000
Estimated Total Monitoring and O&M Costs: $422,000
Estimated Present Worth Cost: $929,000 over 30 years
Estimated Construction Time Frame: 2 months

Alternative 2 would consist of two major components: (1) Institutional Controls, and (2) Monitoring. Aquifer conditions would be continually monitored to ensure that they are favorable and to verify that naturally occurring processes are occurring to significantly reduce the concentrations of chlorinated VOCs and hexavalent chromium. These processes include a combination of biodegradation, dispersion, dilution, and adsorption in various proportions depending on the type of contaminant and aquifer conditions. Institutional controls, to be developed in a Land Use Control Implementation Plan, would include limitation of land use to industrial purposes and prohibition of aquifer use for potable purposes. These controls would eliminate pathways of exposure to contaminants at the site. Monitoring would consist of regularly collecting and analyzing groundwater samples both from within the contaminant plumes to assess performance of the naturally-occurring processes and downgradient of the leading edge of the plumes to evaluate potential migration of COCs. Reviews would be performed every 5 years to evaluate site status, assess the continued adequacy of remedial activities, and determine whether further action is necessary.

Alternative 3 – "Hot Spot" In-Situ Bioremediation, Source Removal, Institutional Controls, and Monitoring

Estimated Capital Cost: $1,095,000
Estimated Total Monitoring and O&M Costs: $422,000
Estimated Present Worth Cost: $1,517,000 over 30 years
Estimated Construction Time Frame: 6 months

Alternative 3 would consist of three major components: (1) in-situ bioremediation of VOC plume No. 2 with hydrogen release compounds (HRC®) injection, (2) institutional controls, and (3) monitoring. HRC® would be injected into the aquifer to accelerate the anaerobic degradation of chlorinated VOCs in one area identified by modeling as requiring the longest time for natural restoration of groundwater quality across all

of Site 11. A total of 5,400 pounds of HRC® would be injected in 90 points over the 35,000 ft^2 of VOC Plume No. 2 in the area of the greatest concentrations of chlorinated VOCs. Monitoring would be identical to that for Alternative 2. Alternative 3 was developed to lessen the time for the overall reduction of VOC concentrations associated with VOC Plume No. 2 (described in Alternative 2) but allows natural processes to drive contaminant reduction across the remainder of Site 11.

Alternative 4 – Extraction, Ex-Situ Treatment, Surface Discharge, Institutional Controls, and Monitoring

Estimated Capital Cost: $2,020,000
Estimated Total Monitoring O&M Costs: $6,739,000
Estimated Present Worth Cost: $8,759,000 over 25 years
Estimated Construction Time Frame: one year

Alternative 4 would consist of five major components: (1) groundwater extraction, (2) on-site treatment to remove chlorinated VOCs and hexavalent chromium, (3) discharge of treated groundwater to surface water, (4) institutional controls, and (5) monitoring. This component would consist of installing an array of groundwater extraction wells and operating this array for a period of up to 25 years. A submersible centrifugal pump equipped with level controls would be installed in each groundwater extraction well. Each of these pumps would be connected to a piping network that would convey the extracted groundwater to an on-site treatment system. An on-site treatment system would operate for a period up to 25 years to reduce contaminant concentrations. The treated groundwater would be discharged to the nearby unnamed tributary of Paint Branch. Performance of the treatment system would be monitored. Performance monitoring would consist of collecting monthly water samples from the inlet and outlet of the treatment system and analyzing these samples for chlorinated VOCs, hexavalent chromium, and general water-quality parameters. Institutional controls identical to Alternative 2 would be applied to the site to limit exposure to contaminated groundwater until the concentrations were reduced to acceptable levels. Monitoring would be identical to that for Alternative 2, except that it would only last an estimated 25 years, instead of 30.

EVALUATION OF ALTERNATIVES

The criteria specified in Office of Solid Waste and Emergency Response (OSWER) Guidance Document 9902.3-2A, RCRA Corrective Action Plan were used to evaluate the remedial alternatives. Explanations of the criteria are attached. The detailed evaluation can be found in the CMS.

Protection of Human Health and the Environment

Alternative 1 would not be sufficiently protective of human health and the environment. Alternative 2 would provide adequate protection of human health and the environment. Alternatives 3 and 4 would be more protective than Alternative 2 by significantly accelerating restoration of the aquifer quality. Alternative 4 would be slightly more protective than Alternative 3 because it would be more likely to achieve MCSs sooner.

Alternatives 2, 3, and 4 include LUCs to prevent use of the aquifer as a drinking water source and groundwater monitoring to examine the concentration and migration of site contaminants. The potential for off-site migration is greater under Alternatives 1 and 2, than Alternatives 3 and 4.

Attainment of MCSs

Alternative 1 might eventually attain MCSs through naturally-occurring processes but this would not be verified because groundwater monitoring would not be performed.

Alternatives 2, 3, and 4 are estimated to attain MCSs for chlorinated VOCs within approximately 70 years, 35 years, and 25 years respectively. Alternatives 2, 3, and 4 would attain the MCS for hexavalent chromium within 8 years and also significantly lower perchlorate concentrations within 8 years. With all four alternatives attainment of the MCSs would be verified through groundwater monitoring.

Source Control

The likely sources of contamination (the leaching wells) have already been removed and the RFI concluded that the site soil is not a source of groundwater contamination. Alternatives 1 and 2 would not provide any additional source control. Alternatives 3 and 4 would provide additional source control through active treatment of the contaminated groundwater.

Compliance with Waste Management Standards

Alternative 1 would not generate any waste material. Alternative 2 would not generate any treatment residues and would generate a minimal amount of waste materials associated with the installation and sampling of new monitoring wells (drill cuttings, development fluids, purge water). Alternative 3 would also not generate any treatment residues and, in addition to the same waste materials as generated by Alternative 2 it would generate waste materials associated with the installation of injection wells (drill cuttings). In addition to the same waste materials as generated by Alternative 2, Alternative 4 would generate significant amounts of waste materials associated with the operation and maintenance of an ex-situ groundwater treatment system (clogged filter elements, spent GAC, and spent ion exchange resin). Permitted off-site facilities would be readily available for the disposal of the

waste materials generated by any of the alternatives.

Long-Term Reliability and Effectiveness

Alternative 1 would not be effective and reliable. Alternative 2 would effectively remove COCs through naturally-occurring processes. Alternatives 3 and 4 would be somewhat more effective than Alternative 2 because the removal of COCs would be significantly accelerated through in-situ biodegradation and/ or groundwater extraction and treatment. The institutional controls component of Alternatives 2 and 3 would effectively prevent exposure to contaminated groundwater until the groundwater MCSs have been achieved.

Reduction in Toxicity, Mobility, or Volume

Alternatives 1 and 2 would not reduce the toxicity, mobility, or volume of COCs through treatment but a significant reduction of toxicity and volume would be achieved through naturally-occurring processes. Alternatives 3 and 4 would still further reduce the toxicity, mobility, and volume of COCs through in-situ biodegradation and/or extraction and treatment. Alternative 3 would remove an estimated 6 pounds of chlorinated VOCs from VOC Plume No. 2. Alternative 4 would remove an estimated 13 pounds of chlorinated VOCs and 16 pounds of hexavalent chromium from VOC Plumes Nos. 1 and 2 and the Hexavalent Chromium Plume.

Short-Term Effectiveness

Alternative 1 would not result in any short-term risks to human health or the environment. Alternatives 2 and 3 would result in minimal short-term risk to remediation workers (Alternatives 3) and groundwater monitoring personnel. These risks would be addressed through health and safety training and the wearing of appropriate personal protection equipment (PPE). In addition to the same short-term risks as Alternatives 2 and 3, Alternative 4 would also result in some risks to treatment system operating personnel and to the surrounding community from treatment system fugitive emissions and potential spillage of treatment residues during off-site transportation. However, all of these risks could be effectively mitigated.

Implementability

Alternative 1 would be the easiest to implement, because no action would occur.

The groundwater monitoring and institutional controls components of Alternative 2 would be very easy to implement. LUCs would be readily implementable through a LUCAP because Site 11 is located within a government-owned facility where such controls are easier to enforce. A permit would be required for installation of new monitoring wells.

Alternative 4 would somewhat be more difficult to implement than Alternative 2 because, in addition to the same monitoring and institutional controls as Alternative 2, it would require the installation and operation and maintenance of a groundwater extraction and treatment system. Contractors and equipment are readily available for the technologies included in the ex-situ treatment system of Alternative 4. The ongoing and future construction of FDA campus buildings at Site 11 area may limit access to various portions of the site and result in less than ideal placement of the extraction wells and/or ex-situ treatment system associated with Alternative 4. Permits would be required for the installation of new monitoring wells and the construction of the groundwater extraction and treatment systems. Alternative 4 would require approximately 1 year of design and remedy installation.

Alternative 3 would be most difficult to implement. Although the basic activity required for this alternative is the installation of injection wells which should be relatively simple, a large number of these wells would be required and the ongoing and future construction of FDA campus buildings would significantly interfere with their placement. Alternative 3 would require approximately 6 months for design and implementation.

Cost

The costs associated with the alternatives are summarized below. The details of the cost estimates are provided in the CMS.

State Acceptance

The state of Maryland supports the preferred alternative, Alternative 3.

COSTS FOR CORRECTIVE MEASURES ALTERNATIVES

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Capital	$0	$507,000	$1,095,000	$2,020,000
Total O&M / Monitoring	$0	$422,000	$422,000	$6,739,000
Net Present Worth:	$0	$929,000 (30 yrs)	$1,517,000 (30 yrs)	$8,759,000 (25 yrs)

Community Acceptance

Community acceptance of the preferred alternative, Alternative 3, will be evaluated after the public comment period ends and will be described in the ROD for Site 11 groundwater.

COMMUNITY PARTICIPATION

The Navy and USEPA 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, the date, location, and time of the public meeting and 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. Comments received during the public comment period and at the public meeting 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 via mail, e-mail, or fax and should be sent to the following addressee:

Mr. Walter Legg
BRAC Environmental Coordinator
Engineering Field Activity Chesapeake, Code CH32
1314 Harwood Street, SE
Washington Navy Yard, Washington D.C. 20374-5018
Telephone: (202) 685-0061
Facsimile: (202) 433-7018
E-mail: walegg@efaches.navfac.navy.mil

For further information, please contact:

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Remedial Project Manager
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Mr. Steven Richard, Director
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GLOSSARY OF TERMS - SITE 11 GROUNDWATER PROPOSED PLAN

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.

Applicable or Relevant and Appropriate Requirements: The federal and state environmental laws that a selected remedy will meet. These requirements may vary among sites and alternatives.

Background Concentrations: Concentrations of chemical compounds in environmental media that are representative of naturally occurring conditions or that may be attributable to historic, widespread human activity.

Baseline Risk Assessment: A study conducted as a supplement to an RI to determine the nature and extent of contamination at a National Priorities List (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.

Media Clean-up Standard: Media Clean-up Standards are based on promulgated federal and state environmental laws, risk-based action levels, and other applicable guidance documents.

Metals: Metals are naturally occurring elements in the earth. Arsenic, cadmium, iron, mercury, and silver are examples of metals. Exposure to some metals, such as arsenic and mercury, can have toxic effects. Other metals, such as iron, are essential to the metabolism of humans and animals.

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.

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 Action: The actual construction or implementation phase that follows the remedial design for the selected clean-up alternative at a site on the NPL.

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.

Revegetate: To replace topsoil, seed, and mulch on prepared soil to prevent wind and water erosion.

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

Semivolatile Organic Compounds (SVOCs): Chemical compounds that evaporate more slowly than a volatile organic compound at normal temperatures and pressures.

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.

Volatile Organic Compounds (VOCs): Chemical compounds that evaporate readily at normal temperatures and pressures.

EVALUATION CRITERIA FOR RCRA CORRECTIVE ACTIONS SITE 11 GROUNDWATER PROPOSED PLAN FORMER NSWC-WHITE OAK, SILVER SPRING, MARYLAND

In selecting a recommended corrective action alternative, the Navy uses the following criteria to evaluate each of the alternatives developed in the CMS. The Navy must show that the first nine criteria are met for the alternative to be recommended. The final two criteria are used to further evaluate the Proposed Plan after the public comment period has ended and comments from the community, EPA, and MDE have been received. All of the criteria are explained in more detail here.

Protection of Human Health and the Environment: The protection of human health and the environment provides an overall evaluation of the remedies that would be appropriate for Site 11. This standard considers the extent to which the corrective measure alternative mitigates potential short- and long-term exposure to residual contamination and how the remedy protects human health and the environment 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. For management of mitigation measures, the relative reduction of environmental impact for each alternative are determined by comparing residual levels for each alternative with the existing criteria, standards, and guidelines. The ecological considerations for this evaluation standard included: potential short- and long-term beneficial and adverse effects of the corrective measure, adverse effects on environmentally sensitive areas, and an analysis on how to mitigate adverse effects.

Media Clean-up Standards: The Media Clean-up Standard considers whether the corrective measure alternative would achieve the defined RAOs. In addition, this standard includes an assessment of relevant institutional needs for each corrective measure alternative. The effects of Federal, state, and local environmental and public standards, regulations, guidance, advisories, ordinances, or community relations on the design, operation, and timing of each alternative are considered.

Source Control: The Source Control standard evaluates how the corrective measure alternative addresses the source of the release, so as to reduce or eliminate, to the extent practicable, further releases that may pose a threat to human health and the environment. This criteria addresses whether source control measures are necessary and what type of source control actions would be appropriate. In addition, any source control measure proposed should include a discussion on how well the method is expected to work given the site situation and previous experiences of the specific technology.

Waste Management Standards: The corrective measure alternative must comply with applicable standards for the management of wastes. This includes a description of how the specific waste management activities would be conducted in order to maintain compliance with all applicable state and Federal regulations.

Long-term Reliability and 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.

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.

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.

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

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.

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.

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 11or 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:

Mr. Walter Legg
BRAC Environmental Coordinator
Engineering Field Activity Chesapeake, Code CH32
1314 Harwood Street, SE
Washington Navy Yard, Washington D.C. 20374-5018
Telephone: (202) 685-0061
Facsimile: (202) 433-7018
E-mail: walegg@efaches.navfac.navy.mil

Name: _____

Address: _____

_____

Telephone: _____

Affiliation: _____

USE THIS SPACE TO WRITE YOUR COMMENTS

Your input on the Proposed Plan for Site 11 groundwater 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 June 8, 2003. Comments can be submitted via mail, e-mail, or fax and should be sent to the following addressee:

Mr. Walter Legg
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Name:

Address:

City: State: Zip: