DEPARTMENT OF THE NAVY

Proposed Plan for Operable Unit 2 Containment of Site 1 and Site 2 Landfills and Sediment with an Engineered Cap

NAVY ANNOUNCES PROPOSED PLAN

The Department of the Navy (Navy) has completed investigation of Operable Unit 2 (OU2), which is comprised of Installation Restoration (IR) Sites 1 and 2 at the former Naval Surface Warfare Center, Dahlgren Division Detachment, White Oak (NSWC-White Oak) in Silver Spring, Maryland, and development of corrective measures to address waste, soil, and sediment associated with OU2. The location of the former NSWC-White Oak is shown on Figure 1 and the locations of Sites 1 and 2 are shown on Figure 2. Site 1 is known as the Parking Lot Landfill, while Site 2 is known as the Apple Orchard Landfill. The investigation and the development of corrective measures 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).

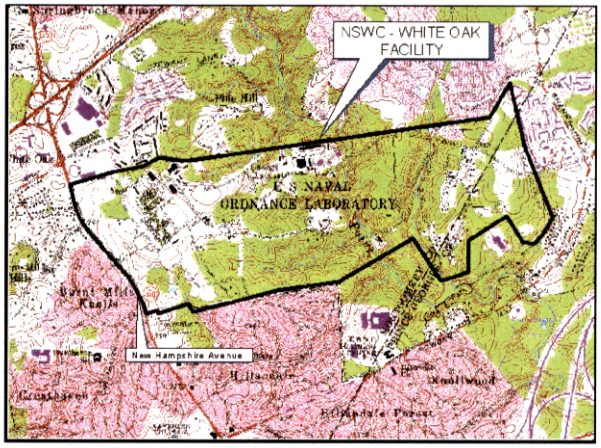

Figure 1 - Facility Location Map

This Proposed Plan presents a remedy to address contamination identified at OU2 at the former NSWC-White Oak. OU2 includes the soil and waste material from Sites 1 and 2, as well as sediment impacted by these sites. Site 1 and Site 2 were initially identified and investigated as separate sites. However, due to their proximity, and their similar period and nature of operations, the sites are being considered as a single OU. Groundwater potentially impacted by Site 1 and Site 2 will be evaluated as a separate OU and the remedy selected for the groundwater will be documented in a separate Proposed Plan and decision document.

The purpose of the investigation of OU2 at the former NSWC-White Oak was to meet the needs of RCRA and CERCLA by evaluating the nature and extent of any contamination associated with it. The investigations completed for OU2 [i.e., Site Screening and Engineering Evaluation/Cost Analysis (EE/CA) for Site 1, Confirmation Study/Verification Phase, Remedial Investigation (RI), Design Verification Study, and RCRA Facility Investigation (RFI) for Site 2, and draft Basewide Ecologi-

LEARN MORE ABOUT THE PROPOSED PLAN

The Navy solicits written comments from the community on the preferred alternative for OU2 as identified in this Proposed Plan as well as other response options considered for OU2. The Navy has set a public comment period from March 28, 2001 through April 28, 2001 to encourage public participation in the remedy selection process for OU2. A public meeting has been scheduled for April 17, 2001. 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 OU2. In addition, an overview of the site characterization will be presented.

Important Information to Remember:

Public comment period begins **March 28, 2001**

Public Meeting

Date: Tuesday, April 17, 2001

Time: 7:00 PM

Location: Federal Research Center at White Oak
Former Naval Surface Warfare Center-White Oak
10901 New Hampshire Avenue
Silver Spring, MD 20902-1049
Telephone: (301) 344-1147 or (301) 344-1145

Public comment period ends **April 28, 2001**

The relevant environmental documents for the former NSWC-White Oak and OU2 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

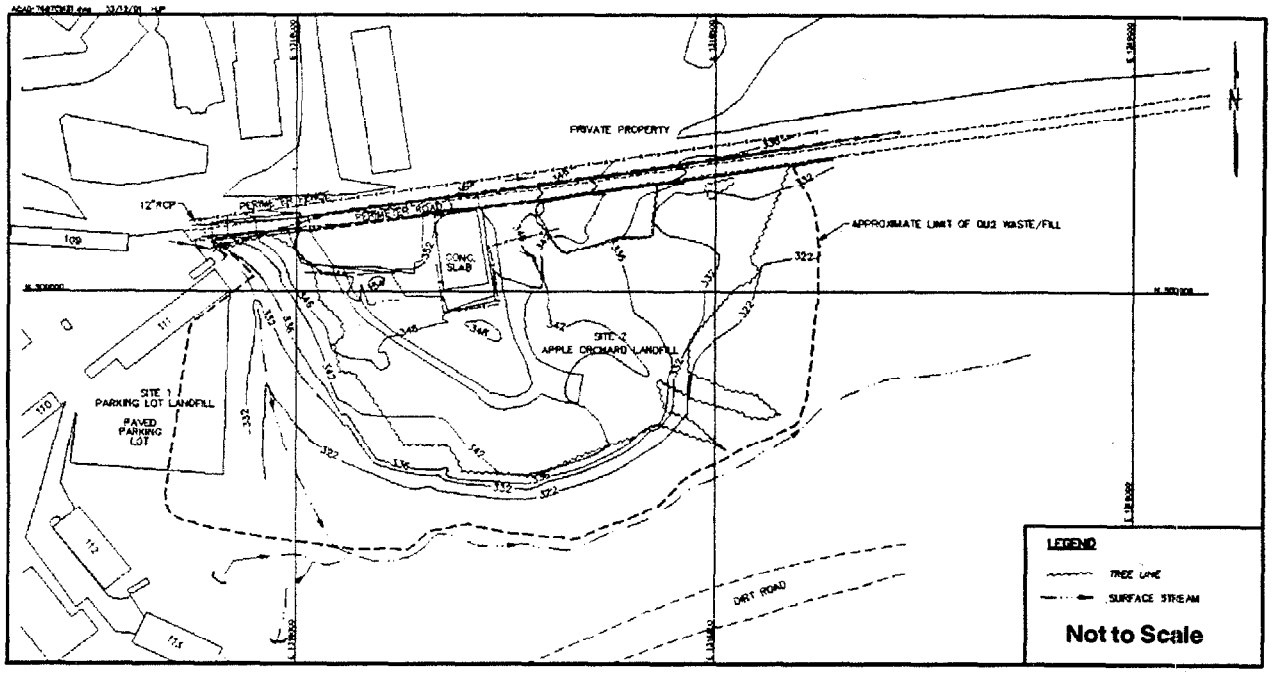

Figure 2 - Site Location Map

cal Risk Assessment (ERA) for NSWC-White Oak that included Sites 1 and 2] collectively meet the requirements of both a CERCLA RI and a RCRA RFI. The term RI is subsequently used throughout this document to refer to the collective investigations completed at OU2. The OU2 Corrective Measures Study (CMS) evaluated options for eliminating unacceptable risks identified by the RI, and meets the requirements of a CERCLA Feasibility Study (FS). The term CMS is subsequently used throughout this document to refer to the collective review of remedial options completed for OU2. This Proposed Plan summarizes the findings of the RI and CMS and proposes that soil and waste associated with OU2 be consolidated and contained by an engineered cap and that impacted sediments be excavated and placed under the cap. The Proposed Plan also proposes institutional controls to prevent certain uses of the subject property and to ensure maintenance of the cap. The Proposed Plan discusses the rationale for this proposal and explains how the public can participate in the decision making process.

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

This document is issued by the Navy and the U.S. Environmental Protection Agency (EPA). The Navy and EPA, in consultation with the Maryland Department of the Environment (MDE), will select a remedy for OU2 after reviewing and considering any comments submitted during the public comment period. The Navy and EPA may modify the recommended alternative or select another corrective action based on new information or public comments. Therefore, the public is encouraged to review and comment on the CMS and the proposed remedy.

This Proposed Plan is issued pursuant to 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 that are relevant to the remedy selection for OU2 (i.e., documents that comprise the OU2 RI and CMS) 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 for OU2 is maintained by the Navy at the Engineering Field Activity Chesapeake office at the Washington Navy Yard in Washington, D.C. The Montgomery County Public Library, White Oak Branch, is the information repository, which contains key documents from the Administrative Record on which this action is based. The Navy, EPA, and MDE encourage the public to review this information and to comment on the proposed plan during the public comment period. Information regarding when and how to comment is provided later in this Proposed Plan.

A final remedy for OU2 will be documented in a Record of Decision (ROD), which will be issued after all public comments are considered and will become part of the administrative record for NSWC-White Oak.

SITE BACKGROUND

The former NSWC-White Oak was originally established in 1944 as the Naval Ordnance Laboratory, with a mission to carry out research on military guns and explosives. The former facility is located in Prince George's and Montgomery Counties approximately 5 miles north of Washington, D.C., off New Hampshire Avenue in Silver Spring, Maryland.

Through the years, NSWC-White Oak's mission was expanded to include research involving mines, torpedoes, 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.

In response to the Base Realignment and Closure (BRAC) Act, NSWC-White Oak was closed in 1997. The approximately 712-acre property was subsequently transferred 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 and one of the major tenants will be the U.S. Food and Drug Administration (FDA). 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 IRP. On June 2, 1998, the EPA issued an Administrative Order to the Navy pursuant to Section 7003 of RCRA, requiring it to

(1) undertake "Interim Measures (IM) at the facility to prevent or mitigate threats to human health and/or the environment;

(2) perform a RCRA [RFI] to determine fully the nature and any release of hazardous wastes, solid wastes and/or hazardous constituents at and/or from the Facility; and

(3) perform a [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."

EPA's RCRA 7003 Order provides the framework for completing the investigation and remediation of the former NSWC-White Oak facility under RCRA. 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. As noted above, this Proposed Plan addresses two of the Areas of Contamination identified in the Order at the facility, which together comprise OU2.

As part of the closure of the facility, the Navy has assembled a BRAC Cleanup 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.

OU2 CHARACTERISTICS

Site 1, the Parking Lot Landfill, is an approximately 1-acre area that was reportedly used from 1947 to 1952, for waste disposal. While the majority of the material disposed was reported to be fill and municipal-type waste such as trash, metal scrap, and construction debris, other wastes reportedly disposed included lubricating oil, battery acid, and metal plating wastes. Other than reports that 60 automobile batteries were disposed, there is no information regarding the quantity of different wastes disposed. It is estimated that Site 1 contains a total of 10,000 cubic yards of fill and waste. A majority of the site is currently a paved parking lot with adjacent slopes having no erosion or sediment control measures in place.

Site 2, the Apple Orchard Landfill, is a 6-acre area reportedly used from 1948 to 1982, for waste disposal. Again, while the majority of the material disposed was reported to be fill and municipal-type waste, other wastes reportedly disposed include polychlorinated biphenyls (PCBs), solvents, paint residue, acids, and miscellaneous compounds. Reportedly up to 500 gallons of oil containing PCBs were deposited in the landfill prior to 1970. In addition, an unknown quantity of ordnance shapes, which are metal vessels used during research at the former facility, were disposed in the landfill. Ordnance shapes are considered to be inert (i.e., do not have explosive characteristics) and low-hazard military waste. It is estimated that Site 2 contains a total of 75,000 cubic yards of fill and waste. Currently, the majority of the landfill is a plateau and steep side slopes exist along its eastern, southern, and western sides. The slopes are moderately eroded and exposed waste and fill material are evident throughout. Visible waste along the slopes includes several ordnance shapes.

Stormwater from Site 1 and Site 2 drains to a swale between the sites and to an intermittent stream (i.e., referred to as Tributary 187) which runs immediately south of the sites. The stream ultimately discharges to Paint Branch. Sediment within the swale and intermittent stream is part of OU2.

Based on reports that the Site 1 and Site 2 landfills were used primarily for municipal waste disposal, available information was reviewed per the EPA Directives "Presumptive Remedy for CERCLA Municipal Landfill Sites" and "Application of the CERCLA Municipal Landfill Presumptive Remedy to Military Landfills," to determine whether the EPA Presumptive Remedy for landfills could be applied to the Site 1 and Site 2 landfills. These directives provide that a remedy of containment is appropriate for landfills where the volume and heterogeneity of the disposed waste generally make removal and/or treatment impractical. The presumptive remedy may be applied unless the containment system would be threatened if certain waste is left in place. In the case of landfills where military wastes have been disposed, a determination of the military waste's characteristics should be made to confirm that the presumptive remedy is appropriate.

A review of available information indicates that the presumptive remedy of containment for municipal and military landfills is appropriate for OU2. Primary factors considered in this case are as follows: (1) there are no known reports of disposal of high-hazard military waste, (2) any military waste that may have been disposed can be readily contained, and (3) available information indicates that a majority of the waste disposed was non-hazardous, municipal-type waste. Therefore, the RI for Site 1 and Site 2 landfills was conducted in a manner consistent with the presumptive remedy directives. In this case, the RI focused primarily on characterizing contaminant migration pathways to determine which components of the presumptive remedy should be applied. No discrete areas within the landfill that contain RCRA hazardous waste or high hazard military waste (i.e.,"hot spots") were identified during the investigation. Notwithstanding the applicability of the presumptive remedy guidance, as discussed below the Navy does propose to implement a cover at OU2 that complies with RCRA Subtitle C closure requirements, i.e., one that exceeds closure requirements for municipal solid waste landfills.

Site 1

The results of the RI for Site 1 are summarized in a Site Screening report issued in December 1998, an EE/CA report issued in July 1999, and a draft ERA report issued in December 2000. The CMS for OU2 was issued in March 2001. Since no hot spots were reported within the landfill, the RI focused on characterizing surface soil, groundwater, surface water, sediment, and to a lesser extent, the landfill contents. A limited number of groundwater samples were collected from temporary, shallow monitoring wells. The findings of the investigations included the following:

- No evidence of potential hazardous waste was observed or identified at the site. Municipal-type wastes were evident in the subsurface and along the side slopes of the site. Several low-hazard military waste items (i.e., ordnance shapes) were encountered in the subsurface. No leachate or seeps were observed emanating from the landfill.

- Organic compounds detected at elevated concentrations in surface soils included polycyclic aromatic hydrocarbons (PAHs), PCBs, and, to a lesser extent, pesticides (i.e., dieldrin and heptachlor epoxide). PAHs and PCBs were also detected at elevated concentrations in subsurface soils.

- Inorganics detected in surface soil at elevated concentrations include chromium, iron, lead, manganese, thallium, and vanadium. Barium, manganese, and vanadium were detected at elevated levels in subsurface soil.

- Organic compounds detected in downgradient shallow groundwater at significant concentrations included two volatile organic compounds, 1,2-dichloroethane (1,2-DCA) and chloroform, and two pesticides, aldrin and heptachlor epoxide.

- Inorganics detected in shallow groundwater at elevated concentrations included aluminum, chromium, iron, manganese, and nickel.

Site 2

The RI work at Site 2 consisted of investigations conducted between 1985 and 2000, which are summarized in a Confirmation Study/Verification Phase report issued in April 1987, a draft RI report issued in March 1992, a Design Verification Study report issued in June 1995, a RFI report issued in October 2000, and a draft ERA issued in December 2000. The CMS for OU2 was issued in March 2001. Since no hot spots were reported, the RI focused on surface soil, groundwater, surface water and sediment. Minimal subsurface investigations were performed. A summary of the findings is provided below:

- No evidence of potential hazardous waste was observed or identified. Municipal-type waste and low-hazard military waste (i.e., ordnance shapes) were observed on the surface. No leachate or seeps were observed emanating from the landfill.

- Organic compounds detected at significant concentrations in surface soils included PAHs and PCBs. These same compounds were detected at lower concentrations in the subsurface.

- Inorganics detected at elevated concentrations in surface and/or subsurface soils included chromium, iron, manganese, nickel, thallium, and vanadium.

- Chemicals detected at elevated concentrations in downgradient groundwater included organic compounds [i.e., trichloroethene (TCE), 1,2-dichloropropane, benzene, chloroform, cis-1,2-dichloroethene (cis-1,2-DCE), and RDX (an explosive)] and inorganics (i.e., barium, manganese, arsenic, and mercury).

Surface Water and Sediment

Surface water and sediment in the drainage swale and intermittant stream potentially impacted by Site 1 and Site 2 were characterized as part of the investigations addressing Site 2. The primary findings are indicated below:

- Organic compounds detected at significant concentrations in sediment were PAHs, PCBs (Aroclor 1260), and pesticides (dieldrin). Inorganics detected at elevated levels were aluminum, arsenic, iron, and manganese.

- Organics, including chloroform, TCE, and bis(2-ethylhexyl)phthalate, and one inorganic, managanese, were detected at significant concentrations in surface water.

SCOPE AND ROLE OF THE ACTION

This Proposed Plan addresses the final corrective action for soil, waste material, and sediment at OU2. The general corrective actions for OU2 are to prevent current and future exposure to contaminated soil, waste material, and sediment and contaminant migration through the presumptive remedy of containment of the media. The purpose of the Proposed Plan is to present alternatives from which the Navy and EPA, with MDE concurrence and public input, will select a remedy to prevent unacceptable exposure to contaminated site media and minimize contaminant migration in the environment.

This Proposed Plan is the first to be prepared for a former NSWC-White Oak site and it addresses contaminated soil, waste material, and sediment at OU2. Actions taken for groundwater and surface water associated with Sites 1 and 2will be documented in a separate Proposed Plan and decision document. Proposed Plans for other sites at the former NSWC-White Oak will be issued in the future.

SUMMARY OF OPERABLE UNIT RISKS

As part of the RI, risk evaluations were conducted with available data to estimate the potential risks to human health and the environment posed by OU2 media. The risk evaluations for Site 1 and Site 2 were conducted per EPA presumptive landfill remedy directives, which provide that where an established human health standard for a contaminant along a migration pathway is exceeded, there is a basis for selecting a presumptive remedy of containment. In this case, a streamlined risk assessment is performed and focuses on contaminant migration pathways (i.e., downgradient groundwater, surface water, and sediment).

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 cleanup 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 helps 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 reasonable 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." 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.

In assessing the groundwater migration pathway for the Site 1 landfill, the RI found 1,2-DCA to be present at 13 micrograms/liter (mg/L) in a downgradient monitoring well. This level exceeds the Maximum Contaminant Level (MCL) of 5 mg/L for 1,2-DCA in public drinking water supplies. MCLs are chemical specific standards. Based on available information, it is likely that this contaminant is attributable to Site 1. The RI also found TCE in two monitoring wells downgradient of Site 2 landfill at levels of 19 mg/L and 35 mg/L, respectively. The MCL for TCE is 5 mg/L.

The presumptive remedy directives for landfills provide that where groundwater contaminant concentrations exceed chemical specific standards and/or where direct contact with landfill contents may occur due to unstable slopes there is an adequate basis for conducting a remedial action that has the primary component of containment. In this case only a streamlined risk evaluation of the landfill source is necessary. Since Site 1 and Site 2 landfills meet the criteria, a streamlined risk assessment was conducted for the Site 1 and Site 2 landfill source areas. A more detailed risk assessment has been performed for migration pathways to help identify which presumptive remedy components should be applied in this case.

Site 1

Analytical results for soils at Site 1 were evaluated to estimate risks associated with different, potential uses of the property. Risks were assessed for both the planned commercial/industrial use of the property as well as potential residential use. The routes of exposure were assumed to be incidental ingestion and inhalation.

The risk evaluation indicates that Site 1 surface soils present an incremental carcinogenic risk (ICR) of 7.49×10^{-4} under residential use. This risk is not within the acceptable range. The primary contributors to this risk are PAHs and PCBs. Pesticides (dieldrin and heptachlor epoxide) also contributed to the risk but to a lesser extent. The evaluation found the ICR for surface soils under the planned industrial/commercial use was 8.34×10^{-5} and thus within the acceptable range.

The total HI for surface soil under residential use was 1.8, which suggests a potential unacceptable noncarcinogenic risk. This HI was greater than one due to iron. However, iron's risk-based concentration is based on an allowable daily intake set for nutritional guidelines and results in calculated risk which may be considered conservative. The total HI for surface soil under commercial/industrial use was 0.068 and well within the acceptable range.

An evaluation of limited subsurface soil data found carcinogenic and noncarcinogenic risks under both residential and industrial use to be acceptable.

Lead has been detected in Site 1 surface soils at levels exceeding 1000 mg/kg. Per an EPA Office of Solid Waste and Emergency Response Directive, CERCLA cleanup levels of 400 mg/kg and 1000 mg/kg have been established for lead in soil in residential and industrial areas, respectively. This suggests that lead in Site 1 soils presents a threat under both residential and industrial use.

In assessing threats posed by Site 1 to groundwater, in addition to the aforementioned detection of 1,2-DCA, chloroform, aldrin, and heptachlor epoxide were detected in one or two downgradient wells at concentrations that exceeded the 10^{-6} risk screening level for domestic water use.

Ecological risks posed by soil/waste at Site 1 are addressed in a draft Basewide Ecological Risk Assessment (ERA) for the former NSWC-White Oak dated December 2000. This ERA found that soils (gneiss soil type) at Site 1 should contain no greater than 2.4 mg/kg of PCBs (as an average concentration at the site) or 470 mg/kg of total PAHs to ensure protection of ecological receptors. The representative concentration of PCBs in Site 1 surface soils has been calculated as 26.3 mg/kg, which is in exceedance of the target level. The maximum concentration of total PAHs detected in a surface soil sample at Site 1 was 1,078 mg/kg which is also in exceedance of the target level. PCBs and PAHs are the only contaminants in Site 1 soil which were found to present a threat to the environment.

Site 2

A more detailed human health risk assessment was performed for Site 2. The assessment was conducted using available RI data, which consisted primarily of surface soil data, but also included groundwater, sediment, and surface water data. Receptors evaluated included full time workers, maintenance/utility workers, construction workers, adult recreational users, adolescent trespassers, day care center children, and child and adult residents. It was assumed that maintenance/utility workers and construction workers would be exposed to surface and subsurface soil while the other receptors would be exposed only to surface soil.

The estimated ICR for the construction worker was less than $1x10^{-6}$, while the ICRs for full time worker, maintenance/utility worker, adult recreational user, adolescent trespasser, and day care center child were within acceptable target risk range of $1x10^{-6}$ to $1x10^{-4}$. The ICR calculated for adult residential exposure to soil was $1.9x10^{-4}$ and therefore unacceptable. The elevated carcinogenic risks are attributable to PAHs and PCBs in surface soil.

The calculated total HIs for soil exposure by a day care center child, adult resident, and child resident all exceeded one. However, for the day care center child and the adult resident, the HIs for soil for the individual target organs were less than one, indicating that no toxic effects are anticipated. The calculated HI for the potential child resident exposure to soil was 1.1 due to manganese. The HIs for all other receptors were calculated to be less than one.

In assessing risks posed by Site 2 to groundwater, in addition to the aforementioned detection of TCE and arsenic, chloroform has been detected in two wells at levels exceeding a 10-6 carcinogenic risk for domestic water use and manganese has been detected in one well at a level exceeding an HI of 1 for domestic water use.

Surface Water and Sediment

Surface water and sediment in a swale and intermittent stream collecting surface drainage and groundwater from Site 1 and Site 2 was sampled to assess the potential impact of the landfills on environmental receptors. The range of PCB concentrations detected in sediment samples collected from the swale and stream was 0.42 mg/kg to 143.1 mg/kg. Levels of low molecular weight (LMW) and high molecular weight (HMW) PAHs in the sediment of the drainage swale and intermittent stream range from to 0.05 mg/kg to 24.8 mg/kg and 0.6 mg/kg to 17.1 mg/kg, respectively. The detected PCBs and PAHs appear to be attributable to Site 1 and/or Site 2. Results from the ERA indicate that PCB levels of greater than 1 mg/kg in sediment present an unacceptable risk to ecological receptors. The ERA also indicates that LMW PAH concentrations greater than 3.2 mg/kg and HMW PAH concentrations greater than 9.6 mg/kg pose unacceptable risks to ecological receptors. The ERA found that PCBs and PAHs were the only contaminants in the sediment that present a threat to the environment. Surface water in the swale and stream was not found to present a threat to the environment.

A human health risk assessment was also conducted for sediment. The ICR for sediment was estimated at $2.4x10^{-4}$ to a potential adult resident, slightly in excess of the acceptable range. The primary contributors to this estimated risk were PAHs and PCBs. The HI for adult resident exposure to sediment was estimated at 1.05, slightly in excess of the acceptable level. The primary contributor to the HI was manganese. Sediments also presented unacceptable risks to potential child residents.

Contaminant levels found in surface water were found to pose no threat to human health or ecological receptors.

Summary of Risks

The Site 1 and Site 2 landfills are sources of groundwater contamination that have resulted in contaminant concentrations in the groundwater that exceed MCLs.

Concentrations of contaminants in Site 1 and Site 2 surface soils present a threat to environment and present an unacceptable risk for residential use. However, these soils do not present a threat under the planned commercial/industrial use of the property.

Sediment impacted by Site 1 and/or Site 2 presents a threat to the environment and to potential residential receptors. Surface water does not present a threat to any receptors.

Based on the findings above, actual or threatened releases of hazardous substances from Site 1, Site 2 and associated sediment at the former NSWC-White Oak, if not addressed by a response action, may present potential or actual threats to public health, welfare and the environment.

RESPONSE ACTION OBJECTIVES

Based on the RI and the risk assessment, the objectives of the response action for OU2 are as follows:

- Prevent direct contact with landfill contents/surface soils.
- Minimize infiltration and resulting contaminant migration to groundwater.

- Control surface water runoff and erosion.
- Eliminate exposure of human and ecological receptors to sediment of concern.

The first three objectives are consistent with the presumptive landfill remedy. The forth objective is not required under the presumptive landfill remedy, but it is necessary so that the response action for OU2 is protective of human health and the environment.

SUMMARY OF REMEDIAL ALTERNATIVES

Where a presumptive landfill remedy of containment is being applied, the remedy components to be considered may be limited to (1) a landfill cap, (2) source area groundwater control, (3) leachate collection and treatment, (4) landfill gas collection and treatment, and (5) institutional controls, unless site conditions dictate otherwise.

Based on an evaluation of these and various other response options, and as allowed by EPA's presumptive remedy guidance, two response alternatives have been developed for OU2. Alternative 1 is no action. An evaluation of this alternative is required by the NCP. Alternative 2 is the presumptive remedy as applied to Site 1 and Site 2 and includes a remedy for sediment. A summary of these two alternatives is provided below.

Alternative 1 - No Action
Estimated Capital Cost: $0
Estimated Annual Operation and Maintenance (O&M) Cost: $0
Estimated Present Worth Cost: $0
Estimated Construction Time Frame: 0 Months

No action would be taken under this alternative. In addition, no monitoring would be performed.

Alternative 2 – Multimedia Cap
Estimated Capital Cost: $6,800,000
Estimated Annual O&M Cost: $43,000
Estimated 5-Year Review Cost: $10,000
Estimated Present Worth Cost: $7,300,000
Estimated Construction Time Frame: 8 Months

Based on site conditions and the results of the RI, leachate collection/treatment is not necessary. In addition, source area groundwater control for the purpose of ensuring containment does not appear to be necessary and impacted groundwater will otherwise be evaluated as a separate OU and documented in a separate Proposed Plan and decision document. Finally, landfill gas requires collection (i.e., venting) but should not require treatment. Therefore, for OU2 the presumptive remedy alternative (Alternative 2) includes three of the above components - a multimedia cap to provide for containment of the landfill contents/soils and sediment, landfill gas venting, and institutional controls. The seven major components of Alternative 2 are described below in the sequence in which they would be implemented.

Component 1 - Excavation, regrading, and/or consolidation of soil, waste, and sediment

Soil/waste outside of the area of the proposed cap would be excavated and consolidated within the area to be capped. Excavation would remove all soils that pose a threat to the environment and the receptors associated with the planned

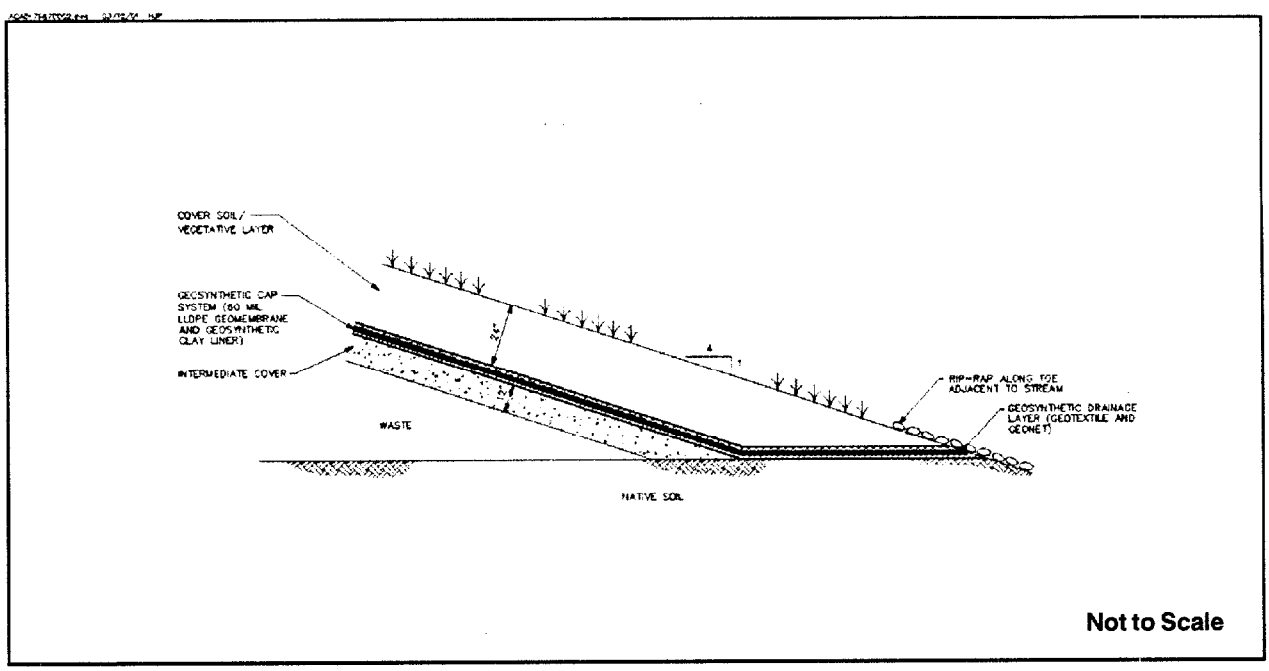

Figure 3 - Proposed Multimedia Cap

commercial/industrial use of the property (i.e., soil with COC concentrations that are in excess of the remedial action levels identified in the CMS and any additional soil with COC concentrations that result in unacceptable risks per a supplemental risk assessment). Any low-hazard military waste (e.g., metal ordnance shapes) encountered would be removed, evaluated and, where appropriate, the metal recycled for consolidation under the cap.

Up to 1,300 cubic yards of sediment would be excavated and consolidated under the proposed cap. Excavation would remove all sediments that pose a threat to human health and the environment (i.e., sediment with COC concentrations in excess of remedial action levels identified in the CMS).

Waste and soil within the cap area would be regraded to provide for the construction of the cap. Any metal ordnance shapes encountered would be handled as described above.

Component 2 - Treatment/disposal of hot spots, if encountered, and waste water

Any material encountered during excavation or regrading which could not be contained under the cap due to Applicable or Relevant and Appropriate Requirements (ARARs) identified in the CMS would be removed for offsite disposal/treatment. These hot spots may include RCRA hazardous waste and high-hazard military waste. The probability of encountering high-hazard military waste is considered to be low.

Dewatering is expected to be necessary during excavation and/or regrading activities. Wastewater collected during dewatering would be collected and treated/disposed offsite.

Component 3 - Restoration of excavated areas

Areas of soil/waste excavation would be restored by placing and grading 1-foot of clean fill over the area and revegetating the area.

Areas of sediment excavation would be restored as necessary to prevent erosion, retain flow capacity, and maintain the cap.

Component 4 - Construction of engineered multimedia cap components

An engineered multimedia cap would be constructed over consolidated soil, sediment, and waste. The total area of the cap would be approximately 5.5 acres and it would cover approximately 86,300 cubic yards of material. The multimedia cap would meet or exceed the federal and state solid waste [40 Code of Federal Regulations (CFR) 258/Code Of Maryland Regulations (COMAR) 26.04] and hazardous waste (40 CFR 264/COMAR 26.13) landfill closure requirements. While high-hazard military waste is not expected to be present, the cap would meet Department of Defense (DOD) Standard 6055.9, which provides acceptable containment given the planned, controlled use of the site. The cap would limit infiltration into the landfill and include a 12-inch fill layer over landfilled material, a geosynthetic-clay liner, a flexible membrane liner, a passive landfill gas collection and venting system, and a geosynthetic drainage layer covered by 24-inches of cover and top soil. The proposed multimedia cap is shown on Figure 3.

Component 5 - Installation of surface water controls and vegetation of cap

Temporary surface water controls would be implemented to prevent erosion during construction activities. Permanent surface water controls would be constructed to limit run-on to the cap and to collect and direct run-off from the cap. Because all of the run-on and run-off will not contact any of the soil, sediment, or waste material consolidated under the cap, it will be discharged directly to the adjacent drainage swale. The entire capped area would be vegetated after construction.

Component 6 - Institutional controls

Institutional controls would be implemented to further reduce the potential for exposure to contaminants and to ensure maintenance of the cap. The controls would consist of land use restrictions and/or deed notifications. The Navy would issue a Land Use Control Assurance Plan describing the specific nature of the institutional controls and how they would be implemented.

Component 7 - Monitoring

To evaluate the performance of the cap, groundwater and surface water monitoring would be performed after installation of the cap. The results of the monitoring would be evaluated to ensure the effectiveness of containment remedy, which would be assessed every 5 years.

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 protective of human health or the environment. The contaminants remaining in the soil and sediment would pose risks to both human and ecological receptors.

Under Alternative 2, a multimedia cap would be protective of human health and the environment. The cap would prevent direct exposure to the contaminated soil/waste and consolidated sediment, and minimize contaminant migration to the groundwater and surface water. Treatment and offsite disposal of hot spots encountered during excavation and grading would further minimize risks. Institutional controls would provide added assurance of protectiveness. Monitoring would ensure that the cap is effective.

Media Cleanup Standards

Alternative 1 would not comply with the media clean-up standards for soil or sediment.

Under Alternative 2, all soil/waste outside of the cap and sediment exceeding remedial action levels identified in the CMS would be excavated and consolidated for containment under

EVALUATION CRITERIA FOR RCRA CORRECTIVE ACTIONS

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 Enviornment: The protection of human health and the enviornment provides an overall evaluation of the remedies that would be appropriate for OU2. 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 enviornment 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 enviornmental 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.

the cap. Excavation would continue until sampling confirmed that all remedial action levels had been met and remaining soils/sediments were otherwise protective of potential commercial/industrial use and ecological receptors.

Source Control

Alternative 1 involves no source control, as no action would be performed at OU2.

Alternative 2 includes several source control components. Contaminant sources outside of the planned cap area would be excavated and consolidated under the cap. The cap would be designed to prevent direct exposure, minimize infiltration, and prevent erosion of the landfill. Factors such as flooding potential, slope stability, stream bank stabilization, and settlement would be considered during the design of the cap to ensure effective source control. Hot spots encountered during excavation that could not be contained under the cap per ARARs would be disposed offsite, eliminating these potential contaminant sources.

Waste Management Standards

There are no actions to be implemented for Alternative 1 and, therefore, no waste would be generated.

The proposed multimedia cap for Alternative 2 would meet the requirements of the federal and state solid and hazardous waste disposal regulations (i.e., 40 CFR 258, 40 CFR 264, COMAR 26.04.07, and COMAR 26.13.05). The thickness of the cap and cap construction methods would ensure compliance with the military waste disposal requirements specified in DOD Standard 6055.9. The proposed multimedia cap and institutional controls would meet all ARARs for PCBs. Any hot spots and/or waste water that cannot be capped per ARARs would be treated/disposed offsite as necessary. The federal and state waste regulations would be followed during the handling, transportation, and disposal of the waste.

Long-Term Reliability and Effectiveness

Alternative 1 would not be reliable or effective over the long-term. There are no long-term management controls and there would be no long-term monitoring.

Alternative 2 provides an effective long-term remedy for OU2. The initial constructed cap would be designed for a minimum life span of 30 years and should be effective indefinitely with regular, routine maintenance. The cap would be inspected on a periodic basis and maintenance performed based on these inspections. Institutional controls would help provide for maintenance of the cap. Long-term groundwater and surface water monitoring would be conducted to ensure the effectiveness of the cap.

Reduction in Toxicity, Mobility, or Volume

Alternative 1 involves no reduction in toxicity, mobility, or volume of contaminants other than that which would result from dispersion, dilution, or natural processes.

The multi-media cap under Alternative 2 would reduce the mobility of contaminants by eliminating erosion of contaminants and minimizing infiltration. The cap should lower the water table, minimizing the potential for saturated waste. The toxicity and volume of contaminated soil, sediment, and waste material would be reduced by disposing offsite any material which could not be contained onsite per ARARs.

Short-Term Effectiveness

Alternative 1 involves no action and, therefore, would not pose any risks to on-site workers during construction. There would be no environmental impacts from construction.

Under Alternative 2, environmental conditions would be monitored as necessary to ensure safety of onsite workers and the community. Dust control measures would be employed during construction activities to minimize the emission of particulate contaminants. Erosion and sediment control measures would be maintained during construction. Onsite workers would use proper personal protective equipment (PPE) and observe OSHA guidelines. A majority of the construction under Alternative 2 would be completed within 4 to 6 months.

Implementability

No actions would occur under Alternative 1; therefore, it would be readily implementable.

Alternative 2 would be readily implementable. Resources, equipment, and materials for the cap construction, as well as services for cap construction and maintenance would be readily available. Offsite disposal sites would be available for any identified hot spots. Groundwater and surface water monitoring could be easily implemented. The institutional controls under Alternative 2 should be readily implementable with the cooperation of the current owner of the property, the General Services Administration. A transfer of property outside of the federal government would require the implementation of deed restrictions.

Cost

The costs associated with Alternatives 1 and 2 are summarized below. The details of the cost estimate for Alternative 2 is provided in the CMS.

	Alternative 1	Alternative 2
Capital Cost:	$0	$6,800,000
O&M Costs:	$0	$43,000
Present Worth:	$0	$7,300,000

State Acceptance

The State of Maryland supports the preferred alternative, Alternative 2.

Community Acceptance

Community acceptance of the preferred alternative, Alternative 2, will be evaluated after the public comment period ends and will be described in the ROD for OU2.

SUMMARY OF THE PREFERRED ALTERNATIVE

The preferred alternative for OU2 is Alternative 2. This presumptive containment remedy for landfills will prevent direct contact with and erosion of the Site 1/Site 2 landfill contents and associated soils, and limit infiltration of water into the landfilled area. In addition, contact of potential ecological and human receptors with sediment of concern will be eliminated. This will be accomplished by installation and maintenance of a multimedia cap over the landfill area, excavation and placement of the sediment under the cap, and implementation of institutional controls and monitoring. Any hot spots encountered during construction that could not be contained by the cap per ARARs would be disposed offsite.

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 *PG Journal*, *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 during the public meetings will be summarized and responses provided in the Responsiveness Summary section of the ROD. The ROD is the document which 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:

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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.

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

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

Corrective Measures Study (CMS): A CMS is prepared to develop and evaluate corrective measure alternative(s) and to recommend the final corrective measure(s) for a site. This study is one of the four components of the Corrective Action Plan for a site under RCRA. The study is similar to a Feasibility Study that is completed under CERCLA.

Ecological Receptor: A plant or animal that is introduced to a compound in 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 a chemical from on-site exposure divided by the reference dose for that chemical. 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.

Incremental Cancer Risk (ICR): Probability of developing cancer as a result of being exposed to a hazardous substance.

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.

Monitoring: Ongoing collection of information about the environment that helps gauge the effectiveness of a clean-up action. This includes the collection of samples with laboratory analysis for the contaminants of interest.

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.

Net Present Worth: A present-worth analysis is used to evaluate costs that occur over different time periods by discounting all future costs to a common base year. It represents the amount of money that, if invested in the base year and dispersed as needed, would be sufficient to cover all costs associated with the remedial action over its planned life. Net present worth considers both capital (construction) costs and costs for annual operation and maintenance.

Organic Compounds: These are naturally occurring or man-made chemicals containing carbon. Volatile organics can evaporate more quickly than semivolatile organics. Other organics 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.

Polycyclic Aromatic Hydrocarbons (PAHs): A group of chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances. PAHs can be man-made or occur naturally.

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 Facilitiy 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 a site. 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.

Remedial Investigation (RI): Investigation and analytical studies which gather data needed to determine the type and extent of contamination and establish criteria for cleaning up the site.

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.

Risk Based Concentrations (RBC): Concentrations of constituents that correspond to a hazard quotient of 1 or a risk level of one-in-one million based on EPA's default exposure assumptions.

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.

Target Risk Range: Defined by EPA as by the range of 10^{-4} (one-in-ten-thousand) to 10^{-6} (one-in-one million).

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

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MAILING LIST

If you are not on the mailing list and would like to receive future publications pertaining to OU2 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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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 OU2 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 April 28, 2001. Comments can be submitted via mail, e-mail, or fax and should be sent to the following addressee:

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