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Proposed Plan

SWMU 14 (Q-50 Satellite Accumulation Area)

Naval Station Norfolk
Norfolk, Virginia
August 2009

1 Introduction

This **Proposed Plan** identifies the Preferred Remedial Alternative and provides the rationale for addressing historical releases at the **Solid Waste Management Unit (SWMU)** 14 (Q-50 Satellite Accumulation Area) at Naval Station, Norfolk (NSN). The U.S. Navy (Navy) proposes the implementation of **Land Use Controls (LUCs)** to effectively limit **site** access and to protect against human exposure to soil and groundwater that would result in an unacceptable risk at SWMU 14.

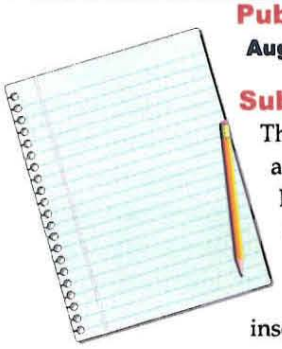
This Preferred Alternative is presented jointly by the Navy, the lead agency for site activities, and the **U. S. Environmental Protection Agency (USEPA)** Region III, in consultation with the **Virginia Department of Environmental Quality (VDEQ)**, the support agency. The Navy and USEPA, in consultation with VDEQ, will make the final decision on the remedial approach for SWMU 14 after reviewing and considering all information submitted during the 30-day **public comment period**. The Navy and USEPA, in consultation with VDEQ, may modify the Preferred Alternative or select a different **remedial action** based on new information or public comments. *Therefore, public comment on each alternative is invited and encouraged.* Information on how to participate in this decision making process is presented below and in Section 9.

The Navy is issuing this Proposed Plan as part of its public involvement responsibilities under Section 117(a) of the **Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)**, as amended, and Section 300.430(f)(2) of the **National Oil and Hazardous Substances Pollution Contingency Plan (NCP)**. This Proposed Plan summarizes information that can be found in greater detail in the June 2009 **Focused Feasibility Study (FFS)** for SWMU 14, Q-50 Satellite Accumulation Area, and other documents available in the **Administrative Record** file and **Information Repository** for NSN (see Section 9). This plan summarizes the following:

> Technical or administrative terms used in this document are called out in bold text the first time they appear and are included in the Glossary on page 17.

- Site Background (Section 2)
- Site Characteristics (Section 3)
- Scope and Role of Proposed Plan (Section 4)
- Summary of Site Risks (Section 5)
- **Remedial Action Objectives (RAOs)** (Section 6)
- Evaluation of Alternatives (Section 7)
- Preferred Alternative (Section 8)
- Community Participation (Section 9)

Mark Your Calendar for the Public Comment Period



Public Comment Period

August 5 - September 5, 2009

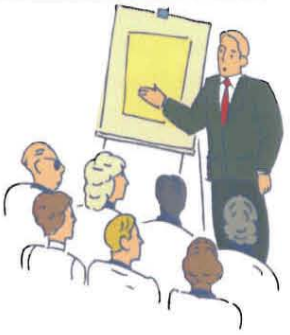
Submit Written Comments

The Navy, USEPA, and VDEQ will accept written comments on the Proposed Plan during the public comment period. To submit comments or obtain further information, please refer to the insert page.

Attend the Public Meeting

August 26, 2009 at 6:30 p.m.
Place - Larchmont Library
6525 Hampton Boulevard
Norfolk, Virginia 23508

The Navy will hold a public meeting to explain the Proposed Plan. Verbal and written comments will also be accepted at this meeting.



Location of Information Repository

For more information about SWMU 14, see the Public Repository at:
Norfolk Main Library
235 East Plume Street
Norfolk, Virginia 23510
(757) 664-7323

2 Site Background

SWMU 14, Q-50 Satellite Accumulation Area, is located in the northwest portion of the city of Norfolk, Virginia (Figure 1) on NSN. Located on 4,631 acres of land, NSN is the largest naval base in the United States. NSN is bounded on the north by Willoughby Bay, on the west by the confluence of the Elizabeth and James Rivers, and on the south and east by the city of Norfolk. A portion of the NSN eastern boundary is formed by Mason Creek. NSN contains approximately 4,000 buildings, 20 piers, and an airfield. The western portion of NSN is a developed waterfront area containing the piers and facilities for loading, unloading, and servicing naval vessels. A network of rail lines in the area services nearby industries. Residential areas surround NSN to the south and east. Willoughby Spit, a residential area northeast of the NSN, is also used for recreational activities. Land use in the surrounding area is commercial, industrial, and residential. The waterfront area south of NSN provides shipping facilities for several large industries.

The peninsula at Sewell's Point is a manmade land mass formed from two distinct periods of fill activities. The first began in the early 1950s, when the channels were dredged to allow construction of the northernmost series of piers at the site. The resulting dredge material was used to create much of the land at Sewell's Point. The second was between 1974 and 1978, when the site's eastern portion was formed from the disposal of construction debris. This disposal area was later designated as Site 9, the Q Area Landfill. SWMU 14, which is co-located with Site 9 (Figure 2), was initially identified from a 1982 Environmental Photographic Interpretation Center (EPIC) aerial photograph (USEPA, 1994) that showed a drum storage area and scrap metal pile north and east of the concrete pad, respectively. Furthermore, historical plans of the area showed the presence of stockpiled railroad ties and metal debris northeast of the pad. The site was also cited during the 1992 RCRA Facility Assessment (RFA) (A. T. Kearney, 1992) site inspection, when areas of stained soil were observed. Site 9 was initially identified in the Initial Assessment Study (IAS) (ESE, February1983) and reportedly was used for the disposal of non-hazardous construction debris. Site 9 was recommended for No Further Action (Baker, December 1997). However, because Site 9 and SWMU 14 are co-located, future investigation of SWMU 14 encompassed the boundary of Site 9.

Investigations began at SWMU 14 when Baker Environmental, Inc. (Baker) was contracted to complete two Relative Risk Ranking (RRR) studies from 1995 to 1996 to evaluate the presence of contamination and potential **exposure pathways** (Baker, 1996a; 1996b). Based on the findings of these studies, a Confirmatory Site Investigation and Supplemental Investigation were conducted to evaluate SWMU 14, among other SWMUs (CH2M HILL, 2000). The objectives were to determine the extent of contamination at each SWMU, to develop and evaluate economically feasible remedial alternatives for each SWMU, and to close out appropriate SWMUs. Based upon the findings, SWMU 14 was recommended for additional investigation.

Three **Remedial Investigation (RI)** phases were conducted in 1999, 2000, and 2001 to assess the extent of the fill material and **groundwater** impacts at SWMU 14. A fourth, final phase was initiated in 2002 to fill data gaps from Phases I through III that were identified by the Tier I Partnering Team (CH2M HILL, 2004). Sediment pore water samples were collected and analyzed in 2006 to evaluate groundwater discharge into the adjacent Willoughby Bay for potential ecological receptors (CH2M HILL, 2007). No preferential pathway and associated potential risk were identified for the groundwater discharge to surface water, and no further action was recommended for ecological receptors. An **Engineering Evaluation/Cost Analysis (EE/CA)**, finalized in March 2008 (CH2M HILL, 2008), documented evaluation of a **Non-time-critical Removal Action (NTCRA)** to mitigate potential human health risk associated with direct contact to contaminated soil and groundwater beneath the former staging areas. The NTCRA, which was performed in 2008, included filling as necessary to achieve appropriate grades and installing an asphalt cover (parking lot) with associated drainage piping, electrical conduits, and bioretention features to manage stormwater in the subsurface. The construction activities are documented in the *Final Completion Report, SWMU 14, Q-50 Satellite Accumulation Area, Naval Station Norfolk, Norfolk, Virginia Construction* (Shaw, 2009). The asphalt cover layout that serves as a parking lot is shown in Figure 3.

3 Site Characteristics

General Characteristics

SWMU 14 is in the northeast corner of Sewell's Point (Figure 1) and is co-located with Site 9 (Figure 2). The site consisted of a concrete storage pad surrounded by a grass-covered field that was sometimes used as a temporary parking lot when the adjacent lots were full. The original pad served as a less-than-90-day hazardous waste accumulation area, where materials generated through various streams were sampled, identified, labeled, and packaged before being shipped for eventual disposal. The pad was later removed and replaced by a second pad, which was used for temporary storage of environmental investigation-derived waste (IDW) materials (Figure 2). As noted earlier, the 2008 NTCRA provided for a protective cover over the site (an asphalt parking lot).

Soil

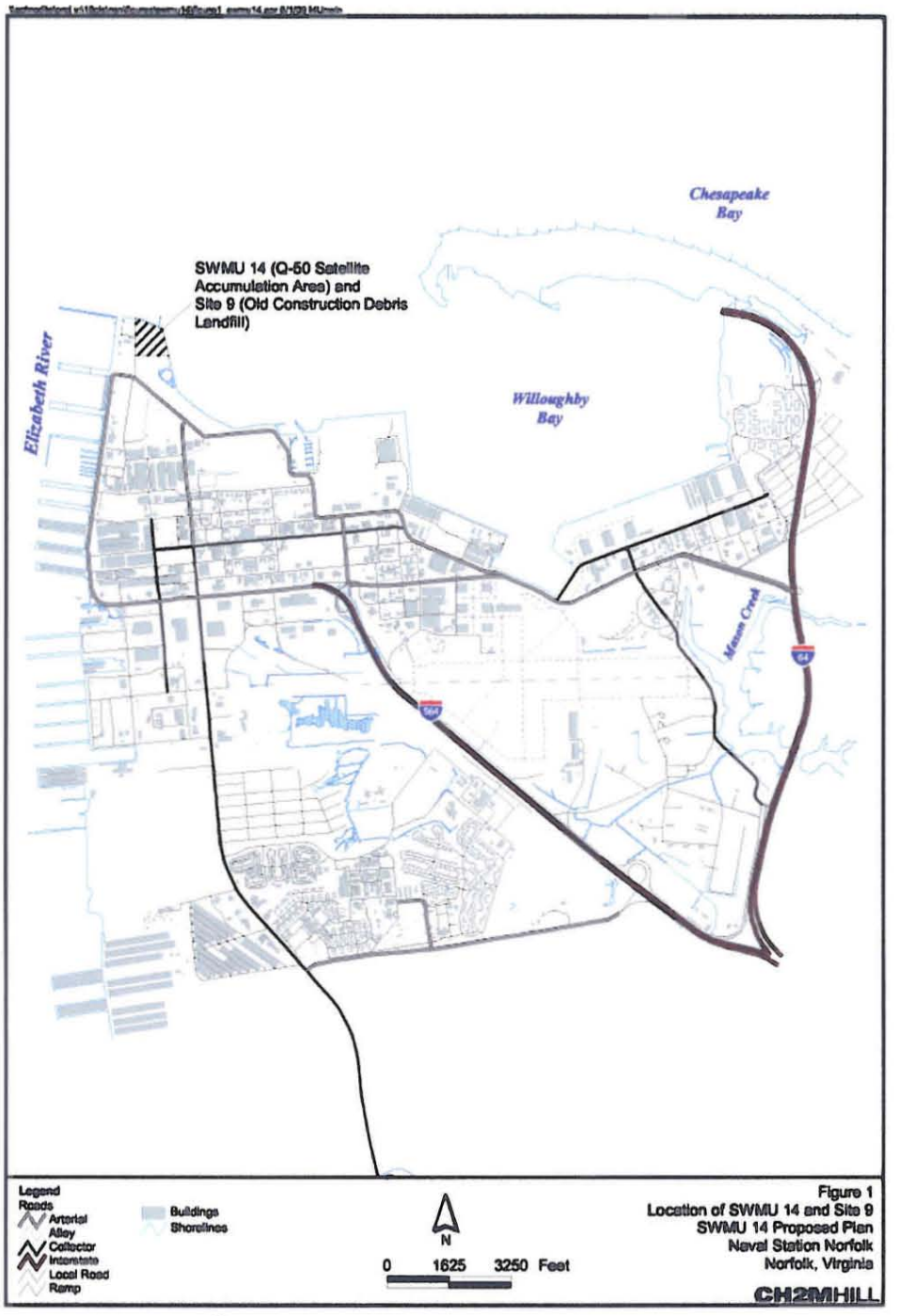
The material at SWMU 14 is characterized by two distinct classifications: dredge fill and construction-debris fill. The dredge fill consists mainly of fine- to medium-grained sand and shell hash in the western half of the Sewell's Point peninsula. Similar material is found below the construction debris fill at 6 to 14 feet deep in the site's eastern portion. The eastern section of the peninsula (Site 9 fill area) consists of construction debris fill composed of black to brown silts and sands, with some gravel pockets. Large amounts of metal debris were observed during test pit and drilling activities. Additionally, coal and glass fragments were noted as well as what appeared to be buried wood pilings.

Groundwater

Two significant groundwater **aquifer** systems lie beneath NSN -- the water-table (Columbia) aquifer and the underlying Yorktown Aquifer. The water-table aquifer at NSN is generally thin and consists of discontinuous heterogeneous sand and shell lenses in the upper 20 to 40 feet (below ground surface) of the Columbia group. The depth to the water-table is usually less than 8 feet. The Yorktown Aquifer is semi-confined beneath a clay layer in the upper Yorktown Formation. Water-bearing zones in the Yorktown Aquifer consist of fine to coarse sand, gravel, and shells. The shallow groundwater at SWMU 14 is located within dredge fill and construction debris fill materials and is not consistent with a natural aquifer system.

The groundwater-level data from the SWMU 14 RI (CH2M HILL, 2004) indicated that the water table was relatively flat across the site, with a fluctuation of approximately 0.6 foot. The highest groundwater elevations were found near the concrete pad, creating a slight groundwater mound near the center of the site that was likely caused by the infiltration of precipitation. Groundwater flow was generally east and north towards Willoughby Bay, and west towards the Elizabeth River. In addition, a slight hydraulic divide appeared to separate the groundwater flow to the east and west along the site's western edge.

Slug tests, conducted to support the RI, showed that the **hydraulic conductivities** at the site ranged from 28 to 106 feet per day (ft/day). This variation in hydraulic conductivity is characteristic of a site composed of heterogeneous material (i.e., varying types of fill). An average hydraulic gradient of 0.0019 foot per foot (ft/ft) was estimated using the groundwater elevation data. Based upon the range of fill materials comprising the subsurface, an assumed effective porosity of 0.35 was used in the calculation. The resulting flow velocity across the site was estimated to be between 56 and 209 feet per year (ft/yr). The 2008 construction of the asphalt parking lot has likely affected the flow of groundwater at the site because of the reduction in infiltration observed. SWMU 14 is bordered by relatively impervious parking lots to the south



and west. The previously estimated groundwater flow may have been affected by the infiltration of precipitation, as observed from a slight mounding effect near the center of the site. Groundwater flow is still anticipated to be north and east toward the adjacent open surface water. Because infiltration has been minimized by the asphalt cover, the mounding is likely to no longer occur, thus limiting the potential for contaminant transport through the subsurface.

Summary of Previous Investigations

This section summarizes the Pre-RI and RI activities conducted in the SWMU 14 area as well as investigations conducted at Site 9.

SWMU 14: Pre-Remedial Investigations (1995 – 1998)

Phase I Summary

As stated earlier, Baker completed two Relative Risk Ranking studies between 1995 and 1996 to evaluate the presence of contamination and potential exposure pathways associated with SWMUs at NSN (Baker, 1996a and 1996b). Surface soil and groundwater samples were collected at SWMU 14 and analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and metals (and cyanide) in 1995 during the Phase I RRR (Baker, 1996a). Several VOCs, SVOCs, and metals were detected in each medium at SWMU 14 above applicable screening and regulatory criteria, warranting further investigation.

Phase II Summary

The Phase II investigation began in 1996 to further delineate the areas of surface soil and groundwater contamination where the concentrations of the Phase I sampling locations exceeded the risk-based criteria. Therefore, surface water, sediment samples, and additional surface soil and groundwater samples were collected from expanded locations at SWMU 14 in 1996 during the Phase II RRR (Baker, 1996b). All media were analyzed for VOCs, SVOCs, and metals. Soil and groundwater samples were also analyzed for pesticides and polychlorinated biphenyls (PCBs). Several VOCs, SVOCs, pesticides, PCBs, and metals were detected in one or more of the media at SWMU 14 above applicable screening and regulatory criteria. Therefore, an additional investigation was recommended to help determine the scope of a RI at SWMU 14 and other SWMUs.

Supplemental Investigation

A Supplemental Investigation was performed in 1998 for SWMUs 9, 10, 12, 14, 16, 28, 32, 33, 34, 35, 38, 40, 41, and

Legend

---- Estimated Landfill Boundary (determined by geophysical survey in 2000)

Accumulation Area Boundary

IDW: Investigation Derived Waste

N

0 100 200 Feet

Figure 2
SWMU 14 Layout
SWMU 14 Proposed Plan
Naval Station Norfolk
Norfolk, Virginia

CH2MHILL

42 (CH2M HILL, 1998). The objectives were to determine the extent of contamination at each SWMU, to develop and evaluate economically feasible remedial alternatives for each SWMU, and to close out appropriate SWMUs. Groundwater, surface soil, and subsurface soil samples were collected from new locations at SWMU 14 and analyzed for VOCs, SVOCs, pesticides, PCBs, and metals. The data showed several VOC, SVOC, PCB, or metal concentrations above applicable screening and regulatory criteria in soil and groundwater at SWMU 14. Therefore, a RI was initiated at SWMU 14.

SWMU 14: Remedial Investigation (1999 - 2004)

Three RI phases were conducted in 1999, 2000, and 2001 to assess the extent of the fill material and groundwater impacts at SWMU 14. Soil and groundwater samples were collected from the site. A fourth and final phase was completed in 2002 to fill data gaps from Phases I through III that were identified by the Tier I Partnering Team (CH2M HILL, 2004). The RI activities for SWMU 14 consisted of a geophysical survey, soil borings, monitoring well installations, and four phases of sampling in 1999, 2000, 2001, and 2002 (CH2M HILL, 2004). The objectives and activities of each phase of the RI are summarized below.

Phase I RI Summary

As part of the Phase I RI, 18 surface and subsurface samples were collected and analyzed for metals, SVOCs, and pesticides/ PCBs. Eight new shallow monitoring wells were installed to collect and analyze groundwater samples for VOCs, SVOCs, pesticides/ PCBs, and metals. Electromagnetic technology was used to establish the extent of the disturbed area and identify buried objects at SWMU 14. The survey covered the entire area of the grass field and concrete pad. Following a review of the data, a ground-penetrating radar survey was performed to assess large anomalies identified in the electromagnetic survey. The result of the survey was a revised estimated boundary for SWMU 14.

Phase II RI Summary

The Phase II RI involved sampling of the groundwater, surface soil, and subsurface soil. Twenty surface and 17 subsurface soil samples were collected and analyzed for VOCs, SVOCs, pesticides/PCBs, and metals. Samples from six new shallow monitoring wells and one existing monitoring well were collected and analyzed for VOCs, SVOCs, pesticides/PCBs, and metals.

Phase III RI Summary

Activities that occurred during the Phase III RI included exploratory test pitting, groundwater sampling, surface soil sampling, and subsurface soil sampling. Four shal-

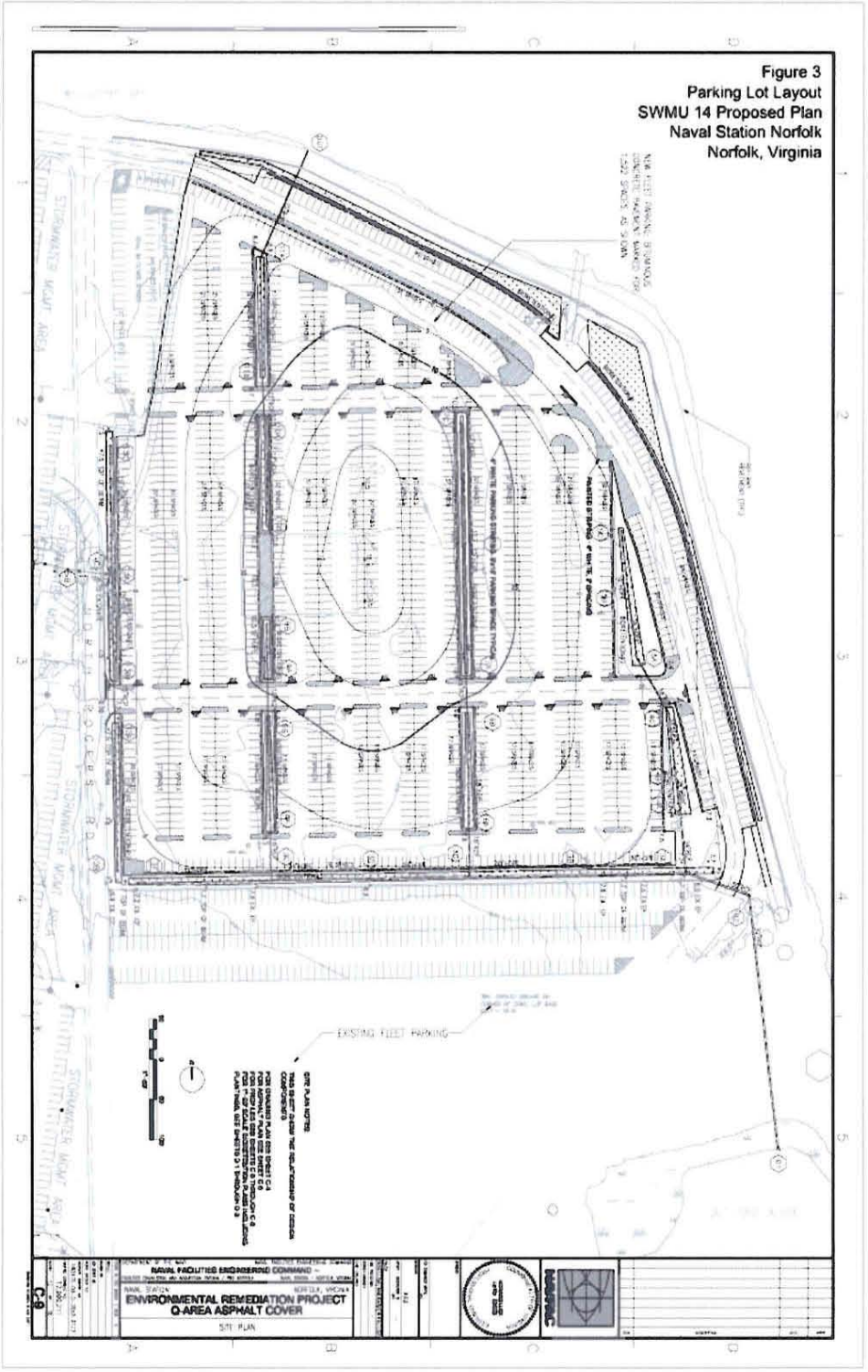


Figure 3
Parking Lot Layout
SWMU 14 Proposed Plan
Naval Station Norfolk
Norfolk, Virginia

low monitoring wells were installed, sampled, and analyzed for VOCs, SVOCs, pesticides/PCBs, and metals. Nine surface and eight subsurface soil samples were collected and analyzed for VOCs, SVOCs, pesticides/PCBs, and metals from 11 new soil borings. Five of these samples were also analyzed for dioxin and pentachlorophenol.

Phase IV RI Summary

As part of the Phase IV RI, five sediment samples were collected and analyzed for SVOCs, pesticides/PCBs, metals, pH, grain size, and total organic carbon; four surface soil samples were collected and analyzed for lead; and five groundwater samples from select monitoring wells were collected and analyzed for VOCs, SVOCs, pesticides/PCBs, metals, cyanide (total and free), total suspended solids (TSS) and total dissolved solids. This phase of the RI focused on the evaluation of potential impacts of contaminated media on ecological and human receptors.

RI Results

The results of Phases I, II, III, and IV of the RI are the following:

- Groundwater analytical results indicated exceedances of the screening criteria (risk-based concentrations [RBCs] and maximum contaminant levels [MCLs]) for VOCs, SVOCs, pesticides, and metals;
- Surface soil samples indicated exceedances of screening criteria for VOCs, SVOCs, pesticides, PCBs, metals, and dioxins/furans;
- Subsurface soil samples detected SVOCs, pesticide, PCBs, metals, and dioxin/furans at concentrations exceeding the screening criteria; and
- Sediment samples collected at the SWMU 14 lagoon indicated arsenic and iron concentrations above both human health and ecological screening values; SVOC, pesticides, and PCB concentration did not exceed their respective RBCs.

Trident Probe Pore Water Sampling Investigation Summary

A Trident Probe study was conducted in September 2006 (CH2M HILL, 2007) to evaluate potential ecological concerns regarding the discharge of site groundwater to the surrounding surface water bodies. The Trident Probe is a direct-push, integrated temperature sensor, conductivity sensor, and sediment pore water sampler designed to detect areas where groundwater may be discharging to a surface water body. Differences in observed conductivity and temperature indicate areas where groundwater discharge is occurring. The integrated pore water sampler can be used to rapidly collect samples of the pore water for chemical analysis.

The results of the Trident Probe study indicated that there were no strong areas of groundwater discharge from SWMU 14 to the James River or Willoughby Bay and that there was significant attenuation by mixing with surface water in the weak discharge zones identified. The potential impact of possible chemical migration via groundwater from SWMU 14 to the James River and Willoughby Bay was negligible because pore water concentrations for site-related ecological risk drivers were less than detection limits, less than screening values, or were consistent with background. Based on this additional information, it was concluded that there is no unacceptable ecological risk from groundwater discharging from beneath SWMU 14 to the surrounding water bodies.

Groundwater Evaluation Summary

An evaluation of the groundwater analytical results from the RI indicated exceedances of the screening criteria for VOCs, SVOCs, pesticides, and metals. However, a further evaluation of the groundwater, as summarized in the *Rationale for "No-Treatment" Strategy for Groundwater at SWMU 14/Site 9, Q-50 Satellite Accumulation Area, Naval Station Norfolk, Norfolk* (CH2M HILL, 2008), indicated that no action was necessary for groundwater. The rationale for this determination included:

- **The groundwater is present in an area of fill, or "made land," and is not within a naturally occurring aquifer system.** Based on the soil borings and historical photos for SWMU 14/Site 9, the soil beneath the site is characteristic of fill and not the Columbia Aquifer or any natural aquifer system.
- **NTCRA.** The asphalt cover installed will minimize infiltration of precipitation into the fill beneath SWMU 14, thus minimizing migration of leachable constituents from the unsaturated fill into groundwater beneath SWMU 14.
- **No unacceptable ecological risk is associated with groundwater discharging from beneath SWMU 14.** The 2006 Trident Probe study conducted to evaluate the potential ecological risks associated with the groundwater discharge found that there were no strong areas of groundwater discharge from SWMU 14 to the adjacent surface water bodies. Consequently, it was concluded that the potential impact of possible chemical migration via groundwater from SWMU 14 to adjacent surface waters was negligible.
- **According to federal groundwater or drinking water regulations, the groundwater at SWMU 14 is not considered a potable water source.**

- **USEPA**—Groundwater at SWMU 14 is characterized as having a high-to-intermediate degree of interconnection with the adjacent surface water, and thus is not considered a potential source of drinking water (USEPA, 1986).

- **According to state and local groundwater or drinking water regulations, the groundwater is restricted at SWMU 14.**
  - **Virginia State Health Department**—Although groundwater at SWMU 14 cannot be classified as an aquifer, it is the water which is present at the water table. Additionally, according to 12 VAC 5-590-840, the shortest permitted casing length for wells is 50 feet (Class II, Type B), which would extend below the bottom depth of the material beneath SWMU 14 that contains the water table aquifer.
  - **City of Norfolk Health Department**—Prohibits the use of groundwater for public or private potable water under law ordinance Chapter 46.1, Reference 46.1-5.

SWMU 14: Engineering Evaluation/Cost Analysis

Based on the RI results and recommendations from the NSN Tier I Partnering Team, an EE/CA was prepared in 2008 in accordance with the CERCLA process to evaluate alternatives for addressing potential risks posed by site soil (CH2M HILL, 2008). An NTCRA was evaluated to address soils in SWMU 14 affected by polycyclic aromatic hydrocarbons (PAHs), antimony, arsenic, iron, manganese, thallium, and vanadium from past landfilling and waste storage activities onsite. The main objective of the NTCRA for SWMU 14 was to prevent human exposure to contaminants in the soil. The four alternatives evaluated under the EE/CA were:

(1) No Action (required for all EE/CA evaluations, providing a baseline against which to assess other alternatives);

(2) Soil Cover

(3) Asphalt Cover (Parking Lot)

(4) Excavation and Offsite Disposal

A comparative analysis of the alternatives included evaluating the effectiveness, implementability, and cost of each. The evaluation of effectiveness included reviewing the protectiveness of the alternative for health and environmental health, compliance with **Applicable or Relevant and Appropriate Requirements (ARARs)** to the extent practicable, long-term effectiveness and permanence, reduction in toxicity, mobility, or volume of contaminants, short-term effectiveness, and its ability to meet the RAO. Implementability included looking at the technical feasibility, availability, and administrative feasibility of the alternatives. The evaluation of cost included a review of capital costs and total net present values of each alternative.

Based on the EE/CA findings (CH2M HILL, 2008), Alternative 3, the asphalt cover (parking lot), was recommended as the Preferred Alternative. Under Alternative 3, soil and groundwater that were found to potentially pose unacceptable risks to human receptors remained at the site, but were covered to prevent exposure. The EE/CA was made available for public review and comment from January 25, 2008 to February 25, 2008; no comments were received and a public meeting was not requested by the public during the public comment period.

Non-time-critical Removal Action

In 2008, the NTCRA recommended in the EE/CA was implemented. Following site preparation activities, stormwater drainage and utility trenches were excavated, and clean backfill was placed to amend the grade as necessary. Sub-grade stormwater drainage piping, bioretention areas, and electrical conduits were installed onsite and the area was then paved with asphalt for use as a parking lot. Soil and groundwater that were found to potentially pose unacceptable risks to human receptors remained at the site. Figure 3 depicts the layout of the site with the completed parking lot. The new parking lot covers SWMU 14. The asphalt cover prevents exposure to soil and groundwater.

Focused Feasibility Study

Two alternatives, (1) no action and (2) LUCs, were developed and evaluated as remedial action alternatives in the FFS. The alternatives were evaluated against NCP criteria in preparation for the SWMU 14 Proposed Plan.

4 Scope and Role of Response Action

In 1975, the Department of Defense (DOD) began a program to assess past hazardous and toxic materials storage and disposal activities at military installations. The goals of this program, now known as the **Installation Restoration Program (IRP)**, are to identify, evaluate, and remediate environmental contamination resulting from activities that involved hazardous and toxic materials. In 1976, the **Resource Conservation and Recovery Act (RCRA)** was passed by Congress to address human health and environmental issues related to the management and disposal practices of hazardous wastes. In 1980, Congress passed CERCLA, more commonly known as "Superfund." This CERCLA program was put in place to investigate and remediate areas affected by past hazardous waste management practices and is administered by USEPA. The DOD's IRP is implemented in accordance with CERCLA, the Defense

Environmental Restoration Program (DERP) (10 U.S.C. 2701 et seq.), and all applicable state laws. Additionally, the President of the United States, by Executive Order, has delegated certain CERCLA responsibilities to DOD for defense facilities such as NSN.

In 1997, NSN was placed on USEPA's **National Priorities List (NPL)** of Superfund sites.

The following Installation Restoration (IR) sites and SWMUs have been investigated following the CERCLA process, with an action **Record of Decision (ROD)** for closure of each site or SWMU performed pursuant to a ROD.

- Site 1: Camp Allen Landfill (1996)
- Site 2: NM Slag Pile (2000)
- Site 3: Q-Area Drum Storage Yard (1996)
- Site 4: P-71 Transformer Storage (1991)
- Site 6: CD Landfill (1996 and 1998)
- Site 19: Buildings V-60/V-90 (1989)
- Site 20: Building LP-20 Site (1996)
- Site 22: Camp Allen Salvage Yard (2004)
- Site 23: Building LP-20 Plating Shop (2008)

Two IR sites have been remediated by removal actions:

- Site 5: Pesticide Disposal Site was remediated by a soil removal completed November 1999
- Site 21: Building W-316 was remediated by a soil removal completed August 1998

Seven IR Sites and 16 SWMUs were investigated and closed out without a ROD.

- Site 7: Inert Chemical Landfill
- Site 8: Asbestos Landfill
- Site 9: Q Area Landfill
- Site 10: Apollo Fuel Disposal Sites
- Site 12: Alleged Mercury Disposal Site
- Site 16: Chemical Fire Building X-136
- Site 17: Chemical Fire Building X-215
- SWMU 1: SP-20 Accumulation Area
- SWMU 4: PWC Sandblast Area
- SWMU 6: Building V-28 Waste Pit
- SWMU 8: Fire-fighting School
- SWMU 9: LP-200/MAC Terminal
- SWMU 10: LP-200/MAC Terminal East
- SWMU 28: Potable Solid Waste Disposal South of CEP 201
- SWMU 32: Solid Waste Disposal Area CEP 160/161 Embankment
- SWMU 33: Debris Piled as Seawell
- SWMU 34: Solid Waste Disposal Area at CEP 200
- SWMU 35: Solid Waste Disposal Area CEP 196/ Resolute Embankment
- SWMU 38: CD Area Behind Compost Yard
- SWMU 39: Open Dump & Disposal Area near boundary of Camp Allen Landfill
- SWMU 40: MCA-603 Pits
- SWMU 41: Disposal Area, CA-99 Golf Course
- SWMU 42: CEP 201 Area

Two SWMUs were investigated and closed out under a No Further Action ROD:

- SWMU 12: Disposal Area Near NM-71
- SWMU 16: NM37 Accumulation Area

Additionally, the NSN Federal Facilities Agreement includes a list of 148 sites for which no further action under CERCLA is required.

One IR site is currently under investigation which will be closed pursuant to a ROD:

- Site 18: Former Naval Magazine Hazardous Waste Storage Area

The purpose of the Preferred Alternative presented in this Proposed Plan is to address all of the potential threats posed by releases from SWMU 14 and to eliminate exposure to sources of contamination that may pose unacceptable human health or ecological risks from contamination at the site. The specific objectives of the preferred remedy are referred to as RAOs, which are listed in Section 6.

5 Summary of Site Risks

Human Health Risk Evaluation

A baseline Human Health Risk Assessment (HHRA) was conducted during the Phase IV RI to evaluate the potential human-health risks associated with the presence of site-related soil, groundwater, surface water, and sediment contamination at NSN SWMU 14 (Table 1). The HHRA evaluated potential noncarcinogenic hazards and carcinogenic risks under current site use (site workers and adult and adolescent trespassers) and potential future site use (construction workers, adult and child recreators, adult and child residents, site workers, and adult and adolescent trespassers). Reasonable maximum exposure (RME) risks were evaluated for all scenarios. Central Tendency Exposure (CTE) risks were evaluated for those scenarios with RME noncarcinogenic hazards above USEPA's target levels (noncarcinogenic hazard above 1 for each target organ/effect) and/or RME carcinogenic risks that exceeded USEPA's target risk level (carcinogenic risk above 10^{-4}). Tables 2 and 3 summarize the RME and CTE noncarcinogenic hazards and carcinogenic risks for all of the receptors evaluated in the risk assessment.

No noncarcinogenic hazards or carcinogenic risks exceeded USEPA's target levels under current site use. Although the current site worker cumulative noncar-

Table 1: Human Health Risk Assessment Description

What is Human Health Risk and How is it Calculated?

A human health risk assessment estimates "baseline risk" posed to receptors exposed to site-related contamination. This is an estimate of the likelihood of health problems occurring if no cleanup action were taken at a site. The Navy undertakes a four-step process to estimate baseline risk at a site:

Step 1: Identify Site-Related Contamination

In Step 1, the Navy looks at the concentrations of chemicals found at a site as well as past scientific studies on the effects these chemicals have had on people (or animals, when human studies are unavailable). Comparisons between site-specific concentrations and concentrations established by the USEPA as generic screening levels that are protective of residential exposure help the Navy to determine which chemicals detected at the site are most likely to pose a potential impact to human health. These chemicals are identified as **'chemicals of potential concern' (COPCs)** and are evaluated in the next steps of the HHRA.

Step 2: Estimate Exposure

In Step 2, the Navy considers the different ways that people might be exposed to the COPCs identified in Step 1, the concentrations that people might be exposed to, and the potential frequency and duration of exposure. Using this information, a "reasonable maximum exposure" (RME) scenario is calculated that portrays the highest level of human exposure reasonably expected to occur. A central tendency exposure (CTE) scenario may also be considered to describe median, rather than the upper limit, exposures. A CTE scenario is probably more representative of the actual risk to a majority of potential receptors.

Step 3: Assess Toxicity

In Step 3, the Navy compiles information on the toxicity of the COPCs. The toxicity assessment defines the relationship between the magnitude of exposure and possible severity of adverse effects, and weighs the quality of available toxicological evidence. Two types of adverse effects are evaluated: carcinogenic and non-carcinogenic. For non-carcinogenic effects, information evaluated includes the type of non-carcinogenic effect that is associated with exposure (e.g., exposure that could result in liver damage).

Step 4: Characterize Site Risk

In Step 4, the Navy combines the information gathered in the previous steps to evaluate whether exposure to site contaminants is sufficient to cause health effects in people exposed to the site contamination. The results of the three previous steps are combined, evaluated, and summarized. The likelihood of any kind of cancer resulting from exposure to chemicals at 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 individual may develop cancer as a result of exposure to site contaminants. For non-carcinogenic health effects, a "hazard index" (HI) is calculated. The key concept here is that a "threshold level" exists below which non-carcinogenic health effects are not expected to occur, even in sensitive receptors. For non-carcinogenic health effects, the HI can be added based on the particular effect or target organ (e.g., if exposure to two or more COPCs at a site would all affect the liver in some way, these can be summed for a liver-specific HI).

cinogenic hazard index (HI = 1.5) exceeded USEPA's target value, the constituents contributing to this hazard do not affect the same organ and there are no individual target organ/effects with an HI greater than 1; therefore, no unacceptable noncarcinogenic hazard exists. Additionally, no noncarcinogenic hazards or carcinogenic risks for exposure to surface water and sediment exceeded USEPA's target levels. Six of the exposure scenarios evaluated for potential future site use identified total RME noncarcinogenic hazards or carcinogenic risks that exceeded USEPA's target levels. These exposure scenarios were:

- Future site worker exposed to subsurface soil
- Future adult resident exposed to subsurface soil and groundwater
- Future child resident exposed to surface soil, subsurface soil, and groundwater
- Future lifetime resident exposed to subsurface soil and groundwater
- Future construction worker exposed to subsurface soil, and groundwater
- Future recreational child exposed to subsurface soil

As with current site worker exposure to surface soil, although the cumulative noncarcinogenic hazard for the future site worker, future child resident, future recreational child, and future construction worker exposed to surface soil, and future recreational adult exposed to subsurface soil exceeded USEPA's target value, the constituents contributing to this hazard do not effect the same organ and there are no individual target organ/effects with an HI greater than 1; therefore, no unacceptable hazards for these media for these receptors exist.

The metals detected in the soil are the principal contributors to the noncarcinogenic hazards associated with exposure to surface soil (iron, thallium, and vanadium) and subsurface soil (antimony, iron, thallium, and vanadium). Exposure to the lead in soil by future child residents could result in levels above USEPA acceptable levels for lead exposure. However, because elevated lead concentrations in soil were found to be randomly distributed across the site regardless of depth, exposure point concentrations used to evaluate risks for exposure to lead are biased high by specific locations not indicative of site-wide concentrations. A comparison of the maximum detected concentrations to facility-wide background soil concentration levels indicated that the concentrations of metals detected at SWMU 14 are likely site-related. Benzo(a)pyrene, dioxins, and arsenic are the primary contributors to the subsurface soil carcinogenic risk.

The main contributors to the groundwater noncarcinogenic hazard are 4-methylphenol, dibenzofuran,

TABLE 2
Summary Table for Risks and Hazards Across Media for All Reasonable Maximum Exposures
SWMU 14
NSN, Norfolk, VA

	Exposure Scenarios										Total Risk for Pathways	Total HI for Pathways	Chemicals with HIs above 1	Chemicals with Risks above 10^{-4}	Chemicals with Risks above 10^{-5}
	Surface Soil (ss)		Subsurface Soil (subs)		Groundwater (gw)		Surface Water		Sediment (sed)						
	Risk	HI	Risk	HI	Risk	HI	Risk	HI	Risk	HI					
Current Site Worker*	3.0E-05	1.5E+00	--	--	--	--	--	--	--	--	3.0E-05	1.5E+00	--	--	Subsurface Soil- Arsenic
Current Trespasser Adult	5.6E-06	2.1E-01	--	--	--	--	--	--	--	--	5.6E-06	2.1E-01	--	--	--
Current Trespasser Adolescent	2.6E-06	2.9E-01	--	--	--	--	--	--	--	--	2.6E-06	2.9E-01	--	--	--
Future Site Worker*	3.0E-05	2.7E+00	2.7E-04	5.3E+00	--	--	--	--	--	--	2.9E-04	8.0E+00	Subsurface Soil - Vanadium	Subsurface soil - Benzo(a)pyrene	Surface soil- Arsenic; subs - Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenz(a,h)anthracene
Future Resident Adult*	NA	1.6E+00	NA	5.4E+00	NA	2.2E+01	--	--	--	--	NA	2.9E+01	Subsurface soil - Vanadium; Groundwater - 4-Methylphenol, Thallium, Arsenic, Iron, Manganese, Vanadium	--	--
Future Resident Child	NA	8.5E+00	NA	2.3E+01	NA	5.4E+01	--	--	--	--	NA	8.5E+01	Surface Soil- Iron, Thallium; Subsurface Soil - Antimony, Iron, Thallium, Vanadium; Groundwater - Dibenzofuran, 4-Methylphenol, Arsenic, Iron, Manganese, Thallium, Vanadium	--	--

NA - Not applicable

TABLE 2
Summary Table for Risks and Hazards Across Media for All Reasonable Maximum Exposures
SWMU 14
NSN, Norfolk, VA

	Exposure Scenarios										Total Risk for Pathways	Total HI for Pathways	Chemicals with HIs above 1	Chemicals with Risks above 10^{-4}	Chemicals with Risks above 10^{-5}
	Surface Soil (ss)		Subsurface Soil (subs)		Groundwater (gw)		Surface Water		Sediment (sed)						
	Risk	HI	Risk	HI	Risk	HI	Risk	HI	Risk	HI					
Future Age-Adjusted Resident	5.9E-05	NA	6.0E-04	NA	7.1E-03	NA	--	--	--	--	7.7E-03	NA	--	Subsurface Soil - Benzo(a)pyrene; Groundwater - Pentachlorophenol, n-Nitroso-di-n-propylamine, Arsenic	Surface soil - Arsenic; Subsurface Soil - Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenz(a,h)anthracene, Dioxin, Indeno(1,2,3-cd)pyrene, Arsenic; Groundwater - Vinyl chloride, Carbazole
Future Construction Worker	3.6E-06	3.7E+00	1.8E-05	1.1E+01	2.3E-05	3.1E+00	--	--	--	--	4.4E-05	1.5E+01	Subsurface Soil - Antimony, Thallium, Vanadium	--	Groundwater – Pentachlorophenol
Future Trespasser Adult	5.6E-06	2.1E-01	4.3E-05	6.8E-01	--	--	--	--	--	--	4.9E-05	8.9E-01	--	--	Subsurface Soil - Benzo(a)pyrene
Future Trespasser Adolescent	2.6E-06	2.9E-01	1.7E-05	8.4E-01	--	--	--	--	--	--	2.0E-05	1.1E+00	--	--	--
Future Recreational Adult**	1.1E-05	4.0E-01	8.3E-05	1.3E+00	--	--	No COPC	No COPC	3.0E-06	1.6E-01	9.7E-05	1.9E+00	--	--	Subsurface Soil - Benzo(a)pyrene
Future Recreational Child	1.7E-05	2.7E+00	1.1E-04	7.5E+00	--	--	No COPC	No COPC	2.7E-06	1.9E-01	1.3E-04	1.0E+01	Subsurface Soil - Thallium, Vanadium	--	Subsurface Soil - Benzo(a)pyrene

***Although total HI for surface soil is above target level of 1, no individual target organs with HI above 1, so no unacceptable hazard**

****Although total HI for subsurface soil is above target level of 1, no individual target organs with HI above 1, so no unacceptable hazard**

NA - Not applicable

No COPC - No chemicals of potential concern (COPCs) identified during initial screening of data to select COPCS. Therefore, risks not quantified for this media.

TABLE 3

Summary Table for Risks and Hazards Across Media for All Central Tendencies

SWMU 14

NSN, Norfolk, VA

	Exposure Scenarios						Total Risk for Pathways	Total HI for Pathways	Chemicals with HIs above 1	Chemicals with Risks above 10^{-4}	Chemicals with Risks above 10^{-5}
	Surface Soil (ss)		Subsurface Soil (subs)		Groundwater (gw)						
	Risk	HI	Risk	HI	Risk	HI			--	--	--
Future Site Worker	NA	--	1.4E-05	--	--	--	1.4E-05	--	--	--	
Future Resident Adult	--	--	NA	9.4E-01	NA	5.4E+00	NA	6.3E+00	Groundwater - 4-Methylphenol	--	--
Future Resident Child	NA	1.5E+00	NA	2.9E+00	NA	1.5E+01	NA	2.0E+01	Groundwater - Dibenzofuran, 4-Methylphenol, Arsenic, Iron, Manganese, Thallium	--	--
Future Age-Adjusted Resident	--	--	2.0E-05	NA	2.3E-03	NA	2.3E-03	NA	--	Groundwater - Pentachlorophenol, n-Nitroso-di-n-propylamine, Arsenic	Groundwater - Vinyl chloride
Future Construction Worker	NA	1.3E+00	NA	2.6E+00	NA	2.9E+00	NA	6.8E+00	--	--	--
Future Recreational Child	NA	6.5E-01	NA	1.4E+00	--	--	NA	2.0E+00	--	--	--

NA = not applicable

naphthalene, arsenic, iron, manganese, thallium, and vanadium. The main contributors to the carcinogenic risk are vinyl chloride, n-nitroso-d-n-propylamine, pentachlorophenol, and arsenic. Based on the groundwater evaluation summary, SWMU 14 groundwater is not suitable for potable use under any scenario.

A more detailed discussion of the site risk screening assessment and results are contained in the Phase IV RI, which is available at the Information Repository.

Based on the results of the risk assessment, an EE/CA was performed. The EE/CA concluded that an NTCRA should be implemented to reduce the potential for unacceptable noncarcinogenic hazard and/or carcinogenic risk associated with exposure to surface soil by a future child resident, and the unacceptable noncarcinogenic hazard and/or carcinogenic risk associated with exposure to subsurface soil by a future site worker, future resident adult and child, future construction worker, and future recreational child.

Following the EE/CA, the NTCRA was implemented to provide a protective barrier as well as serve as usable parking space, limiting potential exposure to the surface and subsurface soil. Tables 2 and 3 summarize the streamlined risk evaluation presented in the EE/CA.

Ecological Risk Evaluation

Six metals (antimony, copper, lead, nickel, thallium, and zinc) and PAHs in surface soil exceeded surface soil screening values or facility-wide background soil concentrations. Copper, lead, and zinc were the inorganics that exceeded both screening values and background concentrations most frequently and at the highest magnitudes. Site-wide, potential risks to terrestrial receptors from exposure to PAHs in surface soils were likely to be limited. There were possible risks to lower-trophic-level receptors utilizing some portions of the terrestrial habitats on SWMU 14; however, these risks were likely to be minimal under both existing and reasonably anticipated future land uses because exposures were likely to be limited based upon the poor surrounding habitat quality (a grassy field that is periodically mowed), and the site's isolated nature (i.e., developed areas to the south and west as well as open water to the north and east). Potential risks to upper-trophic-level terrestrial receptors were minimal because no chemical exceeded a Lowest Observed Adverse Effect Level -based screening value for such receptors even assuming that they would obtain all of their food from the site (an unrealistically conservative assumption given the limited habitat that was present on the site).

Relatively few chemicals exceeded screening values in sediment in the lagoon located southeast of the site. Arsenic was the only inorganic chemical with a mean hazard quotient (HQ) greater than or equal to one based upon detected concentrations. However, arsenic was not found to exceed screening values in site surface soils or groundwater, suggesting that these low-magnitude sediment exceedances are not site related. Four pesticides (4,4'-DDE, 4,4'-DDT, alpha-chlordane, and gamma-chlordane) and one PCB (Aroclor-1260) exceeded screening values based upon mean detected concentrations. While the mean detected concentrations of five individual PAH compounds exceeded screening values, maximum HQs were less than two and the mean HQ for total PAHs was less than one. This suggests that potential risks related to PAHs are minimal in lagoon sediments. A comparison of sediment concentrations to equilibrium partitioning-based sediment values, which provide a measure of bioavailability, suggested that potential exposures and risks were very low for all these organic compounds.

The potential magnitude of contaminant transport via groundwater from SWMU 14 to Willoughby Bay was qualitatively and conservatively evaluated through a comparison of groundwater concentrations with surface water screening values. Total cyanide, manganese, and 4,4'-DDT had mean HQs exceeding one, based upon detected groundwater concentrations and a dilution factor of 10, which is very conservative for this site. Amenable cyanide was not detected in any of the five wells at the same reporting limit as total cyanide. Thus, the cyanide in groundwater is not likely to be present in bioavailable forms and would likely pose a minimal risk to aquatic receptors in Willoughby Bay following discharge. Since no site-specific upgradient wells or facility-specific background wells are available, it was unclear if the observed manganese concentrations are within the range of naturally occurring concentrations in groundwater. However, the maximum manganese concentration in groundwater was found far removed from the source areas and main groundwater flow direction. This suggested that manganese is likely to be present at background levels in groundwater or is not site-related.

The results of the Trident Probe Study discussed in Section 3 indicated there was no preferential pathway for the discharge of groundwater from SMWU 14 into the adjacent surface water bodies.

6 Remedial Action Objectives and Summary of Remedial Alternatives

In June 2009, the Navy completed a FFS for SWMU 14. The document developed remedial action alternatives and provided an evaluation of those alternatives.

The site-specific RAO for SWMU 14 is to implement measures to reduce or eliminate exposure routes that pose a potential unacceptable risk to human health. Based on the reasonably anticipated future use of SWMU 14 as a

parking lot, the existing asphalt cover prevents exposure to soil and groundwater; however, future construction workers could be exposed to affected soil or groundwater during excavations or other intrusive activities. If future land use were to change, additional evaluation would be required to ensure potential risks are mitigated or addressed.

The following alternatives were developed and evaluated in the SWMU 14 FFS to address these risks:

- Alternative 1 - No Action
- Alternative 2 – LUCs

The FFS recommended Alternative 2. This alternative achieves the RAOs by limiting site use to prevent exposure to soil and groundwater that present unacceptable risks. The LUCs would be implemented on the entire asphalt cover and bioretention areas, which will encompass SWMU 14 and collocated Site 9. Under this alternative, any necessary measures for protecting construction workers from exposure to soil would be addressed in a **Remedial Design (RD)**. This recommended alternative meets the NCP evaluation criteria for Superfund sites.

The major components of Alternative 2 include:

- Preparing an RD to outline the objectives of LUCs and to specify measures for implementing the controls, such as, but not limited to, restricting or limiting excavation activities, notification requirements for changes in land use, or posting signs describing the site conditions or restrictions
- Performing periodic site inspections and associated reporting to ensure continued effectiveness of the NTCRA
- Conducting 5-year site reviews and preparing reports required under CERCLA to evaluate the continuing effectiveness, protectiveness, and need for LUCs
- Site approval process includes NSN geographical information system entry. This entry requires land use approval and ensures that the NSN staff uses an environmental checklist.

7 Evaluation of Alternatives

The NCP identifies the **nine evaluation criteria** listed below (see the Glossary for a detailed description of each) for use in comparative analysis of alternatives. Each remedial alternative for SWMU 14 was evaluated against the nine criteria. A comparative analysis of the alternatives is presented in Table 4 and is detailed in the FS.

7.1 Threshold Criteria

Overall Protection of Human Health and the Environment

TABLE 4
Comparative Analysis of Alternatives

		Alternative 1 (No Action)	Alternative 2 (LUCs)
Threshold Criteria	Overall Protection of Human Health / Environment	Not Effective	Effective
	Compliance with ARARs	None	None
	Reduction of Toxicity, Mobility, or Volume	None	None
	Short-Term Effectiveness	Effective under current land use	Effective
	Implementability	Not Applicable	Feasible
	Cost	None	Moderate

Alternative 1, No Action, does not restrict, manage, or monitor site conditions to reduce exposure to contaminants that pose potential risks to human health. Alternative 2 is protective of human health and the environment because potentially unacceptable risk exposures will be managed through the implementation and enforcement of LUCs.

Compliance with ARARs

ARARs include any federal or state environmental or facility-siting standards, requirements, criteria, or limitations that are legally applicable or relevant and appropriate to a CERCLA site or action. No ARARs have been identified for either alternative.

7.2 Primary Balancing Criteria

Long-term Effectiveness and Permanence

Alternative 1 does not achieve long-term effectiveness; the site would not be restricted, monitored, or managed to reduce exposure to contaminants that pose potential risk. Alternative 2 is effective and permanent in the long term. LUCs would prevent unacceptable exposures over the long term and achieves long-term effectiveness and permanence for future use.

Reduction in Toxicity, Mobility, or Volume through Treatment

Neither Alternative 1 nor Alternative 2 reduces the toxicity, mobility, or volume through treatment of the contaminants at SWMU 14.

Short-term Effectiveness

SWMU 14 is currently in use as a parking lot. As long as no intrusive activities occur onsite, there are no current receptors that would potentially be exposed to soil or groundwater that would result in unacceptable risks in the short term. As a result, both Alternatives 1 and 2 would be effective in the short term; however, without the implementation of LUCs there is no mechanism to prevent site disturbance of the asphalt cover or inappropriate use of the site.

Implementability

Alternative 1, No Action, would be the easiest to implement because there is no effort associated with this alternative. Alternative 2, LUCs, is relatively easy to implement and has been used at other IRP sites; the alternative would require preparation of an RD for LUCs, periodic site inspections, associated reporting (including the Five-Year Review Report), and coordination among NAVFAC, NSN, USEPA, and VDEQ to ensure the LUCs are enforced.

Cost

In terms of **Net Present Worth (NPW)**, the No Action alternative has no cost. There would be minimal costs to implement Alternative 2. These costs would be for the preparation of an LUC RD, periodic inspections, and periodic reporting (including the Five-Year Review Report) to maintain the LUCs. These costs are assumed to occur over the 30-year timeframe of the alternative.

7.3 Modifying Criteria

State Acceptance

State involvement has been solicited throughout the CERCLA process and proposed remedy selection. The Commonwealth supports the Preferred Alternative, Alternative 2, and its final concurrence will be solicited following the review of all comments received during the public comment period.

Community Acceptance

This criterion will be evaluated after the public comment period for this Proposed Plan.

8 Preferred Alternative

The preferred remedial alternative is Alternative 2, LUCs. This preference is based on a detailed evaluation of alternatives using the nine NCP criteria, including protection of human health, long-term effectiveness and permanence, reduction of toxicity, mobility and volume of contamination through treatment, short-term effectiveness, implementability, and cost. State and community acceptance criteria will be evaluated after the comment period expires.

Specifically, the FFS concluded that LUCs will effectively prohibit inappropriate land use and prevent disturbance of the asphalt cover to protect against human exposure to soil and groundwater that may result in unacceptable risks. Implementation of LUCs has minimal associated cost, is straightforward, and protective in both the short and long terms. A comparison of cost as evaluated in the FFS is provided in Table 5.

TABLE 5
Descriptions of Alternatives

Alternative	Components	Details	Cost	
1—No Action	SWMU 14, Q-50 Area	Not Applicable	Capital Cost	$0
			Annual O&M	$0
			Present-Worth	$0
			Time Frame 30 years	
2 – LUCs	LUCs to cover area	Sign Installation	Capital Cost $10,000	
		RD for LUCs	Annual O&M $1,526	
		Integrity Inspections	Net Present-Worth $63,398	
		Statutory remedy 5-year reviews	Time Frame 30 years	

O&M = operation and maintenance

9 Community Involvement

A community involvement program has been conducted throughout the investigation of SWMU 14. Public input is a key element in the decision making process. Nearby residents and other interested parties are strongly encouraged to use the comment period to relay any questions and concerns about SWMU 14 and both alternatives. The Navy will summarize and respond to comments in a Responsiveness Summary, which will become part of the official **ROD**.

A **Restoration Advisory Board (RAB)** was formed in 1994. Meetings continue to be held to provide an information exchange among community members, USEPA, VDEQ, and the Navy. These meetings are open to the public and are held approximately every 6 months. This Proposed Plan fulfills the public involvement requirements of CERCLA Section 117(a), which specifies that the lead agency (the Navy) must publish a plan outlining any remedial alternatives evaluated for the site and identify the Preferred Alternative. All documentation pertaining to the investigation of SWMU 14 and the development of the remedial action alternatives presented in this Pro-

posed Plan is available for public review in the Administrative Record and at the Information Repository.

Public Comment Period

The public comment period for the SWMU 14 Proposed Plan provides an opportunity to provide input about the how the Navy plans to address unacceptable risks associated with SWMU 14. The public comment period will be held from August 5, 2009 to September 5, 2009, and a public meeting will be held on August 26, 2009, at the Larchmont Library (6525 Hampton Boulevard, Norfolk, Virginia 23508) from 6:30 p.m. to 7:30 p.m. All interested parties are encouraged to attend the meeting to learn more about the alternatives developed for SWMU 14. The meeting will provide an additional opportunity to submit comments on the Proposed Plan to the Navy; however interested parties are not required to be present at the meeting to provide comment during this period. Comments on the Preferred Alternative, or this Proposed Plan, must be postmarked no later than September 5, 2009. On the basis of comments or new information, the Navy and USEPA may modify the Preferred Alternative or choose another alternative. The comment page included as part of this Proposed Plan may be used to provide comments to the Navy.

Record of Decision

After the public comment period, the Navy, in consultation with USEPA and VDEQ, will determine if and how the Proposed Plan should be modified on the basis of comments received. Any required modifications will be made by the Navy and reviewed by USEPA and VDEQ. If the modifications substantially change the proposed remedy, additional public comment may be solicited. If not, USEPA and the Navy will prepare and sign the ROD. The ROD will detail the remedial action chosen for the site and will include the Navy's responses to comments received during the public comment period.

Available Information

The Community Relations Plan, fact sheets, and final technical reports concerning SWMU 14 are available to the public at the following locations:

Naval Facilities Engineering Command, Atlantic
Attention: Mrs. Terri Davis, Public Affairs Officer
6506 Hampton Boulevard
Norfolk, Virginia 23508-1278
(757) 322-8005

Norfolk Main Library
235 East Main Street
Norfolk, Virginia 23510
(757) 664-7323

During the comment period, interested parties may submit written comments to any of the following addresses:

Mr. Chris Murray
NAVFAC Mid-Atlantic, Code OPHE3
Naval Facilities Engineering Command
Building N-26
9742 Maryland Avenue
Norfolk, Virginia 23511-3095
(757) 445-6680

Mr. Steven Hirsh
Remedial Project Manager
USEPA Region III
1650 Arch Street
Philadelphia, Pennsylvania 19103
(215) 814-3352

Mr. Eric Salopek
Remedial Project Manager
Virginia Dept. of Environmental Quality
629 East Main Street
Richmond, Virginia 23219
(804) 698-4427

Mrs. Terri Davis
Attn: Public Affairs Officer
Naval Station, Norfolk
1510 Gilbert Street, Suite 200
Norfolk, Virginia 23511-2722
(757) 322-2576

If individuals have any questions about NSN SWMU 14, Q-50, they may call or write to one of the contact people identified on page 16.

10 References

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USEPA. 1994. *Environmental Interpretation Center Aerial Photograph.* June.

Glossary

Administrative Record: A compilation of the site documents used to support an administrative action under Superfund, generally placed in an Information Repository at or near the facility to facilitate public review.

Applicable or Relevant and Appropriate Requirements (ARARs): Federal or state environmental statutes and regulations with which remedial actions under CERCLA must comply; any waiver must be justified under CERCLA.

Aquifer: an underground rock formation composed of sand, soil, gravel, or porous rock that can store and supply groundwater to wells and springs

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA): A federal law, commonly referred to as "Superfund," passed in 1980 and amended several times. Among other things, CERCLA provides for cleanup and emergency response in connection with existing inactive hazardous waste disposal sites that endanger public health and safety or the environment.

Chemical of Potential Concern (COPC): A chemical that, based upon comparison to regulatory screening criteria, has potential to pose unacceptable risks or hazards to receptors at the site.

Engineering Evaluation/Cost Analysis (EE/CA): A streamlined but structured evaluation of alternatives and associated costs for non-time-critical removal actions (NTCRAs); similar to a Remedial Investigation (RI) and Feasibility Study (FS).

Exposure Pathway: the means by which a person or animal comes into contact with a substance through inhalation, ingestion, or direct contact with the skin, either acute or chronic.

Focused Feasibility Study (FFS): A study that encompasses the development and screening of remedial action alternatives and a detailed analysis of a limited number of the most promising options to establish the basis for a remedy selection decision.

Groundwater: Subsurface water that occurs in soils and geologic formations that are fully saturated.

Hydraulic conductivity: A property of soil or rock, that describes the ease with which water can move through pore spaces or fractures. It depends on the intrinsic permeability of the material and on the degree of saturation.

Information Repository: A set of current information, technical reports, and reference documents regarding a Superfund site; generally located in a public building that is convenient for local residents, such as a public school, city hall, or public library.

Installation Restoration Program (IRP): The program by which the Department of Defense investigates and cleans up Superfund sites.

Land Use Controls (LUCs): Engineered or institutional controls that restrict how a site can be used, such as restrictions on accessibility, soil excavation, construction, etc.

National Oil and Hazardous Substances Pollution Contingency Plan (NCP): The national plan which provides the organizational structure and procedures needed to prepare for and respond to discharges of oil and releases of hazardous substances, pollutants, and contaminants.

National Priorities List (NPL): A list developed by USEPA of uncontrolled hazardous substance release sites in the United States that are priorities for long-term remedial evaluation and response.

Net Present Worth (NPW): Defined as the total present value of a time series of cash flows. It is a standard method for using the time value of money to appraise long-term projects. Used for capital budgeting, and widely throughout economics, it measures the excess or shortfall of cash flows, in present value terms, once financing charges are met.

Nine Evaluation Criteria: A set of criteria specified in the NCP against which the remedial alternatives developed for a site are evaluated. The criteria are as follows:

- **Overall Protection of Human Health and the Environment:** Addresses whether a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.
- **Compliance with ARARs:** Addresses whether a remedy will meet all of the ARARs of other federal and state environmental laws and/or justifies a waiver of the requirements.
- **Long-term Effectiveness and Permanence:** Addresses the expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, after clean-up goals have been met.
- **Reduction of Toxicity, Mobility, and Volume through Treatment:** Addresses the degree to which a treatment technology may be successful in eliminating, reducing, or stabilizing contamination.
- **Short-term Effectiveness:** Considers the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period.
- **Implementability:** Evaluates the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement an option.
- **Cost:** Compares the estimated capital, O&M, and present-worth costs among the alternative remedial actions.
- **State Acceptance:** Considers the state support agency's comments on the Proposed Plan.
- **Community Acceptance:** Provides the public's general response to the alternatives described in the Proposed Plan, RI, and FS reports. The specific responses to the public comments are addressed in the Responsiveness Summary section of the ROD.

Non-time-critical Removal Action: An action taken to abate, prevent, minimize, stabilize, mitigate, or eliminate the release or threat of release of a contaminant at a Superfund site for which a *planning period of at least 6 months is available before onsite activities must begin and the lead agency decides that a removal action is appropriate.*

Proposed Plan: A document that presents and requests public input regarding the proposed cleanup alternative.

Public Comment Period: The specific time-period allocated for the public to express views and concerns regarding an action proposed to be taken.

Record of Decision (ROD): A legal document that describes the cleanup action or remedy selected for a site, the basis for choosing that remedy, and public comment on alternative remedies.

Remedial Action: A cleanup method proposed or selected to address contaminants at a site. Implementation of the remedy, once selected in accordance with the CERCLA process.

Remedial Action Objectives (RAOs): Objectives of remedial actions that are developed based on contaminated media, contaminants of concern, potential receptors and exposure scenarios, human health and ecological risk assessment, and attainment of regulatory cleanup levels, if any exist.

Remedial Design (RD): The phase of Superfund site cleanup in which the technical specifications for cleanup remedies and technologies are designed. Remedial action follows the remedial design phase and involves the actual construction or implementation phase of Superfund site cleanup.

Remedial Investigation (RI): A study of a facility that supports the selection of a remedy where hazardous substances have been disposed or released. The RI identifies the nature and extent of contamination at the facility.

Resource Conservation and Recovery Act (RCRA): The 1976 amendment to the first federal solid waste legislation, the Solid Waste Disposal Act of 1965. In RCRA, Congress established initial directives and guidelines for USEPA to regulate and manage solid waste, including hazardous waste. RCRA established a regulatory system to track hazardous substances from the time of generation to final disposal. The law requires safe and secure procedures to be used in treating, transporting, storing and disposing of hazardous wastes. RCRA was designed to prevent new, uncontrolled hazardous waste sites, while Superfund was designed to address existing hazardous waste sites.

Restoration Advisory Board (RAB): A community group co-chaired by a local citizen and a representative of the lead agency, designed to increase two-way communication between the agency and the community and to provide an opportunity for members of the community to provide input on the decision-making processes.

Site: The area of the facility where a hazardous substance waste or constituent; pollutant; or contaminant from the facility has been deposited, stored, disposed of, or placed; has migrated; or has otherwise come to be located.

Slug Tests: A particular type of aquifer test where water is quickly added or removed from a groundwater well, and the change in hydraulic head is monitored through time, to determine the near-well aquifer characteristics. It is a method used by hydrogeologists and civil engineers to determine the transmissivity and storativity of the material the well is completed in.

Solid Waste Management Unit (SWMU): Any discernible unit at which solid wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste.

United States Environmental Protection Agency (USEPA): The federal agency responsible for administration and enforcement of CERCLA and other environmental regulations, and with final approval authority for the selected ROD.

Virginia Department of Environmental Quality (VDEQ): The Commonwealth of Virginia's agency responsible for administration and enforcement of environmental regulations.

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