N62578.AR.002604
NCBC DAVISVILLE
5090.3a

DRAFT PROPOSED PLAN SITE 16 WITH TRANSMITTAL NCBC DAVISVILLE RI
6/6/2012
U S NAVY

DEPARTMENT OF THE NAVY
BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE, NORTHEAST
4911 SOUTH BROAD STREET
PHILADELPHIA, PA 19112-1303

5090
BPMO NE/DB
Ser 12-085
June 6, 2012

Ms. Christine Williams
Mail Code: OSRR07-03
U.S. Environmental Protection Agency, Region I
5 Post Office Square, Suite 100
Boston, MA 02109-3912

Mr. Richard Gottlieb
Office of Waste Management
Rhode Island Department of Environmental Management
235 Promenade Street
Providence, RI 02908-5767

Dear Ms. Williams and Mr. Gottlieb:

The enclosed Draft Proposed Plan for Installation Restoration Program (IRP) Site 16 at the Former Naval Construction Battalion Center (NCBC) Davisville, Rhode Island is submitted for your review pursuant to § 7.6 (f) of the FFA.

We have received your letters dated June 4 2012 and June 5, 2012 regarding the draft final Feasibility Study. We appreciate your review efforts to finalize the Feasibility Study for Site 16 as defined in § 7.8 of the FFA. Please note your letters have become part of the administrative record for this site.

To maintain the current schedule and submit the draft Record of Decision (ROD) for Site 16 on 3 November 2012, I suggest we tentatively schedule a meeting during the week of July 23, 2012 to discuss any comments you may have on this draft Proposed Plan.

If you have any questions in the interim, please do not hesitate to contact me at 617-753-4656.

Sincerely,

DAVID BARNEY
BRAC Environmental Coordinator
By direction of BRAC PMO

Enclosure:
Draft Proposed Plan, IRP Site 16

Copy to:
J. Dale, NAVFAC Midlant
L. Rapp, B. Capito, NAVFAC (electronic)
J. Trepanowski, TtNUS PMO
J. Logan, TtNUS, Project FS Engineer
S. Anderson, TtNUS Project Hydrogeologist
L. A. Sinagoga, TtNUS Project Manager
G. Wagner, TtNUS, Admin Record
S. Currie, TtNUS Project Files (CTO 418 112G00822)

Proposed Plan

Site 16 – Creosote Dip Tank Area, Fire-Fighting Training Area, and Former Building 41 Area (OU 9)

Former Naval Construction Battalion Center, Davisville, Rhode Island

The Proposed Plan

This Proposed Plan has been prepared in accordance with federal laws to present the Navy's proposed cleanup approach (remedy) for Site 16 (**Creosote** Dip Tank Area, Fire-Fighting Training Area, and Former Building 41 [known as Operable Unit (OU) 9] at the former Naval Construction Battalion Center, Davisville, Rhode Island. This plan describes the Navy's proposed remedy for the site, which consists of the following:

- Installation of a soil cover across the north-central portion of the study area; limited excavation of soils by Building E-107
- **Natural attenuation** and long-term **monitoring** of groundwater
- Implementation of **land use controls** to prevent access to soil and **groundwater**.

This plan provides information on the remedial alternatives evaluated, public comment period, informational open house and public meeting, and also describes how the final remedy for Site 16 will ultimately be selected.

LET US KNOW WHAT YOU THINK

Mark Your Calendar!

PUBLIC COMMENT PERIOD

SEPTEMBER 20, 2012, TO OCTOBER 20, 2012

The Navy will accept written comments on the Proposed Plan for Site 16 during this comment period. Comments can also be sent by mail, e-mail, or fax. Oral or written comments can also be offered at the formal public meeting (see page 11 for details).

INFORMATIONAL OPEN HOUSE AND PUBLIC MEETING

OCTOBER 4, 2012

The Navy invites you to attend an informational open house to be held from XX pm to XX pm, to learn about the Site 16 proposed remedy. The informational session will include posters describing the **Proposed Plan** and an informal question-and-answer session. A formal public meeting will follow, during which the Navy will receive public comments on the **Proposed Plan**. It is at this formal meeting that an official transcript of the comments will be recorded. The above activities will be held at the TBD, Rhode Island.

FOR MORE INFORMATION, VISIT THE INFORMATION REPOSITORY AT THE LOCATION PROVIDED ON PAGE 14 OF THIS PROPOSED PLAN.

*Federal and state environmental laws govern cleanup activities at federal facilities. A federal law called the **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)**, better known as **Superfund**, provides procedures for investigation and cleanup of environmental problems. Under this law, the Navy is investigating and pursuing cleanup, as necessary, of sites at the Former Naval Construction Battalion Center (NCBC) to ensure the property is protective of the community, workers, and the environment. The Navy is issuing this **Proposed Plan** as part of its public participation responsibilities under Section 300.430(f)(2) of the **National Oil and Hazardous Substances Pollution Contingency Plan (NCP)**.*

INTRODUCTION

This **Proposed Plan** provides information to the public on the preferred approach for the cleanup of Site 16 [**Creosote** Dip Tank Area, Fire-Fighting Training Area (FFTA), and Former Building 41] at the former NCBC Davisville, and provides the rationale for this preference. This document is issued by the Navy, as the lead agency for all investigation and cleanup programs ongoing at the former NCBC Davisville, and the United States Environmental Protection Agency (EPA), with concurrence from the Rhode Island Department of Environmental Management (RIDEM). The Navy and EPA, with the concurrence of RIDEM, will select a final remedy for Site 16 after reviewing and considering all

Bolded Terms Throughout This Proposed Plan are Explained in the Glossary of Terms on Pages 14 and 15.

information submitted during the 30-day public comment period. The Navy and EPA, with the concurrence of RIDEM, may modify the proposed remedy or select another response action, based on new information or public comments. Therefore, the public is encouraged to review and comment on this **Proposed Plan**.

The information summarized in this Plan can be found in greater detail in the **Remedial Investigation (RI)** Report and other documents included in the former NCBC Davisville Information Repository, which is located at the Annex Building, Quonset Development Corporation, 95 Cripe Street, North Kingstown, Rhode Island, 02852 (also see Exhibit 1).

The Navy and EPA encourage the public to review these documents to gain a more comprehensive understanding of the site and associated environmental activities.

The purpose of this **Proposed Plan** is to:

- Provide the public with basic background information about the former NCBC Davisville, including Site 16, which is also known as Operable Unit 09. This information includes a description of the site, which was developed by reviewing past documents about the site history and summary of environmental investigations.
- Describe cleanup alternatives (Remedial Action Alternatives) considered for the site.
- Identify and explain the Navy's preferred cleanup plan (remedy) for the site.
- Provide information to the public on how they can be involved in the remedy selection process.
- Solicit and encourage public review of the **Proposed Plan**.

After the public has had the opportunity to review and comment on this **Proposed Plan**, the Navy will summarize and respond to all comments received during the comment period and formal public meeting in a document called the **Responsiveness Summary**. The Navy will carefully consider all comments received and could even select a remedial action different from that which has been proposed. Ultimately, the selected remedy for Site 16 will be documented in a **Record of Decision (ROD)** for the site. The **Responsiveness Summary** will be issued with the **ROD**.

Exhibit 1: Summary of Environmental Investigations and Removal Actions

1992 Removal Action: Soil with elevated concentrations of **polycyclic aromatic hydrocarbons (PAHs)** in a spill area around an upended **creosote** dip tank located in the North Central Area (NCA) was excavated and disposed of off-site. (The **creosote** dip tank was part of the Navy's past **creosote** wood-treatment operations in the northwestern portion of the NCA.)

1995-1998 Environmental Baseline Survey (EBS) and Follow-On Investigations: The 1995 Basewide EBS identified Site 16 as requiring additional investigation. From 1996 to 1998, samples (including soil, **groundwater**, and/or **seep water**) were collected in various areas of the site. Contaminated soils in the Building E-107 area were excavated and disposed of off-site. Based on the results of the EBS investigations, the Navy concluded that additional investigation of Site 16 was required.

1999-2008 Remedial Investigation (RI): **RI** activities included soil, **groundwater, seep,** surface water, and sediment sampling, and an Allen Harbor tidal study to evaluate site physical characteristics and to determine the sources, nature, and extent of contamination at the site. An extended area of **groundwater** contaminated with **volatile organic compounds (VOCs)** (known as a **VOC plume**) was identified. This **VOC plume** also underlies Allen Harbor. The RI evaluation concluded that Site 16 source areas were not the primary sources of the **PAHs** detected in the sediments underlying Allen Harbor.

2010 Feasibility Study (FS) Support Field Investigation: Supplemental sampling was conducted to further determine the nature and extent of contamination.

2012 – FS: Conducted to develop and evaluate potential cleanup alternatives for contaminated soil and **groundwater** at Site 16.

Site Background

The former NCBC Davisville facility is located in the Town of North Kingstown, Rhode Island, and is approximately 18 miles south of Providence (Figure 1). The NCBC Davisville mission was to provide mobilization support to the active Naval Construction force; to act as a mobilization base for the rapid assembly, outfitting, and readying of Reserve Construction Battalions; to store, preserve, and ship advance base and mobilization stocks; and to procure, receive, pack, and ship equipment for Atlantic, European, and Caribbean military construction projects. Much of NCBC Davisville was comprised primarily of warehouse space and freight yards, most of which have been demolished or redeveloped. The base was **decommissioned** in March 1994, and closed on April 1, 1994, under the Base Realignment and Closure (BRAC) program.

Where is Site 16 within the base?

Site 16 is located in the eastern portion of the former NCBC Davisville (Figure 2). The undeveloped portion of Site 16 [currently leased to Quonset Development Corporation (QDC)] is bounded by Allen Harbor to the north, Westcott Road to the west, Davisville Road to the south, and Allen Harbor Road to the east. [This area is referred to as the north central area (NCA) in this **Proposed Plan**.] The developed portion of Site 16 (previously transferred to QDC through BRAC and developed for commercial purposes) is roughly bounded by Davisville Road to the north, Thompson Road to the west, and Buildings E-319 and 318 to the south. However, it also includes the area between former Building 41 and Narragansett Bay (to the east), because the **VOC plume** underlying Site 16 extends to Narragansett Bay (to the east).

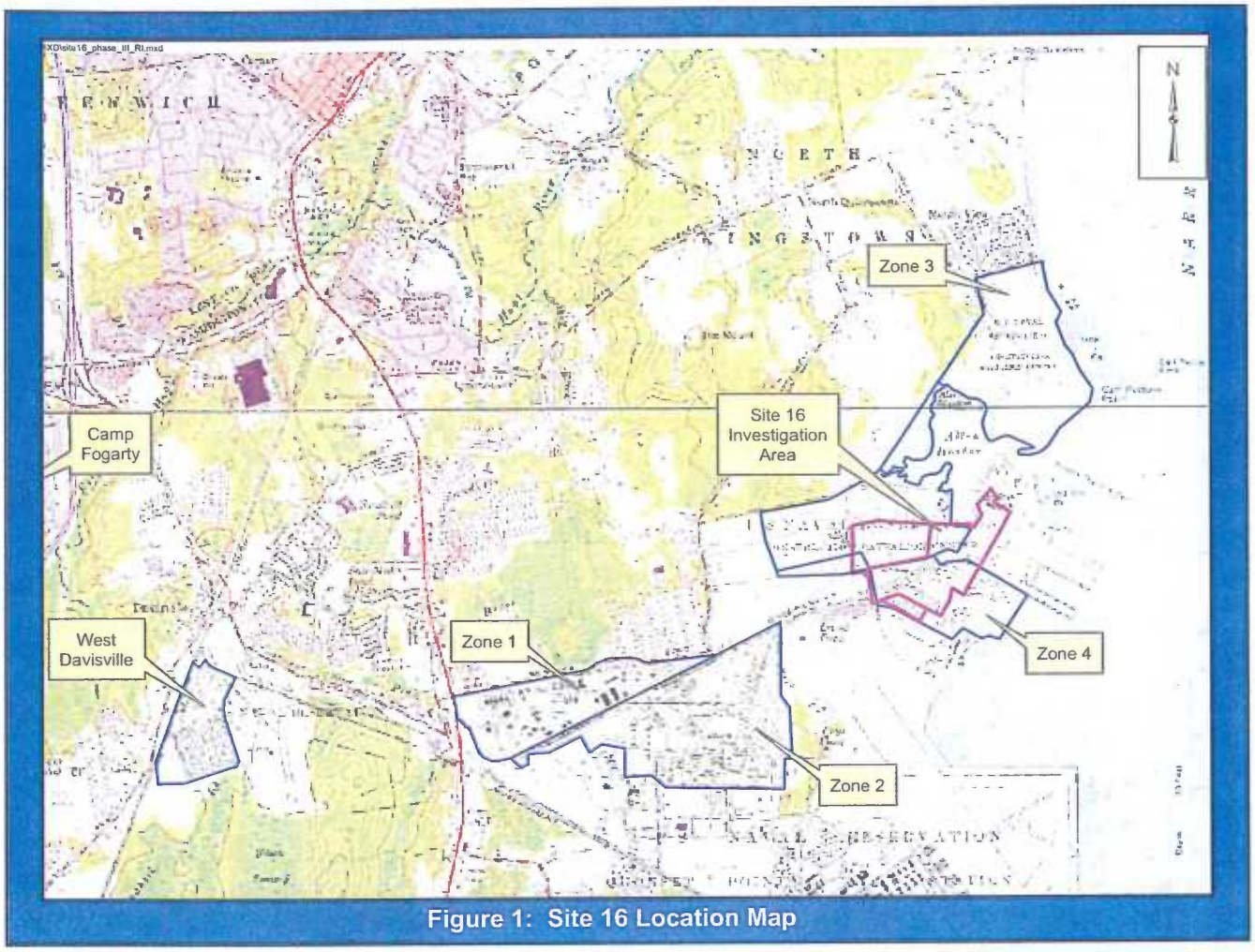

Figure 1: Site 16 Location Map

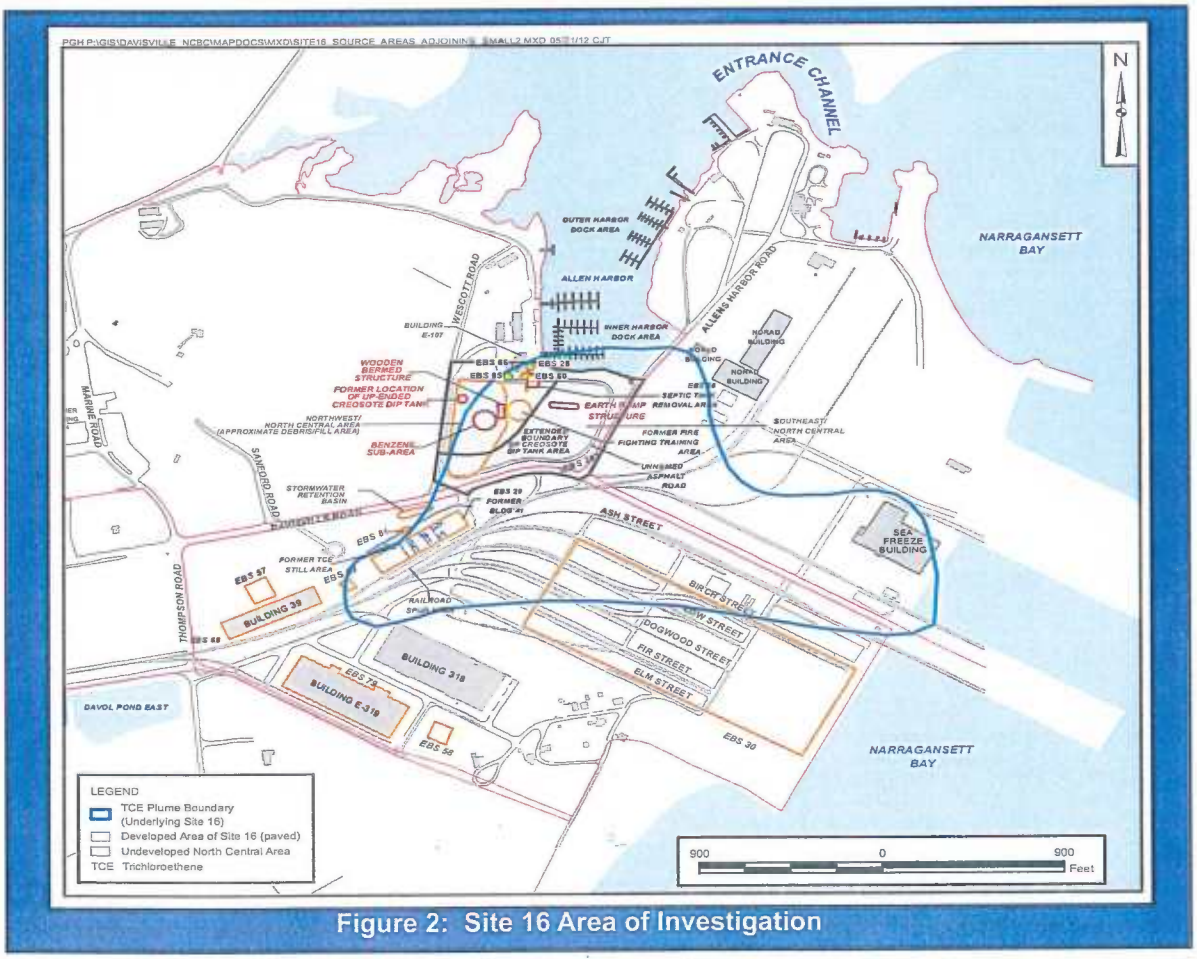

Figure 2: Site 16 Area of Investigation

For what was Site 16 used?

Creosote dipping operations (for preserving wood pilings) historically occurred in the northwestern portion of the NCA. Structures in the north-central portion of the NCA were also constructed, doused with flammable materials, set on fire, and the fires extinguished as part of fire-fighting training exercises. NCBC training exercises involving large construction and transport vehicles also occurred in the NCA. Fill materials and subsurface debris exist throughout a significant portion of the NCA, suggesting that much of this portion of the site likely received fill, either during training exercises or during other Navy activities.

Former Building 41 was used as an equipment preservation/ packing shop and an automotive parts storage building; a solvent recovery tank was located in the westernmost portion of this building. (The solvent recovery tank reclaimed trichloroethene (TCE), used as a degreaser for equipment.) Other buildings within Site 16 (e.g., 318, E-319, 39, and E-107) were used as warehouses or for operations support. Aboveground and/or underground fuel storage tanks and septic tanks were associated with all of these buildings.

What are the current and future land uses at the site?

The undeveloped portion of Site 16 (the NCA) is currently vacant land. The developed portion of Site 16 includes mostly paved areas that are now primarily used for the temporary storage of cars delivered by ships and trains, pending delivery to automotive dealers. The anticipated future land use for all of Site 16 is commercial/industrial.

What are the results of the environmental investigations?

Exhibit 1 lists the environmental investigations and removal actions that have been conducted at Site 16.

The principal contaminants associated with the Site 16 **groundwater** are **VOCs** such as TCE, tetrachloroethene (PCE), cis-1,2-dichloroethene (cis-1,2-DCE), vinyl chloride, and benzene. TCE is the primary **VOC** found in the **groundwater**. The maximum level detected in the **groundwater** exceeds 5,000 parts per billion (ppb).

Several **VOC** releases have occurred over the course of time. These releases have resulted in an elongated **VOC** plume (an area of **VOC**-contaminated **groundwater**) in the deeper **groundwater**, extending towards both Allen Harbor (to the north/northeast) and Narragansett Bay (to the east).

Limited **VOC** contamination has been detected in soils less than 10 feet below ground surface, with the exception of one area in the northwestern portion of the NCA where elevated levels of benzene were detected in shallow soils. Most **VOC** soil contamination has migrated downward into deeper soils and **groundwater**.

Elevated levels of **polycyclic aromatic hydrocarbons or PAHs** (e.g., naphthalene) were detected in surface and shallow subsurface soil within the NCA, and, to a much lesser extent, in shallow **groundwater** in the NCA. These chemicals are often associated with industrial operations such as those conducted in the **Creosote** Dip Tank area or with the combustion of fuels, wood, coal, etc.

Some metals (arsenic and lead in soils) were found at levels higher than background conditions. Most locations demonstrating elevated arsenic or lead levels are within the northwestern portion of the NCA.

Scope and Role of the Site 16 Response Action

At NCBC Davisville, sixteen sites have been identified for assessment and cleanup under **Superfund/CERCLA**; each of these sites is undergoing this cleanup process independently of each other. **RODs** for "no further action" have been signed for Sites 05, 06, 08, 10, 11, 12, 13, 14, and 15. To meet the requirements of the **RODs** for Sites 07 and 09, periodic **monitoring** is being conducted in accordance with the Long-Term **Monitoring** Program for each site.

Risk assessments are being prepared for Study Areas 01 and 04 and Sites 02 and 03 in support of one combined **Feasibility Study** and **Proposed Plan** to address all of these areas/sites.

Summary of Results for Site 16 Human Health and Ecological Risk Assessments

As part of site investigation activities, the Navy completed **human health and ecological risk assessments** to evaluate potential current and future effects of the chemicals detected at Site 16 on human health and the environment. The results of the **risk assessments** are described below.

HUMAN HEALTH RISKS - The human health **risk assessment** estimates the baseline risk, which is the likelihood of health problems occurring if no cleanup actions were taken at Site 16. To estimate the baseline risk for humans, a four-step process was used.

Step 1 - Identify Chemicals of Potential Concern: **Chemicals of potential concern (COPCs)** are chemicals found at the site at concentrations greater than federal and state risk screening criteria. Chemicals with concentrations greater than these levels are further evaluated in the **risk assessment**.

Step 2 – Conduct an Exposure Assessment: In this step, ways in which humans come into contact with soil, sediment, surface water, air and/or **groundwater** at Site 16 are considered. Both current and reasonably foreseeable future exposure scenarios are identified. For Site 16, it is anticipated that construction workers, industrial workers, trespassers, recreational users, and, in the future, residents may come in contact with these environmental media. (While residential development of the Site 16 area is not anticipated, the Navy did evaluate the most restrictive possible use of the site, which is a resident living on the site.)

Individuals could potentially contact soil through touching, ingesting, or inhaling soil particulates, such as dust. Individuals visiting the site could also potentially contact the surface water and sediments along the southern shoreline of Allen Harbor, through ingesting or touching. Construction workers could potentially contact chemicals in **groundwater** through touching **groundwater** or inhaling **VOCs** vaporizing from the **groundwater** (e.g., if the

groundwater was pooling in the bottom of an excavation or ditch). Future residents could contact chemicals in **groundwater** beneath the site if it were to be used as a drinking water source. Finally, indoor workers or residents could contact **VOC** vapors in indoor air if the vapors seeped into a building constructed over the VOC **plume**.

Step 3 – Complete a Toxicity Assessment: At this step, possible harmful effects from exposure to the individual chemicals of potential concern are evaluated. Generally, these chemicals are separated into two groups: **carcinogens** (chemicals that may cause cancer) and **non-carcinogens** (chemicals that may cause adverse health effects other than cancer).

Step 4 - Characterize the Risk: The results of Steps 2 and 3 are combined to estimate overall risks from exposure to chemicals present at the site. The terms used to define the estimated risks are explained in the text box, *"Expressing Estimated Human Health Risks"*.

Expressing Estimated Human Health Risks

Human Health Risk Assessment: When evaluating the health risk to humans, the risk estimates for **carcinogens** (chemicals that may cause cancer) and **non-carcinogens** (chemicals that may cause adverse health effects other than cancer) are expressed differently.

Carcinogens: For cancer-causing chemicals, risk estimates are expressed in terms of probability. For example, exposure to a particular carcinogenic chemical may present a 1-in-10,000 chance of causing cancer over an estimated lifetime of 70 years. This can also be expressed as $1x10^{-4}$. The EPA risk range for **carcinogens** is $1x10^{-6}$ (a 1-in-1-million chance) to $1x10^{-4}$ (a 1-in-10,000 chance). In general, calculated risks higher than this range would require consideration of the development and implementation of cleanup alternatives. The State of Rhode Island target cancer risk level is $1x10^{-5}$ (a 1-in-100,000 chance of developing cancer).

Non-Carcinogens: For non-cancer-causing chemicals, exposures are first estimated and then compared to a **reference dose (RfD)**. The reference dose is developed by EPA scientists to estimate the amount of a chemical a person (including the most sensitive person) could be exposed to over a lifetime without developing adverse (non-cancer) health effects. This measure is known as a hazard index. A **hazard index** greater than 1 suggests that adverse health effects are possible.

The results of the **risk assessment** evaluating health effects to persons utilizing the site show that:

- For surface soil located primarily (but not exclusively) in the northwestern portion of the NCA, potential risks for future residents exceed EPA and RIDEM acceptable levels (see text box entitled "Expressing Estimated Human Health Risks"). The risks are associated with **PAHs**, dioxins/furans, lead and arsenic in the soils. (However, concentrations of dioxins/furans do not exceed the current EPA Clean-Up Level for soils [1 ppb].)
- For subsurface soil located primarily (but not exclusively) in the northwestern portion of the NCA, potential risks for industrial workers, recreational users, and hypothetical future residents exceed EPA and RIDEM acceptable levels. As noted for the surface soils, the risks are associated with PAHs, dioxins/furans, lead and arsenic. (Again, concentrations of dioxins/furans do not exceed the current EPA Clean-Up Level for soils [1 ppb].)
- For **groundwater**, potential risks for future residents using the **groundwater** as a drinking water source exceed EPA and RIDEM acceptable levels. The potential risks are primarily associated with **VOCs** (e.g., TCE, PCE, benzene, 1,2-dichloroethane, and vinyl chloride). Potential risk is also associated with other chemicals and metals found in the **groundwater** (**PAHs** [e.g., 2-methylnaphthalene and naphthalene], hexachlorobenzene, and the metals, arsenic, aluminum, antimony, chromium, lead, iron, manganese, silver and thallium). However, most of these chemicals/metals were found very infrequently or at levels similar to background levels in **groundwater**.
- Potential risks for individuals touching the surface waters (i.e., seeps) along the southern shore of Allen Harbor do not exceed EPA or RIDEM acceptable levels.
- Potential risks for individuals touching the sediments of Allen Harbor exceed EPA and RIDEM acceptable levels only if these sediments were to be routinely exposed (i.e., not covered with Allen Harbor surface water). The vast majority of Allen Harbor sediments are under water; the potential for human contact (and thus, risk) is very limited.
- Potential risks for industrial workers or hypothetical future residents exposed to **VOCs** in the indoor air of a building constructed over the **VOC groundwater plume** do exceed EPA and RIDEM acceptable levels. The potential risks are primarily associated with TCE in the **groundwater**.

These risk results were used to develop the list of **chemicals of concern (COCs)** further evaluated in the **Feasibility Study** for Site 16.

ECOLOGICAL RISKS - The ecological **risk assessment** is comprised of three steps, as discussed below.

Step 1 – Problem Formulation: The primary objective of an ecological **risk assessment** is to evaluate whether or not ecological **receptors** are potentially at risk when exposed to chemicals at Site 16. More specifically, the ecological assessment for Site 16 was completed to determine whether ecological receptors are able to exist and grow in ways similar to those same **receptors** in the surrounding area. The ecological **receptors** evaluated for this assessment include:

- **Terrestrial vertebrates** (small mammals or birds, such as the Eastern cottontail, meadow vole, bobwhite quail, short-tail

shrew, red fox, and American Robin) coming in contact with or eating food items that have been in contact with surface soil, sediments, and surface water

- **Terrestrial invertebrates** (e.g., earthworms) coming in contact with surface soils
- **Terrestrial plants** in contact with surface soils
- Fish and **aquatic invertebrates** in contact with surface water and sediment, and aquatic birds (e.g., the herring gull)

Similar to the human health **risk assessment**, chemicals found at the site at concentrations above federal or state risk–screening levels are identified as **COPCs**. The **COPCs** evaluated in the ecological **risk assessment** included metals (e.g., lead), pesticides, dioxins/furans, and **PAHs**, the predominant **COPCs** in the Site 16 surface soils and in Allen Harbor sediments. These chemicals and metals are further evaluated in the **risk assessment**.

Step 2 - Risk Analysis: In this step, possible harmful effects from being exposed to individual **COPCs** are evaluated. This step includes measuring or estimating the amount of a chemical in soils, **groundwater-seep**/surface water, sediments, plant and animal tissue, and then evaluating ecological **receptor** exposure to these chemical concentrations.

Step 3 – Risk Characterization: The results of the risk analysis are evaluated to determine the likelihood of harmful effects to ecological **receptors** at Site 16. The ecological **risk assessment** completed for Site 16 concluded that the presence of **COPCs** in the surface soils and in **seep-groundwater**/surface water pose limited site-related risks to mammals, birds, invertebrates (e.g., earthworms), terrestrial plants, or aquatic organisms (e.g., fish, **benthic** organisms living in the sediments of Allen Harbor). The risk characterization considered two important **Remedial Investigation (RI)** results:

- The extensive environmental investigation conducted at Site 16 concluded that it is unlikely that the **PAHs** detected in the Allen Harbor sediments are related to historical operations at Site 16.
- The **VOCs** (e.g., TCE) detected in the **groundwater** underlying Site 16 are not detected in the surface waters or sediments of Allen Harbor at concentrations exceeding conservative, risk-based screening levels for ecological **receptors**.

Remedial Action Objectives

Remedial Action Objectives (RAOs) are the goals that a cleanup plan should achieve. They are established to protect human health and the environment, and to comply with all pertinent federal and state regulations. Based on the current and reasonably anticipated future use of Site 16, the following **RAOs** were developed for soil (with specific **RAOs** for the benzene sub-area) and for **groundwater**.

SOIL RAOs FOR THE NORTHWESTERN PORTION OF THE NCA, EXCLUDING THE BENZENE SUB-AREA:

Soil RAO No. 1 - Prevent industrial worker (including construction worker) exposure to subsurface soil containing concentrations of **COCs** (**PAHs**, arsenic and lead) that cause unacceptable risk.

Soil RAO No. 2 - Ensure/verify that surface and subsurface soil contaminants (e.g., naphthalene) do not migrate to **groundwater** causing the **groundwater** to have associated unacceptable risk.

Soil RAO No. 3 - Prevent future resident exposure to surface and subsurface soil contaminants (**PAHs**, arsenic, lead and dioxins/furans) that cause unacceptable risk.

SOIL RAOs FOR THE BENZENE SUB-AREA:

Soil RAO No. 4 - Prevent industrial worker (including construction worker) exposure to subsurface soil (in the benzene sub-area) containing concentrations of **COCs** (**PAHs**, arsenic and lead) that cause unacceptable risk.

Soil RAO No. 5 - Ensure/verify that surface and subsurface soil contaminants (e.g., benzene and naphthalene in the benzene sub-area) do not migrate to **groundwater** causing the **groundwater** to have associated unacceptable risk.

Soil RAO No. 6 - Prevent future resident exposure to surface and subsurface soil (in the benzene sub-area) containing concentrations of **COCs** (**PAHs**, arsenic, lead and dioxins/furans) that cause unacceptable risk.

RAOs FOR GROUNDWATER:

Groundwater RAO No. 1: Prevent human exposure (including showering, drinking, and irrigation) to **groundwater** containing concentrations of **COCs** that cause unacceptable risk and that does not meet the selected clean-up levels.

Groundwater RAO No. 2: Verify that **groundwater** discharging to Allen Harbor and Narragansett Bay continues to pose no unacceptable risks.

Groundwater RAO No. 3: Prevent unacceptable risks to industrial workers/future residents that could result from exposure to **VOC** vapors seeping into newly constructed buildings.

In the **Feasibility Study (FS)**, **cleanup levels** were developed for the primary soil **COCs**, including **PAHs** [evaluated collectively as **benzo(a)pyrene equivalents (BaPEqs)**], arsenic, lead, naphthalene and benzene. These soil **cleanup levels** are provided in Table 1 (in units of milligram per kilogram [mg/kg]).

Similarly, **cleanup levels** were developed in the FS for the primary **groundwater COCs**, including PCE, TCE, cis-1,2-DCE, vinyl chloride, naphthalene, and benzene. These **groundwater cleanup levels** are provided in Table 2 (in units of microgram per liter [µg/L]).

Summary of Remedial Alternatives

Remedial alternatives, or cleanup options, were identified for Site 16 in the **FS**. These alternatives are different combinations

TABLE 1. SOIL CLEANUP LEVELS		
Chemical of Concern	**Industrial or Recreational User (mg/kg)**	**Residential User (mg/kg)**
BaP Eqs [1][2]	0.8	0.150
Arsenic[2]	7	7
Lead[2]	500	150
Naphthalene[2]	0.8	0.8
Benzene[2]	0.2	0.2
Antimony[3]	220	10
Manganese[3]	10,000	390
Benzo(g,h,i)Perylene[3]	9,500	0.8
Fluoranthene[3]	10,000	20
Fluorene[3]	1,000	28
2-Methylnaphthalene[3]	2,200	123
1,1-Dichloroethene (DCE) [3]	9.5	0.2/0.7
1,1-Biphenyl[3]	10,000	0.8
Pyrene[3]	9,500	13
Vinyl Chloride (VC) [3]	0.2	0.3/0.02
Trichloroethene (TCE) [3]	3.6/20	13/0.2
Tetrachloroethene (PCE) [3]	86/4.2	12/0.1

Notes

1 - Benzo(a)pyrene (BaP) criterion was used for BaP Equivalent concentrations (BaP Eqs). The following carcinogenic PAHs are considered in the calculation of the BaPEqs:
Benz(a)pyrene
Benz(a)anthracene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Chrysene
Dibenz(ah)anthracene
Indeno(1,2,3-cd)pyrene
2 - Chemicals of concern based on Human Health Risk Assessment.
3 - Additional chemicals of concern based on exceedances of State of Rhode Island criteria.

TABLE 2. GROUNDWATER CLEANUP LEVELS		
Chemical of Concern	**Residential User (µg/L)**	**Basis**
1,1-Dichloroethene (DCE)	7	MCL
cis-1,2-DCE[1]	70	MCL
1,1,2-Trichloroethane (TCA)	5	MCL
Benzene[1]	5	MCL
Bis(2 ethylhexyl)phthalate (BEHP)	6	MCL
Methylene Chloride	5	MCL
Naphthalene[1]	0.14	RSL
Tetrachloroethene (PCE)[1]	5	MCL
Trichloroethene (TCE)[1]	5	MCL
Vinyl chloride[1]	2	MCL
Antimony	6	MCL
Arsenic	10	MCL
Barium	2,000	MCL
Beryllium	4	MCL
Cadmium	5	MCL
Chromium	214	Facility-Wide Background
Lead	15	SDWA Action Level
Nickel	154	Facility-Wide Background
Nitrate	10,000	MCL
Nitrite	1,000	MCL
Selenium	50	MCL
Thallium	4.1	Facility-Wide Background

Notes:

1 – COCs selected based on results of human health risk assessment. Other chemicals are included in table because of exceedances of MCLs, non-zero MCLGs, or RIDEM criteria.
SDWA – Safe Drinking Water Act
MCL – Maximum Contaminant Level
RSL – EPA Regional Screening Level
MCLG – Maximum Contaminant Level Goal
RIDEM – Rhode Island Department of Environmental Management

of methods or procedures to restrict access and to contain, remove, or treat contamination to protect human health and the environment. The remedial alternatives that were developed for soil and **groundwater** at Site 16 are listed below.

SOIL ALTERNATIVES:

- Alternative S-1: No Action
- Alternative S-2: Soil Cover and/or Cap, **Monitoring**, and **Land Use Controls (LUCs)**
- Alternative S-3: Excavation, Off-Site Disposal, and **LUCs**
- Alternative S-4: Soil Cover, Selected Excavation and Disposal, and **LUCs**
- Alternative S-5: Excavation and Off-Site Disposal – Unrestricted Use
- Alternative S-6: Full Soil Cover, **Monitoring**, and **LUCs**

GROUNDWATER ALTERNATIVES:

- Alternative G-1: No Action
- Alternative G-2: Monitored **Natural Attenuation** (MNA) and **LUCs**
- Alternative G-3: In-Situ Chemical Oxidation (High-Concentration Areas), MNA, and **LUCs**
- Alternative G-3A: In-Situ Chemical Oxidation (Source Area), MNA, and **LUCs**
- Alternative G-4: Enhanced Bioremediation (High-Concentration Areas), MNA, and **LUCs**
- Alternative G-5: **Groundwater** Extraction and Treatment (High-Concentration Areas), MNA, and **LUCs**
- Alternative G-6: Enhanced Bioremediation, MNA, and **LUCs** (Reduced Remediation Time)

DESCRIPTION OF SOIL ALTERNATIVES

Alternative S-1: No Action, Five-Year Review

Evaluation of the "no action" alternative is required under **CERCLA**, and serves as a baseline for comparison with other alternatives. Under this alternative, no cleanup remedy for soils would be implemented at the site.

Alternative S-2: Soil Cover and/or Cap, Monitoring, LUCs, and Five-Year Review (Including Limited Excavation and Off-Site Disposal)

Alternative S-2 consists of placing a 2-foot-thick soil cover over some areas in the NCA where contaminant concentrations are greater than industrial exposure-based soil clean-up levels, to prevent unacceptable human exposure to contaminated surface and subsurface soil. A low-permeability soil cover or cap would be added to some areas of the NCA to prevent migration of contaminants to **groundwater**. A small portion of soil near Building E-107 would be excavated to a depth of 2 feet, disposed of off-site, and backfilled with clean soil to the existing grade. **LUCs** would be implemented to maintain industrial uses of the site and prevent residential uses, and **monitoring** would include inspections and maintenance of the cover and/or cap.

Alternative S-3: Excavation, Off-Site Disposal, LUCs, and Five-Year Review

Alternative S-3 consists of excavation and off-site disposal of shallow soil (to a depth of 2 feet) containing contaminant concentrations greater than industrial exposure-based soil clean-up levels to prevent unacceptable human exposure. Soil with contaminant concentrations greater than leachability-based soil clean-up levels would also be excavated to the depth of the water table and would be disposed of offsite. The excavated areas would be backfilled with a clean soil cover to restore the pre-existing grade and to prevent exposure to deeper contaminated soil. A small area of soil near the Building E-107 would also be excavated, disposed of offsite, and backfilled with clean soil to the pre-existing grade. **LUCs** would be implemented to maintain industrial uses and prevent residential use of the site, and **monitoring** would include inspection and maintenance of the soil cover where subsurface soil contaminant concentrations are greater than industrial exposure-based soil clean-up levels.

Alternative S-4: Soil Cover, Selected Excavation and Disposal, LUCs, and Five-Year Review

Alternative S-4 consists of excavation of soil with contaminant concentrations greater than leachability-based soil clean-up levels to the depth of the water table, and off-site disposal. A soil cover would be placed over the balance of the NCA, where contaminant concentrations are greater than industrial exposure-based clean-up levels, to prevent unacceptable human exposure to contaminated surface and subsurface soil. **LUCs** would be implemented to maintain industrial uses of the site, prevent residential use, and **monitoring** would include inspection and maintenance of the soil cover where subsurface soil contaminant concentrations are greater than industrial exposure-based soil clean-up levels.

Alternative S-5: Excavation and Off-Site Disposal – Unrestricted Use

Soil with contaminant concentrations greater than residential exposure-based and leachability-based soil clean-up levels would be excavated to the depth of the water table. Soils would be disposed offsite and replaced with clean backfill to restore existing grades. No LUCs would be required.

Alternative S-6: Limited Excavation, Full Soil Cover, Monitoring, LUCs, and Five-Year Review

Alternative S-6 consists of placing a geotextile membrane followed by a 1-foot-thick soil cover over the entire NCA to prevent unacceptable human exposure to contaminated surface and subsurface soil. Although areas of soil with contaminant concentrations greater than leachability-based screening levels would remain, it has been shown that contaminants are unlikely to migrate to Allen Harbor at unacceptable concentrations. (**Groundwater monitoring** wells along the harbor edge would be sampled to verify that no migration is occurring at concentrations that would pose unacceptable risk in the future.). A small area of soil near Building E-107 would be excavated, disposed of offsite,

and backfilled with clean soil to the pre-existing grade. **LUCs** would be implemented to maintain industrial uses of the site and to prevent residential use, and **monitoring** would include inspection and maintenance of the soil cover. A waste management area would also be established in the area of the cover, where the underlying **groundwater** would not be required to meet remedial goals. No excavations would be permitted without an approved soil management plan.

Description of Groundwater Alternatives

Alternative G-1: No Action, Five-Year Review

Evaluation of the "no action" alternative is required under **CERCLA**, and serves as a baseline for comparison with other alternatives. Under this alternative, no cleanup remedy for **groundwater** would be implemented at the site.

Alternative G-2: MNA, LUCs, and Five-Year Review

Alternative G-2 consists of **monitoring** the progress of the degradation of contaminants by **natural attenuation**. **LUCs** would be implemented to restrict the use of **groundwater** (without treatment) and to restrict building design and construction methods to control unacceptable vapor intrusion.

Alternative G-3: In-Situ Chemical Oxidation (High-Concentration Areas), MNA, LUCs, and Five-Year Review

Alternative G-3 consists of the injection of **sodium permanganate** into the **groundwater** in the high-concentration areas to destroy the **VOC** contaminants through oxidation. Downgradient of the treatment area, the progress of the degradation of contaminants by **natural attenuation** would be monitored by a routine sampling program. **LUCs** would be implemented to prevent the use of **groundwater** and to restrict building design and construction methods to control unacceptable vapor intrusion.

Alternative G-3A: In-Situ Chemical Oxidation (Source Area), MNA, LUCs, and Five-Year Review

Alternative G-3A consists of the injection of **sodium permanganate** into the **groundwater** in the source area near former Building 41 to destroy the **VOC** contaminants through oxidation. Downgradient of the treatment area, the progress of the degradation of contaminants by **natural attenuation** would be monitored by a routine sampling program. **Groundwater** beneath the NCA would not be treated. **LUCs** would be implemented to prevent the use of **groundwater** and to restrict building design and construction methods to control unacceptable vapor intrusion.

Alternative G-4: Enhanced Bioremediation (High-Concentration Areas), MNA, LUCs, and Five-Year Review

Alternative G-4 consists of the injection of **emulsified vegetable oil** into the **groundwater** in the high-concentration areas to reduce the concentrations of **VOC** contaminants through **biological degradation**. Downgradient of the treatment area, the progress of the degradation of contaminants by **natural attenuation** would be monitored by a routine sampling program. **LUCs** would be implemented to prevent the use of **groundwater** and to restrict building design and construction methods to control unacceptable vapor intrusion.

Alternative G-5: Groundwater Extraction and Treatment (High-Concentration Areas), MNA, LUCs, and Five-Year Review

Alternative G-5 consists of the extraction and treatment of the **groundwater** in the high-concentration areas to reduce the concentrations of **VOC** contaminants through **air stripping and activated carbon adsorption**. Treated (cleaned) **groundwater** would be discharged to Narragansett Bay. Downgradient of the extraction zone, the progress of the degradation of contaminants by **natural attenuation** would be monitored by a routine sampling program. **LUCs** would be implemented to prevent the use of **groundwater** and to restrict building design and construction methods to control unacceptable vapor intrusion.

Alternative G-6: Enhanced Bioremediation, MNA, LUCs, and Five-Year Review (Reduced Remediation Time)

Alternative G-6 consists of the injection of **emulsified vegetable oil** into the **groundwater** in a large area surrounding and including the high-concentration areas, to reduce the concentrations of **VOC** contaminants through **biological degradation**. Downgradient of the treatment area, the progress of the degradation of contaminants by **natural attenuation** would be monitored by a routine sampling program. **LUCs** would be implemented to prevent the use of **groundwater** and to restrict building design and construction methods to control unacceptable vapor intrusion. Because a large area would be treated by enhanced **biodegradation**, remediation of the **groundwater** contaminant **plume** is expected to be accomplished more quickly than anticipated for the other groundwater alternatives.

Evaluation of Alternatives

EPA has established nine criteria for use in comparing the advantages/disadvantages of cleanup alternatives. These criteria fall into three groups: threshold criteria, primary balancing criteria, and modifying criteria. The nine criteria are explained in the text box, *"What are the Nine Evaluation Criteria?"* A detailed analysis of alternatives can be found in the **FS** and is summarized in Tables 3 and 4 of this **Proposed Plan**.

Preferred Alternative

The Navy recommends Alternatives ***S-6 and G-2*** to address contaminated soil and **groundwater** at Site 16 and to provide long-term risk reduction.

Soil Alternative S-6 - Full Soil Cover at the NCA, Limited Excavation, Monitoring, LUCs, and Five-Year Review is recommended because:

- Chemical concentrations exceeding recommended soil clean-up levels and debris occur in non-connected areas across the NCA.
- A full soil cover across the entire NCA will prevent human exposure to both chemicals and debris and offers the broadest protectiveness across the site, given the nature and distribution of contaminated soils within the NCA.

What are the Nine Evaluation Criteria?

Threshold Criteria (The selected remedy must satisfy these criteria):

Overall Protectiveness of Human Health and the Environment determines whether an alternative eliminates, reduces, or controls threats to public health and the environment.

Compliance with ARARs evaluates whether the alternative meets federal and state environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified.

Balancing Criteria (These criteria are used to weigh the relative merits of the alternatives):

Long-Term Effectiveness and Permanence considers the ability of an alternative to maintain protection of human health and the environment over time.

Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.

Short-Term Effectiveness considers the length of time needed to implement an alternative, and the risk the alternative poses to workers, residents, and the environment during implementation.

Implementability considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.

Cost includes estimated capital and annual operation and maintenance costs, as well as present-worth cost. Present worth cost is the total cost of an alternative over time, in terms of today's dollar value. Cost estimates are expected to be accurate to within a range of +50 to -30 percent.

Modifying Criteria (These criteria are also considered during remedy selection and incorporated into the **ROD**):

State/Support Agency Acceptance considers whether the State agrees with the Navy's analyses and recommendations, as detailed in the **RI**, **FS**, and **Proposed Plan**.

Community Acceptance considers whether the local community agrees with the Navy's analyses and **Preferred Alternative.** Comments received on the **Proposed Plan** are an important indicator of community acceptance.

The Navy also recommends the excavation of soils adjacent to the southeast corner of Building E-107 (where feasible). The proposed excavation would continue only to the depth of the water table, which is approximately 4 feet below ground surface, and would be engineered and implemented to prevent damage to Building E-107.

Groundwater Alternative G-2 - MNA, LUCs, and Five-Year Review is recommended because:

- Human health and the environment will be adequately protected through the implementation of **LUCs** and MNA.
- The current/future land use at Site 16 is industrial/commercial and is not conducive to use of the underlying **groundwater** for public water supply; the **groundwater** underlying Site 16 is not currently used as a water supply source.
- The **groundwater** quality in the area of its current discharge to Allen Harbor does not adversely impact human or ecological **receptors** in the harbor.
- **Groundwater** restoration via active remediation would not be accomplished in less than 50 to 100 years, even under the most aggressive treatment alternatives (see Table 4).
- Due to existing contaminant types and aquifer conditions, the active treatment of **groundwater** could achieve, at best, only partial restoration (using treatment alternatives and associated timeframes as presented in Table 4). Consequently, active remediation of **groundwater** is not considered cost-effective.

The **Preferred Alternatives (S-6 and G-2)** meet the threshold criteria. The Navy believes these alternatives provide the best balance of tradeoffs among the other alternatives, with respect to the modifying criteria (see Tables 3 and 4). The Navy proposes that the implementation of Preferred Alternatives S-6 and G-2 be the final remedy for Site 16.

The Navy expects the **Preferred Alternatives** to satisfy the following statutory requirements of **CERCLA** Section 121(b): (1) be protective of human health and the environment; (2) comply with ARARs; (3) be cost-effective; and (4) utilize permanent solutions to the maximum extent practicable.

Next Steps

The Navy will accept public comments during a 30-day formal comment period. The Navy considers and uses these comments to improve its cleanup approach, and may decide to alter the **Preferred Alternatives** in response to public comment or new information.

During the formal comment period, the Navy will accept written comments via mail, e-mail, and fax. Additionally, verbal comments may be made during the formal Public Meeting on October 4, 2012, during which a stenographer will record all offered comments. The Navy will hold a brief informational meeting prior to the start of the formal Public Meeting on October 4, 2012.

TABLE 3. EVALUATION OF SOIL ALTERNATIVES

	EVALUATION CRITERIA	Alt. S-1 No Action	Alt. S-2 Cover/Cap and Land Use Controls	Alt. S-3 Excavation and Land Use Controls	Alt. S-4 Cover, Excavation and Land Use Controls	Alt. S-5 Excavation – Unrestricted Use	Alt. S-6 Full Cover, Monitoring, and Land Use Controls
Threshold Criteria – Selected alternative must meet these criteria							
1	Protects Human Health and the Environment – *Will it protect people and animal life near the site? Is protection permanent?*	Ø	●	●	●	●	●
2	Meets Federal and State Standards – *Does alternative comply with federal and state environmental laws, regulations, and requirements?*	Ø	●	●	●	●	●
Balancing Criteria – Used to differentiate between alternatives meeting threshold criteria							
3	Provides Long-Term Effectiveness and Permanence – *Do risks remain on site? If so, are the controls adequate and reliable?*	Ø	●	●	●	●	●
4	Reduces Mobility, Toxicity, and Volume Through Treatment – *Is treatment used to reduce contaminant threats?*	Ø	Ø	Ø	Ø	Ø	Ø
5	Provides Short-Term Protection – *How soon will risks be reduced? Will implementing the action cause impacts to people or the environment? If so, are the impacts controllable and acceptable?*	Ø	●	●	●	●	●
6	Implementability – *Can it be implemented? Is the alternative technically feasible? Are necessary goods and services available?*	●	●	●	●	O	●
7	Costs						
	Capital Costs (up front costs to design and construct)	$7,000	$2,051,000	$5,136,000	$5,222,000	$29,115,000	$3,009,000
	Operation and Maintenance Costs (annual costs)	$0	$3,000	$3,000	$3,000	$0	$3,000
	Five-Year Review Costs	$28,000	$28,000	$28,000	$28,000	$28,000	$28,000
	Total Present Value (total cost over duration of alternative in today's $)	$120,000	$2,502,000	$5,312,000	$5,398,000	$29,115,000	$3,185,000
	Assumed Duration of Alternative (Years)	30	30	30	30	1	30
	Time for construction (months)	NA	4	5	5	12	9
Modifying Criteria – May be used to modify recommended cleanup							
8	State Agency Acceptance – *Do state agencies agree with Navy's recommended alternative?*	To be determined after public comment period based on comments on Feasibility Study and Proposed Remedial Action Plan					
9	Community Acceptance – *What objections, modifications, or suggestions do the public offer during the public comment period?*	To be determined after public comment period based on comments on Feasibility Study and Proposed Remedial Action Plan					

NOTES:

● Meets or Exceeds Criteria O Partially or Potentially Meets Criteria (some uncertainty) Ø Does NOT Meet Criteria

TABLE 4. EVALUATION OF GROUNDWATER ALTERNATIVES

	EVALUATION CRITERIA	Alt. G-1 No Action	Alt. G-2 MNA and LUCs	Alt. G-3 Chemical Oxidation, MNA, and LUCs	Alt. G-3A Chemical Oxidation (Source Area), MNA, and LUCs	Alt. G-4 Biorem., MNA, and LUCs	Alt. G-5 Extraction, Treatment, MNA, and LUCs	Alt.G-6 Biorem., MNA, and LUCs (Reduced Time)
Threshold Criteria – Selected alternative must meet these criteria								
1	Protects Human Health and the Environment – *Will it protect people and animal life near the site? Is protection permanent?*	Ø	●	●	●	●	●	●
2	Meets Federal and State Standards – *Does alternative comply with federal and state environmental laws, regulations, and requirements?*	Ø	●	●	●	●	●	●
Balancing Criteria – Used to differentiate between alternatives meeting threshold criteria								
3	Provides Long-Term Effectiveness and Permanence – *Do risks remain on site? If so, are the controls adequate and reliable?*	Ø	●	●	●	●	●	●
4	Reduces Mobility, Toxicity, and Volume Through Treatment – *Is treatment used to reduce contaminant threats?*	Ø	Ø	O	O	O	O	O
5	Provides Short-Term Protection – *How soon will risks be reduced? Will implementing the action cause impacts to people or the environment? If so, are the impacts controllable and acceptable?*	Ø	O	●	●	●	●	●
6	Implementability – *Can it be implemented? Is the alternative technically feasible? Are necessary goods and services available?*	●	O	O	O	O	O	O
7	Costs							
	Capital Costs (up front costs to design and construct)	$7,000	$44,000	$7,922,000	$4,283,000	$6,160,000	$4,862,000	$17,614,000
	Operation and Maintenance Costs (annual costs)	$0	$45,000	$43,000	$48,000	$43,000 - $91,000; $2,222,000 in Year 5	$228,000 - $258,000	$27,000 - $111,000; $6,000,000 in Year 5
	Five-Year Review Costs	$28,000	$28,000	$28,000	$28,000	$28,000	$28,000	$28,000
	Total Present Value (total cost over duration of alternative in today's $)	$120,000	$1,124,000	$9,350,000	$5,587,000	$9,656,000	$9,932,000	$24,186,000
	Assumed Duration of Alternative (Years)	NA	NA	0.5	0.5	6	30	1
	Duration of alternative cleanup (Years)	NA	300	100 - 150	75-100	100 - 150	100 - 150	50
Modifying Criteria – May be used to modify recommended cleanup								
8	State Agency Acceptance – *Do state agencies agree with Navy's recommended alternative?*	To be determined after public comment period based on comments on Feasibility Study and Proposed Remedial Action Plan						
9	Community Acceptance – *What objections, modifications, or suggestions do the public offer during the public comment period?*	To be determined after public comment period based on comments on Feasibility Study and Proposed Remedial Action Plan						

NOTES:

● Meets or Exceeds Criteria O Partially or Potentially Meets Criteria (some uncertainty) Ø Does NOT Meet Criteria

The Navy will not respond to public comments during the formal Public Meeting itself, but rather will review the transcript of all the comments received during the meeting and all written comments received during the comment period before making a final cleanup decision.

The Navy will then prepare a written response to all the formal written and oral comments received. The formal comments will become part of the official public record. The transcript of comments and the Navy's written responses will be issued in a document called a **Responsiveness Summary,** when the Navy releases the **Record of Decision**. The **Responsiveness Summary** and **Record of Decision** will be made available to the public on-line and at the QDC.

The Navy will announce the final decision on the cleanup plan through the local media and via the NCBC Davisville Environmental Restoration Program website, www.bracpmo.navy.mil.

You may send comments by U.S. mail, fax or e-mail. A tear-off mailer is provided for your convenience.

What Do You Think?

The Navy, as the lead agency, is accepting formal public comments on this **Proposed Plan** from September 20, 2012 through October 20, 2012. You don't have to be a technical expert to comment. If you have a comment, the Navy wants to hear it before the final decision about Site 16 is made.

Send Written Comments

Provide the Navy with your written comments about the **Proposed Plan** for Site 16. Please email (jeffrey.m.dale@navy.mil), fax (215)-897-4902, or mail comments, postmarked no later than October 20, 2012, to:

Mr. Jeff Dale
BRAC PMO Northeast
Building 679, Naval Business Center
4911 South Broad Street
Philadelphia, Pennsylvania 19112-1303

For More Detailed Information You May Go to the Public Information Repository or Visit Our Website

The **Proposed Plan** was prepared to help the public understand and comment on the proposal for this site and provides a summary of a number of reports and studies. The technical and public information documents used by the Navy to prepare the **Proposed Plan** are available at the following Information Repository:

Annex Building
Quonset Development Corporation (QDC)
95 Cripe Street
North Kingstown, Rhode Island 02852

Relevant documents can also be accessed via the Department of the Navy BRAC Program Management Office website, www.bracpmo.navy.mil/.

Glossary of Terms

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

Air Stripping: The process of bubbling air through water to remove volatile organic substances from the water.

Aquatic: Growing or living-in or frequenting water.

Aquifer: A water-bearing stratum (subsurface zone) of permeable rock, sand, and gravel.

Activated Carbon Adsorption: Removal of soluble chemicals from water by contact with a highly adsorptive granular or powdered carbon. The contaminants are adsorbed (trapped) onto the carbon.

Background (Conditions, Levels, or Values): Occurring naturally in the environment (soil, groundwater) even if there had been no man-made sources or releases of chemicals.

Benthic organisms: Organisms living at the bottom of a water body (e.g., in the sediments).

Biological Degradation: The breakdown of organic contaminants by microorganisms.

Bioremediation: The use of biological agents, such as bacteria or plants, to remove (destroy) or neutralize contaminants.

Carcinogens: Chemicals that cause cancer.

Chemical of Concern (COC): A substance detected at a level and/or in a location where it could have an adverse effect on human health and the environment.

Chemical of Potential Concern (COPC): Chemicals found at concentrations greater than federal and state risk-based screening levels.

Cleanup Level: A numerical concentration agreed upon by the Navy and EPA, in consultation with RIDEM, as having to be reached for a certain **chemical of concern** to meet one or more of the remedial action objectives. A **cleanup level** may be a regulatory-based criterion, a risk-based concentration, or even a background value.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): A federal law, also known as "Superfund," that was passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act. This law created a tax on the chemical and petroleum industries and provided broad federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment.

Creosote: A black, oily liquid with a pungent odor, obtained by the distillation of coal tar and used as a wood preservative.

Decommissioned: Removed from service.

Emulsified Vegetable Oil: Oils that are easily dispersed/mixed into the groundwater to promote bioremediation.

Feasibility Study (FS): A description and engineering study of the potential cleanup alternatives for a site.

Groundwater: Water found beneath the earth's surface that fills pores between such materials as sand, soil, gravel, or rock.

In-Situ Chemical Oxidation: An environmental cleanup technique that introduces strong chemicals (referred to as **oxidants**) to destroy (or make less toxic) a chemical contaminant "in place" (i.e., in the aquifer).

Invertebrates: An animal lacking a spinal column.

Leachability: A soluble chemical's ability to be removed from soil by the action of a percolating liquid such as precipitation during a rainfall event.

Land Use Control (LUC): A legal or administrative restriction that prevents access or certain uses of land.

Low Permeability Soils: Soils that allow only a little water to pass through.

Monitoring: Collecting environmental information that helps to track changes in the magnitude and extent of contamination at a site or in the environment.

National Oil and Hazardous Substances Pollution Contingency Plan: More commonly called the **National Contingency Plan (NCP)**, it is the federal government's blueprint for responding to both oil spills and hazardous substance releases. Following the passage of Superfund (CERCLA) legislation in 1980, the **National Contingency Plan** was broadened to cover releases at hazardous waste sites requiring emergency removal actions. A key provision involves authorizing the lead agency to initiate appropriate removal action in the event of a hazardous substance release.

Natural Attenuation: The reduction of contaminant concentrations in the environment through biological processes, physical phenomena, and/or chemical reactions.

Non-carcinogens: Chemicals that may cause adverse effects other than cancer.

Plume: A volume of contaminated groundwater that extends downward and outward from a specific source; the shape and movement of the mass of the contaminated water is affected by the local geology, materials present in the plume, and the flow characteristics of the area groundwater.

Polycyclic Aromatic Hydrocarbons (PAHs): PAHs are a group of high molecular weight, moderately toxic organic chemicals. **PAHs** are relatively immobile and insoluble in water; they form from the incomplete combustion of hydrocarbons, such as coal and gasoline. Many of these compounds are highly **carcinogenic** at relatively low levels. Typical examples of **PAHs** are naphthalene and phenanthrene. The group of carcinogenic **PAHs** are often presented as one concentration referred to as the "benzo(a) pyrene equivalent concentration". Benzo(a)pyrene is often referred to as the "index" **PAH** chemical because it is the most studied **PAH** chemical.

Preferred Alternative: The remedy recommended by the Navy for cleaning up a site. The remedy may be modified or changed based on comments received during the Public Comment Period.

Preliminary Remediation Goals (PRGs): Chemical-specific goals for site contaminants that when achieved will result in site concentrations that pose an acceptable risk level.

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

Receptor: An individual, either a human, plant, or animal, that may be exposed to a chemical present at the site.

Record of Decision (ROD): An official document that describes the selected action for a specific site. The **Record of Decision** documents the remedy selection process and is issued by the Navy following the public comment period.

Remedial Action Objectives (RAOs): The final cleanup objectives that must be met by the selected remedial alternative.

Remedial Investigation (RI): An in-depth study designed to gather data needed to determine the nature and extent of contamination at a Superfund site.

Responsiveness Summary: A section of the **Record of Decision** that includes a listing of the written and oral formal comments received during the public comment period and public meeting on the Proposed Plan and Navy's responses to the comments.

Risk Assessment: The evaluation and estimation of the current and future potential for adverse human health and/or ecological effects from exposure to contaminants. A **human health risk assessment** is an evaluation of current and future potential for adverse human health effects from exposure to site contaminants. An **ecological risk assessment** is a study that evaluates the potential risk to ecological receptors (various types of plants and animals) from contaminants at a site.

Seep: An area, generally small in size, where water percolates slowly to the land surface.

Sodium Permanganate: A strong chemical oxidant used to cleanup groundwater contaminants.

Superfund: Another name for the **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)** (see above).

Terrestrial: Living on or in or growing from land.

Vapor Intrusion: Migration of vapors emitted by volatile chemicals from the subsurface into the indoor air spaces of overlying buildings.

Vertebrates: An animal having a spinal column.

Volatile Organic Compound (VOC): An organic chemical that easily forms vapors under normal temperatures and pressures.

Use This Space to Write Your Comments

or to be Added to the Mailing List

Please use this form for your written comments and mail to the address below.

Your comments must be postmarked no later than October 20, 2012.

Mr. Jeff Dale
Remedial Project Manager
BRAC PMO Northeast
Building 679, Naval Business Center
4911 South Broad Street
Philadelphia, Pennsylvania 19112-1303
Fax: (215) 897-4902
E-mail: jeffery.m.dale@navy.mil

(Attach additional sheets as needed)

Comments submitted by:

Mailing List Additions, Deletions, or Changes

I would like to:

- ☐ Join the site mailing list.
- ☐ Note a change of address.
- ☐ Unsubscribe from the mailing list.
- ☐ Obtain additional information about:

_____

Name: _____

Address: _____

_____

_____

Please check the appropriate box and fill in the correct address information above.

Former Naval Construction Battalion Center
Site 16 - Creosote Dip Tank Area, Fire-Fighting Training Area, and Former Building 41 Area (OU 9)
Public Comment Sheet (continued)

Place Stamp Here

MR. JEFF DALE
REMEDIAL PROJECT MANAGER
BRAC PMO NORTHEAST
BUILDING 679, NAVAL BUSINESS CENTER
PHILADELPHIA, PA 19112-1303

Fold on line, staple, stamp, and mail