TETRA TECH

C-NAVY-09-10-3875W

September 30, 2010

Project Number 112G01477

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Reference: CLEAN Contract No. N62472-03-D-0057
Contract Task Order No. 132

Subject: Transmittal of CDs of Executed ROD
Site 09, Old Fire Fighting Training Area
Naval Station Newport, Newport RI

Dear Mr. Lim, Mr. Jablonski:

On behalf of Ms. Winoma Johnson, U.S. Navy NAVFAC, I am providing to you each four copies of the signed version of the Final Record of Decision (ROD) on CD.

If you have any questions regarding this material, please do not hesitate to contact me.

Very truly yours,

Stephen S. Parker, LSP
Project Manager

SSP/lh

encl.

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RECORD OF DECISION

SITE 09 - OLD FIRE FIGHTING TRAINING AREA

NAVAL STATION NEWPORT,
NEWPORT RHODE ISLAND
SEPTEMBER 2010

NAVFAC
Naval Facilities Engineering Command

Naval Station Newport
Newport, RI

TABLE OF CONTENTS

TABLE OF CONTENTS (cont'd)

TABLES

NUMBER

FIGURES

NUMBER

APPENDICES

ABBREVIATIONS AND ACRONYMS

ARARs	Applicable, Relevant and Appropriate Requirements
BAP	Benzo(a)pyrene
bgs	below ground surface
BRAC	Base Realignment and Closure
CDI	Chronic Daily Intake
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CSF	Cancer Slope Factor
CSM	Conceptual Site Model
COC	Contaminant of Concern
COPC	Contaminant of Potential Concern
CTE	Central Tendency Exposure
DEC	Direct Exposure Criteria
EPA	Environmental Protection Agency
EPC	Exposure Point Concentration
ERA	Ecological Risk assessment
FS	Feasibility Study
HHRA	Human Health Risk Assessment
HI	Hazard Index
HQ	Hazard Quotient
IR	Installation Restoration
LUCs	Land Use Controls
MCL	Maximum Contaminant Level
MLW	Mean Low Water
NAVSTA	Naval Station
NCP	National Oil and Hazardous Substances Contingency Plan
NPL	National Priority List
NPW	Net Present Worth
O&M	Operation and Maintenance
PAH	Polycyclic Aromatic Hydrocarbon
PRG	Preliminary Remediation Goal
OFFTA	Old Fire Fighting Training Area
OSWER	Office of Solid Waste and Emergency Response
OU	Operable Unit
OWS	Oil Water Separator

ABBREVIATIONS AND ACRONYMS (cont.)

RAB	Restoration Advisory Board
RAGS	Risk Assessment Guidance for Superfund
RBC	Risk Based Concentration
RAO	Response Action Outcome
RfD	Reference Dose
RI	Remedial Investigation
RIDEM	Rhode Island Department of Environmental Management
RME	Reasonable Maximum Exposure
ROD	Record of Decision
SAIC	Science Applications International Corporation
SARA	Superfund Amendments and Reauthorization Act
SVOCs	Semivolatile Organic Compounds
SWOS	Surface Warfare Officers School
TBC	To Be Considered
TPH	Total Petroleum Hydrocarbons
TtNUS	Tetra Tech NUS, Inc.
UCL	Upper Confidence Limit
UPL	Upper Prediction Limit
UTL	Upper Tolerance Level
URI	University of Rhode Island
UST	Underground Storage Tank
VOCs	Volatile Organic Compounds

1.0 DECLARATION

1.1 SITE NAME AND LOCATION

Site 9 – Operable Unit 3 (OU3), Old Fire Fighting Training Area (OFFTA) at Naval Station (NAVSTA) Newport, Newport, Rhode Island (formerly the Naval Education and Training Center), United States Environmental Protection Agency (EPA) ID number RI6170085470.

1.2 STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) presents the Selected Remedy for Site 9 (see Figure 1-1), which was chosen by the Navy and EPA in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on information contained in the Administrative Record for the site. The Rhode Island Department of Environmental Management (RIDEM) concurs with the Selected Remedy.

FIGURE 1 1. SITE 9 LOCATION MAP

1.3 ASSESSMENT OF SITE

The response action selected in this ROD is necessary to protect the public health and welfare or the environment from actual or threatened releases of hazardous substances into the environment. A CERCLA action is required because concentrations of lead and polycyclic aromatic hydrocarbons (PAHs) in surface and subsurface soil pose unacceptable risk to human health under current and future industrial/commercial land use scenarios, and under hypothetical future

residential/recreational land use scenarios. In addition, concentrations of metals, benzene, and 2-methylnaphthalene in groundwater at the site currently exceed drinking water standards and would pose risk to persons if they were to utilize groundwater as a potable water source. Because drinking water standards are exceeded, the CERCLA action must address groundwater as well.

1.4 DESCRIPTION OF SELECTED REMEDY

The major components of the Selected Remedy for Site 9 include the following:

- Covering of contaminated soil with a geotextile-lined soil cover in grassy areas and/or with asphalt/concrete such that site-wide exposure concentrations meet the established cleanup levels.
- Long-term operation and maintenance (O&M) of the replacement stone revetment (currently under construction as a part of a separate CERCLA removal action) to prevent soil erosion at the shoreline and to maintain the protectiveness of the asphalt/soil cap.
- Implementation of land use controls (LUCs) to ensure that future use of the property is limited to non-residential activities, and to ensure that the soil cover and subsurface soils are not disturbed without appropriate safety precautions.
- Implementation of groundwater use restrictions and a long-term monitoring program. The use restrictions would prevent the installation of wells for any consumptive, irrigational, or industrial purpose and would also describe necessary protection measures for workers that may come into contact with groundwater during any future site development activities. Long-term monitoring will evaluate whether site contamination has migrated to off-shore sediments or to groundwater outside of the compliance boundary for the contamination being managed in place.

Areas that are currently paved (or to be paved) for parking, roadways and sidewalks would provide an effective barrier to prevent access to contaminated soil, including soil contaminated with total petroleum hydrocarbons (TPH). While TPH is not a CERCLA-regulated contaminant, it is comingled with other CERCLA contaminants; therefore, this clean up action will effectively address the TPH and comingled CERLCA contaminants.

The Selected Remedy eliminates unacceptable risks associated with exposure to soil by reducing site-wide exposure concentrations of PAHs and lead to levels that are protective of human health under the current and reasonably anticipated future industrial/commercial use of the site. Land use controls will be established to prevent hypothetical future residential/recreational use of the site. Levels of hazardous substances (PAHs and metals) in groundwater beneath Site 9 exceed drinking water criteria; however, due to the salinity of the water downgradient of the site and because groundwater impacted with site contaminants is limited to the area of soil contamination that is being managed in place, no remedial action other than institutional controls and monitoring are required for groundwater.

No action is necessary with regard to surface water or sediment at Site 9. Based on data collected after the risk assessment was completed, EPA, the State, and the Navy agreed that there is neither a Superfund human health nor ecological risk present to warrant CERCLA action on sediment. Sediment is not a medium of concern, but sediment will be monitored as a part of the soil remedy to make sure the contamination being managed on Site does not pose a future risk to sediment. The State's letter of concurrence with this selected remedy is included in Appendix D. Surface water was not identified as a medium of concern at this site.

The Selected Remedy is expected to achieve substantial long-term risk reduction and allow the property to be used for the reasonably anticipated future land use, which is industrial/commercial.

This ROD documents the final remedial action for Site 9 and does not include or affect any other sites at the facility. Implementation of this remedy will allow industrial/commercial reuse of the site, which is consistent with current use and the overall cleanup strategy for NAVSTA Newport of restoring sites to support base operations.

1.5 STATUTORY DETERMINATIONS

The Selected Remedy is protective of human health and the environment, complies with federal and state requirements that are applicable or relevant and appropriate to the remedial action, is cost-effective, and utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. The Selected Remedy does not satisfy the statutory preference for remedies that use treatment as a principal element to reduce the toxicity, mobility, or volume of hazardous substances, pollutants, and contaminants. The type of contamination at Site 9 (PAHs and metals in soil and groundwater), the relatively low concentrations and inert nature of PAHs and metals, and the large volume of contaminated soil make treatment impracticable. The use of containment rather than treatment is suitable under NCP criteria to address contamination such as that at Site 9, which poses a relatively low long-term threat to human health and the environment.

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on site in excess of levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within 5 years of initiation of the remedial action, and every 5 years thereafter[1], to ensure that the remedy is, or will be, protective of human health and the environment.

1.6 ROD DATA CERTIFICATION CHECKLIST

The locations in Section 2.0, Decision Summary, of the information required to be included in the ROD are summarized in Table 1-1. Additional information and the administrative record index can be found in the Administrative Record file for NAVSTA Newport located in the Information Repositories at NAVSTA Newport, Middletown Free Library in Middletown, Rhode Island; Newport Public Library in Newport, Rhode Island; and Portsmouth Free Library Association in Portsmouth, Rhode Island.

TABLE 1 1. ROD DATA CERTIFICATION CHECKLIST

DATA	LOCATION IN ROD
Chemicals of concern (COCs) and their respective concentrations	Sections 2.5 and 2.7
Baseline risk represented by the COCs	Section 2.7
Cleanup levels established for COCs and the basis for these levels	Section 2.7 and 2.8
How source materials constituting principal threats are addressed	Section 2.11
Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the risk assessment	Section 2.6
Potential land and groundwater uses that will be available at the site as a result of the Selected Remedy	Section 2.12.3
Estimated capital, operating and maintenance (O&M), and total net present worth (NPW) costs; discount rate; and number of years over which the remedy costs are projected	Appendix B
Key factors that led to the selection of the remedy	Section 2.12.1

[1] The 5-year review for the NETC Newport (the NPL listing) has already been triggered by the initiation of the remedial action at OU 1 and the next five-year review will be in 2014.

1.7 AUTHORIZING SIGNATURES

Concur and recommend for implementation:

21 Sep 10

CAPT J.P. Voboril
Commanding Officer
Naval Station Newport, RI
U.S. Navy

Date

9-28-2010

James T. Owens, III
Director, Office of Site Remediation and Restoration
Region 1 – New England
U.S. EPA

Date

2.0 DECISION SUMMARY

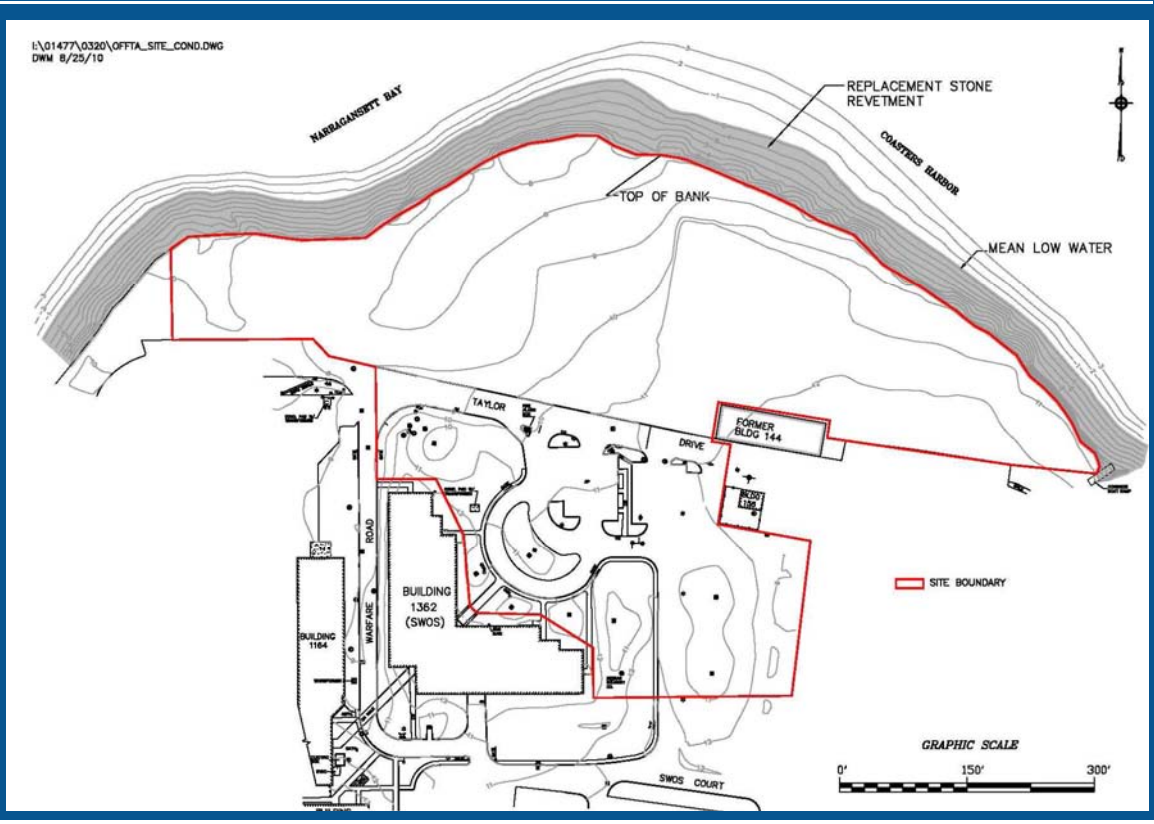
2.1 SITE NAME, LOCATION, AND BRIEF DESCRIPTION

NAVSTA Newport, EPA ID number RI6170085470, is located approximately 60 miles southwest of Boston, Massachusetts, and 25 miles south of Providence, Rhode Island. It occupies approximately 1,063 acres, with portions of the facility located in the City of Newport and the Towns of Middletown, Portsmouth, and Jamestown, Rhode Island. The facility layout is long and narrow and follows the western shoreline of Aquidneck Island for nearly 6 miles, facing the east passage of Narragansett Bay (Figure 1-1).

Training and research and development have been the primary activities at NAVSTA Newport from 1974 to the present. The major commands currently located at NAVSTA Newport include the Naval Education and Training Center, SWOS Command, Naval Undersea Warfare Center, and Naval War College. The Navy is the lead agency for CERCLA activities at the facility, and EPA and RIDEM are consulting agencies.

Site 9, OFFTA, is located at the northern end of Coasters Harbor Island (Figure 1-1) and is bounded to the east, north, and west by Coasters Harbor (part of Narragansett Bay). It occupies a total land area of approximately 8.2 acres, consisting of the original site area (5.5 acres) north of Taylor Drive and an area (2.7 acres) south of Taylor Drive known as the Surface Warfare Officers School (SWOS) site (Figure 2-1). The 2.7 acres south of Taylor drive was originally identified as Site 20 under the FFA for NAVSTA Newport. However, this section was added to the OFFTA site based on a 2005 investigation that showed subsurface soil contamination at the SWOS site similar and contiguous to that at the adjacent OFFTA site.

FIGURE 2 1. SITE 9 SITE PLAN



The site was the location of a Navy fire fighting training facility from World War II until 1972. During training operations, fuel oils were ignited in various structures at the site and then were extinguished by trainees. Underground piping reportedly carried the water/oil mixture from underground storage tanks (USTs) to the structures. Unburned fuels and water were drained from the buildings and routed to an oil-water separator (OWS) before being discharged to Coasters Harbor. Upon closure in 1972, the training structures were demolished and buried in mounds on the site, and the entire area was then covered with topsoil and converted to a recreational area, which included a baseball field, a picnic area, and open pavilion. This recreational area was opened as "Katy Field" in 1976 for Navy use. During a short period in the 1990s, local little league teams were allowed to use the baseball field, and Building 144 was used as a day care facility. Building 144 was demolished in 2009.

Katy Field was used for recreation until it was closed and fenced in October 1998 because of potential environmental and human health concerns. In 2003, the Surface Warfare Officers School (SWOS) Applied Instruction Building was constructed to the south of the now former Katy Field (Building 1362, see Figure 2-1.

A series of removal actions have been undertaken as non-time critical removal actions: The earthen mounds and associated buried debris were removed from the Site in 2005. Soils containing petroleum at concentrations above RIDEM upper concentration limits (UCLs) were removed along with an oil-water separator, clay drains from training structures, and two 8-inch cast iron drainage pipes were excavated and removed during 2007-2008. A replacement stone revetment (shoreline protection system) designed to prevent erosion of remaining contaminated soil to the sediments of Coaster's Harbor is currently under construction as part of a CERCLA removal action. The remaining soils at the site contain PAHs, and metals (primarily lead, arsenic and manganese) comingled with petroleum, at concentrations that pose risk to human receptors under hypothetical residential and unrestricted recreational scenarios, as well as under the current industrial use scenario. These soils are present within the red boundary shown on Figure 2-1.

Currently, Site 9 is a mix of active parking areas and construction lay-down area for construction projects in the immediate vicinity, including the replacement stone revetment. Future use of the site was proposed in 2004 by the Navy to be unrestricted. However, in 2008 the NAVSTA Master Plan was updated, and the site was identified as planned parking for a new fitness facility to be constructed to the south of the site. Based on this current plan, the future exposures at the site would be equivalent to an industrial/commercial use.

2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

Table 2-1 provides brief summaries of previous investigations at Site 9. Results of these investigations indicated that elevated concentrations of PAHs and metals were present in soil and groundwater at the site. The nature and extent of soil contamination is discussed in Section 2.5. Although groundwater at the site has been impacted by site activities, the groundwater contamination associated with the releases does not extend beyond the site boundary or area of contaminated soil that will be managed in place. Therefore, to ensure that the contaminated groundwater does not migrate beyond the compliance boundary of the waste management area established through this remedy, no remedial action other than institutional controls and monitoring are required for groundwater.

TABLE 2 1. PREVIOUS INVESTIGATIONS AND SITE DOCUMENTATION

INVESTIGATION	DATE	ACTIVITIES
Phase I Remedial Investigation (RI) Sampling	1990 - 1991	Included installation of 12 borings, eight groundwater monitoring wells, and associated soil and groundwater samples from the site. The RI also included soil gas and **geophysical surveys**. Survey and sample results indicated the presence of several anomalies (non-soil materials) across the site, elevated soil gas readings in the central portion of the site, and elevated levels of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs, including PAHs), and metals throughout the site.
Phase II RI Sampling	1993	Additional field investigations (geophysical and **soil gas surveys**, as well as installation of six test pits, four additional soil borings, groundwater samples, and storm sewer sampling) were conducted to further delineate the presence, nature, and extent of contamination. Offshore sampling was also conducted to assess the quality of sediment and bivalves (shellfish such as clams, oysters, mussels, etc.) adjacent to the site in Coasters Harbor and Narragansett Bay.
Phase III RI Sampling	1997 - 1998	Included collection of 32 surface soil and 5 shoreline sediment samples to obtain additional data for evaluating potential human health risks from recreational exposure at the site
Source Removal Evaluation Report	1998	Included a metal and buried piping survey, subsurface soil and groundwater investigation, and shoreline sediment and storm sewer outfall investigation and attempted to locate potential discrete contaminant sources. Concluded that no removal action was warranted and although petroleum contamination was pervasive in subsurface soil, it did not appear to be migrating. No discrete contaminant sources were identified.
Background Soils Investigation	2000	Included collection and analysis of surface and shallow subsurface soil samples from 20 undisturbed locations on Coasters Harbor Island, determined to be free of influence from either the site or other anthropogenic sources. The data were used to establish background values for the detected metals at this site and other sites where the same soil type was found.
Marine Ecological Risk Assessment (ERA) Report	2000	**Offshore ecological investigation** conducted in 1998 included sampling and analysis of sediment; pore water and elutriate (23 stations); toxicity studies, and sampling and analysis of biota including tissue samples from clams, blue mussels, lobsters, and cunner fish collected from various stations. Found some potential risk to ecological receptors in the near-shore (intertidal) areas.
Remedial Investigation (RI) Report	2001	Integrated data from all of the investigations cited above to determine the nature and extent of contamination in site media, fate and transport of contaminants in site media, and risks posed to human health and the environment. **Results** identified lead at concentrations greater than background levels in subsurface soil across the site. Arsenic and PAHs in site soils were also identified as contaminants of concern. Although estimated lifetime cancer risks for the recreational, residential, and construction worker scenarios were within EPA's target risk range of 10^{-4} to 10^{-6}, they slightly exceeded the RIDEM risk criterion of 10^{-5} under all scenarios. Non-cancer hazard indices (HIs) for surface soil, subsurface soil, and sediment did not exceed 1.0 for any target organ group under any scenario. For residential children exposed to subsurface soil, 18.6 percent were estimated to have blood lead levels greater than 10 µg/dL. This exceeds EPA's protective cutoff level of 5 percent and therefore indicates that adverse effects from lead exposure are likely to occur in children living at the site.

TABLE 2 1 (CONTINUED). PREVIOUS INVESTIGATIONS AND SITE DOCUMENTATION

INVESTIGATION	DATE	ACTIVITIES
Groundwater Risk Evaluation	2002	Evaluated risk to potential residents exposed to groundwater through ingestion, inhalation, dermal contact, and all potential residential uses of groundwater at the site. Non-cancer risks for the residential child and adult exceeded the acceptable level of 1.0 under both the reasonable maximum exposure (RME) and central tendency exposure (CTE) conditions. Under RME conditions, cancer risks exceeded EPA's target risk range, but under CTE conditions, cancer risks were within EPA's target risk range but exceeded the RIDEM criterion. Elevated blood lead levels (greater than 10 µg/dL), resulting from groundwater exposure (72.7 percent), exceeded the EPA's protective cutoff level of 5 percent.
Draft Feasibility Study (FS)	2002	Based on the RI, potential remedial alternatives that could permanently and significantly reduce potential risks associated with contaminated soil, groundwater, and marine sediment at Site 9 were developed and evaluated based on unrestricted (residential) use of the site.
Soil Pre-Design Investigation (PDI) Report	2004 - 2005	Provided data to quantify buried debris and soil exceeding preliminary remediation goals (PRGs) identified in the draft FS. Included results of subsurface soil samples collected from alternate 2-foot intervals at 35 soil boring locations across Site 9. **Results** indicated elevated levels of metals across the entire site; PAH concentrations varied widely. Debris was limited to the mounds, although solid fill (brick fragments, traces of concrete rubble) was present in some of the underground areas, and foundations of some training buildings were still present.
Soil PDI Report Addendum	2005	Supplemental sampling was conducted to fill data gaps and to better define the extent of soil and groundwater contamination. It included the collection of 21 soil samples from 10 additional boring locations and the installation of three piezometers to determine the hydraulic gradient in the groundwater at the western portion of the site.
Supplemental Risk Evaluation	2007	Evaluated human health risks from industrial/commercial exposures to soil and indoor air and construction worker exposure to groundwater at Site 9 using all soil data (0 to 10 feet) collected from 1990 through 2005 and the most recent groundwater data (unfiltered results) from each well. The earlier baseline human health risk assessment (HHRA) and groundwater risk evaluation did not evaluate industrial/commercial/construction worker exposures.
Revised Draft Final FS, finalized through a July 2010 Technical Memorandum	2009 - 2010	Based on the RI, Supplemental Risk Evaluation, and change in anticipated future use of the site (from residential to industrial), potential soil **remedial alternatives** that could permanently and significantly reduce potential risk associated with contaminated soil at Site 9 were developed and evaluated. Because contaminated groundwater is limited to the area of soil contamination that will be managed, and sediment at the shoreline stations beneath the revetment wall will be removed during its construction, it was determined that no active remedial alternatives are warranted for groundwater or sediment.

There have been no cited violations under federal or state environmental law or any past or pending enforcement actions pertaining to the cleanup of Site 9.

2.3 COMMUNITY PARTICIPATION

The Navy performs public participation activities in accordance with CERCLA and the NCP throughout the site cleanup process at NAVSTA Newport. The Navy has a comprehensive community relations program for NAVSTA Newport, and community relations activities are conducted in accordance with the NAVSTA Newport Community Involvement Plan. These activities include regular technical and Restoration Advisory Board (RAB) meetings with local officials and the establishment of an Information Repository at the local libraries for dissemination of information to the community.
The Navy organized a RAB (previously referred to as a Technical Review Committee) in 1988 to review and discuss NAVSTA Newport environmental issues with local community officials and concerned citizens. The RAB consists of representatives of the Navy, EPA Region 1, RIDEM, local officials, and members of the community. The RAB has met frequently since its inception and now meets bi-monthly. Site 9 investigation activities, results, and associated remedial decisions have been discussed at RAB meetings. Information Repositories for NAVSTA Newport have been established at the Middletown Free Library in Middletown, Rhode Island; Newport Public Library in Newport, Rhode Island; and Portsmouth Free Library Association in Portsmouth, Rhode Island. Documents and other relevant site information, including a copy of the Administrative Record Index, are available for public review at the Information Repositories. For access to the Administrative Record or additional information about the Installation Restoration (IR) Program at NAVSTA Newport, contact: Lisa Rama, Public Affairs Office, 690 Peary Street, Naval Station Newport, Newport, RI, 02841-1512, 401-841-3538.

The Navy distributed copies of the Proposed Plan to a mailing list of approximately 40 community members and the local Information Repositories. In accordance with Sections 113 and 117 of CERCLA, the Navy provided a public comment period from June 28 to July 27, 2010, for the proposed remedial action described in the Proposed Plan for Site 9. A public meeting to present the Proposed Plan was held on July 21, 2010, at the Hampton Inn and Suites, Middletown, Rhode Island. **Public notice** of the meeting and availability of documents was published in the Newport Daily News on July 7 and July 14, 2010.

2.4 SCOPE AND ROLE OF OPERABLE UNIT

Site 9 (OU3) is part of a comprehensive environmental investigation and cleanup program currently being performed at NAVSTA Newport under CERCLA authority pursuant to the Federal Facility Agreement (FFA) dated March 23 1992. IR Program cleanup activities are being performed under CERCLA, except at those sites subject to the RIDEM Underground Storage Tank (UST) Program. Twenty-one IR sites have been identified at NAVSTA Newport. The status of the IRP sites can be found on the RAB website; http://www.rabnewportri.org.

As stated in Section 2.1 of this ROD, Site 9 (OFFTA) was expanded to include Site 20 (SWOS) following a focused site inspection in 2005, which recommended that the two sites be combined because of the similar and contiguous contaminants (petroleum, PAHs, and lead) at each site. Based on implementation of that recommendation, Site 20 is no longer considered its own site but is being addressed as part of Site 9 under OU3.

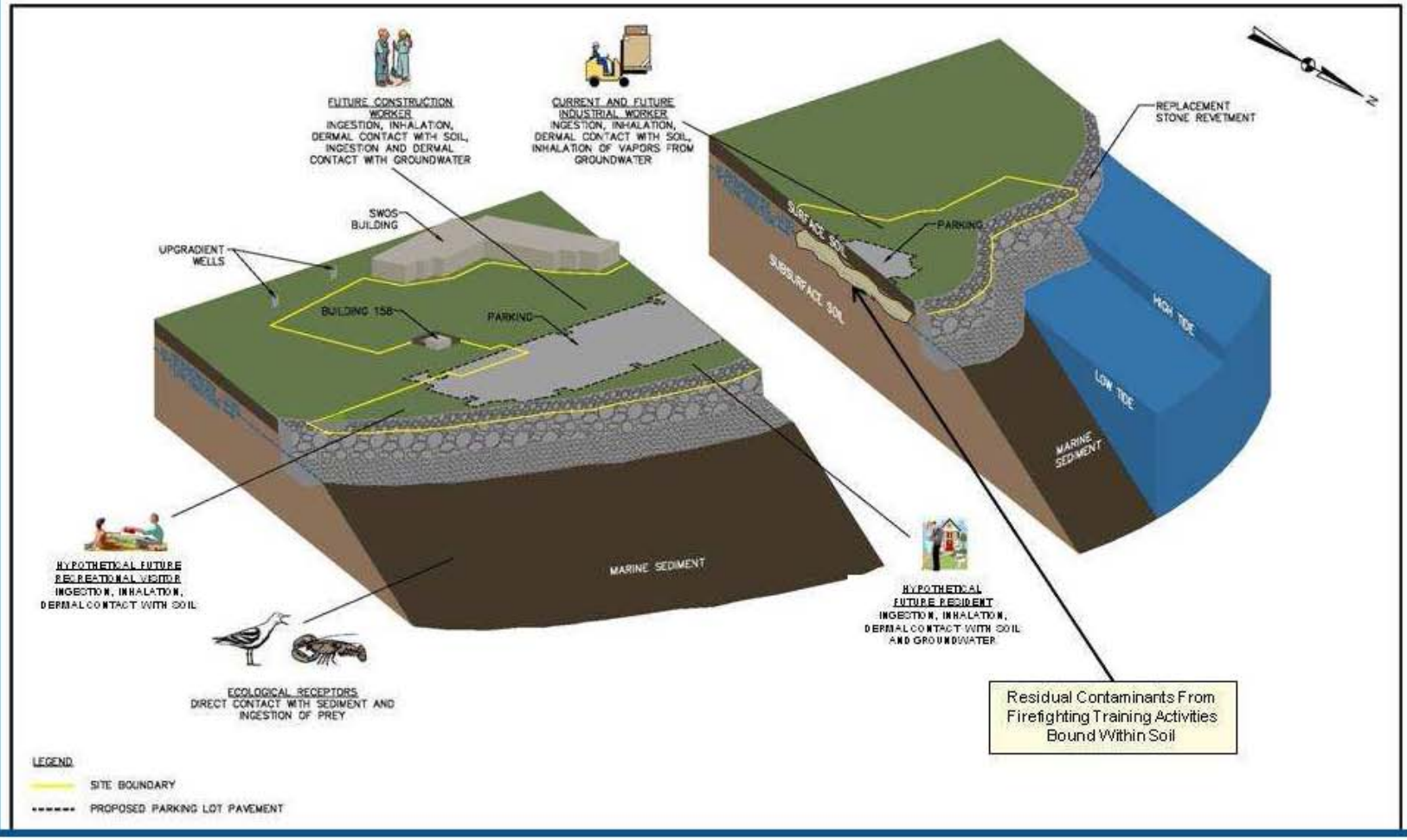
Investigations at Site 9 and Site 20 indicated the presence of soil and groundwater contamination from past operating practices that poses unacceptable human health risk to current and potential future receptors. A series of non-time-critical removal actions undertaken in response to the contamination at Site 9 included the Phase 1 removal of three mounds of contaminated soil and debris from September 2004 through March 2005; followed by Phase 2 hot spot excavations to remove contaminated subsurface soil, former drainage piping, a large OWS, and exploratory excavations around remaining building foundations (2007 – 2008); and construction of a replacement revetment wall (begun in July 2010).

The remedy documented in this ROD will achieve the Remedial Action Objectives (RAOs) for Site 9, as listed in Section 2.8. Implementation of this remedy will allow industrial/commercial reuse of the site, which is consistent with current and reasonably anticipated future use and the overall cleanup strategy for NAVSTA Newport of restoring sites to support base operations.

2.5 SITE CHARACTERISTICS

Figure 2-2 presents the Site 9 conceptual site model (CSM), which identifies contaminant sources, contaminant release mechanisms, transport routes, and receptors under current and future land use scenarios. No discrete source of contamination was identified at Site 9, but previous investigations indicate that past activities associated with fire-fighting training at OFFTA resulted in the release of both organic and inorganic contaminants at the site through release overland and into the soil of burned and unburned oils and other unspecified fuels used for firefighting purposes. Over time these contaminants and comingled fuels have become bound within the soils. Transport is only expected to occur through erosion. Human health and ecological receptors are discussed in Sections 2.7.1 and 2.7.2, respectively. Groundwater at Site 9 resides within these contaminated soils and as a result may be impacted by these contaminants. However, the impact appears to be limited to groundwater directly in contact with the contaminated soil beneath the site.

FIGURE 2 2. CONCEPTUAL SITE MODEL



2.5.1 Physical Characteristics

As shown on Figures 2-1 and 2-2, the Site 9 area is generally flat, with surface elevations ranging from 8 to 12 feet above mean low water (MLW). The entire site is located within the 100-year coastal flood zone. Access to the original OFFTA area, much of which is now gravel covered, is restricted by a chain-link fence along its eastern, southern, and western boundaries.

Prior to the 2004-2005 soil removal action, Site 9 included three soil mounds, one approximately 30 feet above MLW (located in the center of the site) and two that were approximately 17 and 13 feet above MLW (located on the western side of the site). These mounds were created when the fire fighting training structures were demolished but were removed during the 2004 to 2005 removal actions. The ground surface slopes gently from the central and southern portions of the site towards the north and northwest. The site encompasses approximately 8.2 acres consisting of the original 5.5 acres north of Taylor Drive and 2.7 acres south of Taylor Drive originally site 20) that includes the parking areas for the SWOS.

Soils at Site 9 vary in thickness from 6 to 27 feet and are made up of a mixture of fill (consisting of construction debris, sand, and gravel), silty sand and gravel, peat and silt, and glacial till consisting of silt, sand, and gravel (TtNUS, 2009). This soil consists of native soil and soil imported from off site and used as fill and topsoil during previous site development. The bedrock at the site has been described as a conglomerate and may contain localized units of sandstone and phyllite. Blasting conducted in the central portion of the site during site development may have resulted in localized areas of higher conductivity in the bedrock by increasing its fracture density.

Groundwater data from Site 9 indicate that the **groundwater** table occurs within the overburden across most of the site, except in the eastern and southern portions, where it occurs within bedrock. Groundwater levels range from approximately 4 to 9 feet below ground surface (bgs), and groundwater flow is generally to the northwest toward Narragansett Bay and toward Coasters Harbor to the north and east of the site. A tidal influence study conducted for this site indicated that both the overburden and bedrock aquifers are influenced by tides in areas along the shoreline, but this influence does not extend beyond the shoreline.

2.5.2 Nature, Extent, Fate and Transport of Contamination

The **contamination** at Site 9 was not linked to a specific source but rather to general firefighting activities and, in the case of some inorganics, to the construction fill at the site. During the 2001 RI, soil contaminant concentrations were compared to RIDEM Residential Direct Exposure Criteria and GB Leachability Criteria established in the RIDEM Remediation Regulations and EPA Region 3 Risk-Based Concentrations (RBCs). Subsequent data collected during the PDI and supplemental sampling were compared to applicable EPA Region 9 PRGs for industrial soil and tap water. The soil metals results were also compared to background metals concentrations established for Site 9 in 2000 during the Background Soils Investigation. A chemical was considered site related if detected concentrations were greater than the RBCs/PRGs and greater than applicable background concentrations. Arsenic, lead, and PAHs were identified in the RI as chemicals of concern (COCs) in soil, and arsenic, chromium, lead, manganese, 2-methylnaphthalene, and benzene were conservatively identified as COCs based on hypothetical future use of groundwater as drinking water. Figure 2-3 shows locations at which soil COC concentrations exceed industrial PRGs, and Table 2-2 summarizes the laboratory data from the RI (that were used in the HHRA) for the identified soil and groundwater COCs.

FIGURE 2 3. EXTENT OF COCS IN SOIL

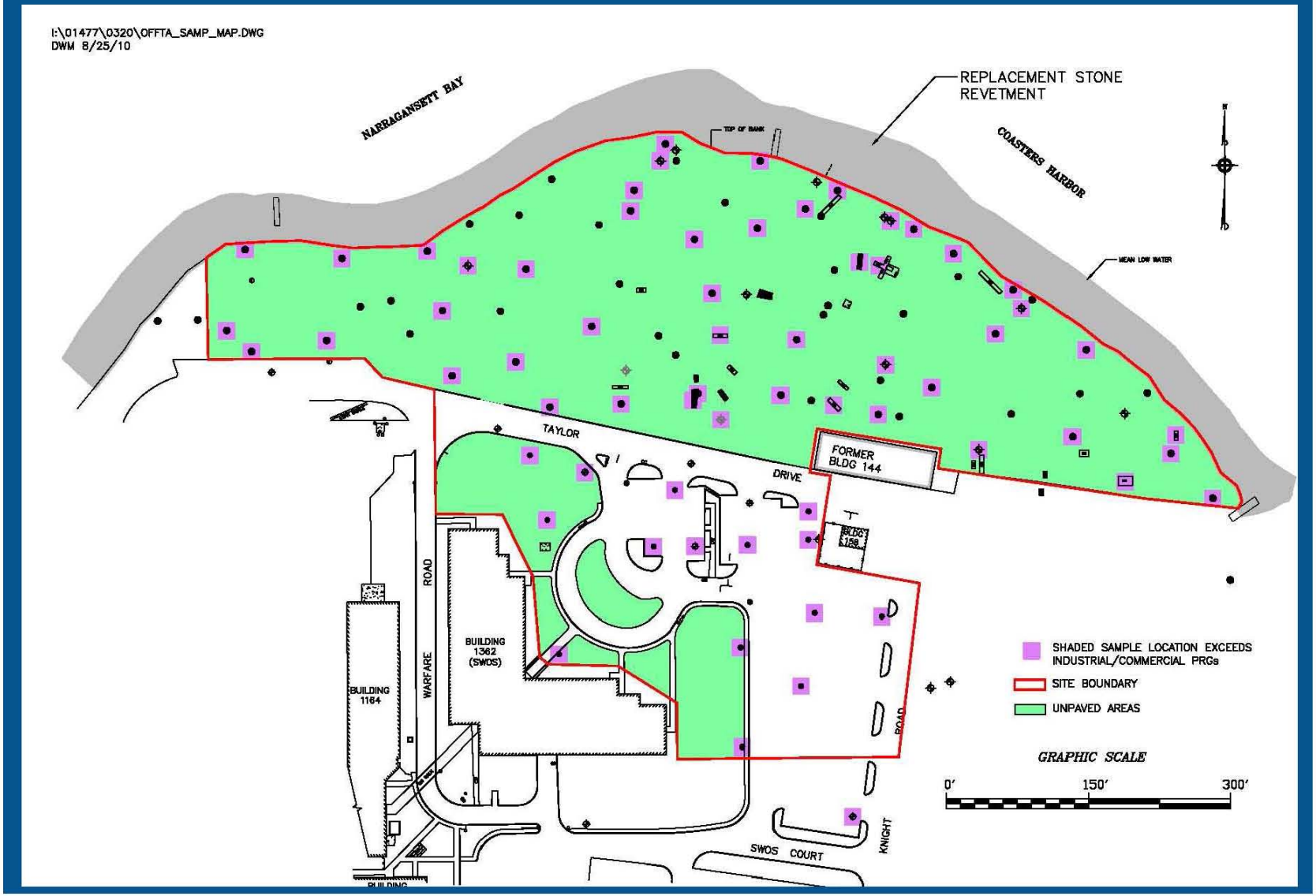


TABLE 2 2. COC CONCENTRATION SUMMARY

COC	EPA REGION 9 INDUSTRIAL SOIL/ TAP WATER PRG	BACKGROUND CONCENTRATION	FREQUENCY OF DETECTION (FOD)	CONCENTRATION	
				MIN	MAX.
SOIL					
Arsenic (mg/kg)	1.6	6.2	134/135	0.64	53.3
Lead (mg/kg)	750	15.4	133/134	2.4 J	8,250
Benzo(a)anthracene (µg /kg)	2,100	---	103/132	12	18,000
Benzo(a)pyrene (µg /kg)	210	---	100/133	11	15,000
Benzo(b)fluoranthene (µg /kg)	2,100	---	108/132	13	17,000
Dibenzo(a,h)anthracene (µg /kg)	210	---	54/129	3.7	4,000
GROUNDWATER (µg/L)					
Arsenic	0.045	---	2/13	44.5	49.8
Chromium	11	---	12/13	3.2	39.9
Lead	15	---	10/13	1.6 J	207 J
Manganese	88	---	13/13	396 J	12,500 J
Benzene	0.35	---	2/13	8 J	33
2-Methylnaphthalene	0.62	---	2/13	3 J	190

J = Estimated concentration.

Estimates of the volume of contaminated soil were generated during the FS after calculation of PRGs for protection of human health under an industrial land use scenario (the planned future use). Based on RI results, soil contamination was assumed to extend to a depth of approximately 10 feet bgs. The volume of PAH and metals-contaminated soil required to be addressed under the industrial scenario was estimated at 62,000 cubic yards.

Contaminants such as **metals and PAHs** are highly persistent and when released to the environment generally adsorb to the soil matrix and remain bound to particulate matter. Because of this, they tend to migrate from source areas via bulk movement processes (e.g., transport by wind erosion of small particles) and, if leaching from soil to groundwater occurs, it usually results in transportation over relatively short distances.

2.6 CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

NAVSTA Newport is an active military training facility and is expected to remain active for the foreseeable future. Forty-two Naval and defense commands currently operate at NAVSTA Newport, which is one of the Navy's primary sites for training and educating officers, officer candidates, senior enlisted personnel, and midshipman candidates, and which is also used for conducting advanced undersea warfare and development systems activities. Tenant commands include the Naval Undersea Warfare Center, Naval Warfare College, SWOS, Navy Warfare Development Command, Officer Training Command, Center for Service Support, Naval Academy Preparatory School, and Senior Enlisted Academy.

When the RI was initiated, the land use was recreational, and the Navy intended to keep it as unrestricted. Therefore, the risk assessment included residential and recreational scenarios. However, in 2008, a Base Master Plan was completed which identified the site as parking areas for a new fitness facility being constructed to the south. Currently the site is being used for parking and construction lay-down areas for other projects at Coasters Island.

Land use in the areas surrounding NAVSTA Newport is commercial/industrial and residential/urban suburban. Land use at OFFTA Site 9 is anticipated to be industrial/commercial in the future. Specifically, the Navy plans to use the site for parking and roadways. If future land use at Site 9 changes from the reasonably anticipated land use, the Navy will reassess risks appropriate to the future use.

Groundwater underlying NAVSTA Newport is **not used for drinking water,** it flows to the site from urbanized/developed land, is partially affected by seawater, and is not expected to be used in the future. Although RIDEM groundwater classifications have designated groundwater in the area as GB (may not be suitable for drinking water without treatment), it has not been officially classified by EPA as a non-drinking water source. Drinking water for NAVSTA Newport and most of the residents of Newport and Middletown is supplied and managed by the Newport Water Department, which receives its water supply from a series of seven surface water reservoirs located on Aquidneck Island and two surface water reservoirs on the mainland. Site 9 (OFFTA) is not within the watershed of any of the area supply reservoirs. Private wells located within 3 miles of NAVSTA Newport provide drinking water to approximately 4,800 of the estimated 10,000 people that live within 3 miles of NAVSTA Newport (TtNUS, 2009a). Because of the Site's coastal location, groundwater at Site 9 is downgradient of any potential or existing water sources.

No natural surface water bodies are located within Site 9. Surface runoff from the facility flows overland and through storm sewers to Coasters Harbor (part of Narragansett Bay) at the northern site boundary.

2.7 SUMMARY OF SITE RISKS

The baseline risk assessment estimates what risks the site poses if no action was taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. A baseline HHRA was conducted as part of the RI (TtNUS, 2001), a groundwater risk evaluation was prepared in 2002, and a supplemental HHRA was conducted in 2007 (TtNUS, 2007). The human health risk assessment was conducted using the then-current risk assessment methodology. There has since been a change in the methodology to quantify inhalation risks using the EPA 2009 RAGS Part F. This change in methodology would not change the remedy for the Site and does not require the risk assessment to be updated, given the reasonably anticipated land use as an industrial site. A Marine ERA Report prepared by Science Applications International Corporation (SAIC) and the University of Rhode Island (URI) Graduate School of Oceanography under contract to TtNUS in 2000, using data collected between 1997 and 1999. A summary of the Marine ERA, which assesses site-related ecological risks to the offshore portions of the OFFTA site, is presented in the RI (TtNUS, 2007). This section of the ROD summarizes the results of the risk assessment for this site.

The risks summarized in this section were those for **potential receptors** indicated on Figure 2-2 which assumes an unrestricted use of the site. Some media and receptors were later eliminated after review of subsequent data collected (Section 2.7.3). As such, residential exposure to soil, and risk to sediment and fish tissue etc. are presented in this risk summary, but are not discussed as media and receptors of concern in other sections of this document.

2.7.1 Summary of Human Health Risk

The quantitative HHRA was conducted using chemical concentrations detected in soil, groundwater, sediment, and fish tissue samples. Key steps in the risk assessment process included identification of chemicals of potential concern (COPCs), exposure assessment, toxicity assessment, and risk characterization. Tables summarizing data used in the HHRA and associated results are presented in Appendix C.

Identification of COPCs

Table C-1 presents exposure point concentrations (EPCs) for the COPCs identified in vadose zone (unsaturated) soil (0 to 10 feet bgs), and Table C-2 (adapted from the 2002 Groundwater Risk Evaluation) presents EPCs for the COCs identified in groundwater at Site 9. EPCs are the concentrations used in the risk assessment to estimate exposure and risk from each COC. For each COC, the table includes the mean and maximum detected concentrations, the EPC, and how the EPC was derived. In accordance with EPA's ProUCL guidance and based on the statistical distribution of the data and the results of preliminary calculations, the 95-percent upper confidence limits (UCLs) on the mean or the maximum

detected concentrations were used as the EPCs for Site 9 COCs. In the case of lead, the arithmetic mean of the lead concentration was selected as the EPC.

Exposure Assessment

During the **exposure assessment**, current and potential future exposure pathways through which humans might come into contact with the chemicals identified in the previous step were evaluated. The results of the exposure assessment for Site 9 were used to refine the CSM (Figure 2-2). A number of exposure pathways and potential receptors were initially identified under various current and future land use scenarios, as listed in Table 2-3 for completeness. The later supplemental risk assessment provided risks for other scenarios to reflect other potential future receptors.

Although groundwater use at the site is unlikely and will be restricted, risk associated with groundwater use was conservatively evaluated under the standard residential scenario of unlimited use to be inclusive of all potential uses at the site, even those not anticipated. Potential exposure routes for soil and groundwater include incidental ingestion (swallowing small amounts of soil and/or groundwater), dermal contact (skin exposure), and/or inhalation (breathing) of airborne soil particulates or volatile COCs in groundwater.

TABLE 2 3. RECEPTORS AND EXPOSURE ROUTES EVALUATED IN HHRA

RECEPTORS	EXPOSURE ROUTES
2001 HHRA	
Recreational Visitors (Adults/Children) (current and future land use)	Soil/sediment dermal contact Soil/sediment ingestion Soil (fugitive dust) inhalation Fish tissue ingestion (includes subsistence fisherman)
On-Base Residents (Adults/Children) (future land use)	Soil/sediment dermal contact Soil/sediment ingestion Soil (fugitive dust) inhalation
Subsistence Fishermen (future land use)	Shellfish and fish tissue ingestion
Construction Workers (future land use)	Soil/sediment dermal contact Soil/sediment ingestion Soil (fugitive dust) inhalation
2002 Groundwater Risk Evaluation	
On-Base Residents (Adults/Children) (future land use)	Groundwater dermal contact Groundwater ingestion Groundwater inhalation of COPCs while showering
2007 Supplemental HHRA	
Industrial/Commercial Workers (current and future land use)	Soil dermal contact Soil ingestion Soil (fugitive dust) inhalation Groundwater inhalation of volatile COPCs via indoor air
Construction Workers (future land use)	Groundwater dermal contact Groundwater ingestion

Following a qualitative comparison of maximum detected soil concentrations to EPA generic soil screening levels and comparison of groundwater data to target levels provided in Table 2c of EPA's Office of Solid Waste and Emergency Response (OSWER) Draft Guidance for Evaluating the Vapor Intrusion Indoor Air Pathway from Groundwater and Soils (2002a), the 2007 Supplemental HHRA determined that evaluation of the **inhalation (of air)** route of exposure was not warranted for the industrial/commercial worker.

Toxicity Assessment

Toxicity assessment involves identifying the types of adverse health effects caused by exposure to site COPCs and determining the relationship between the magnitude of exposure and the severity of adverse effects (i.e., dose-response relationship) for each COPC. Based on the quantitative dose-response relationships determined, **toxicity values** for both cancer (cancer slope factor [CSF]) and non-cancer (reference dose [RfD]) effects were derived and used to estimate the potential for adverse effects.

Tables C-3 through C-5 provide carcinogenic risk information relevant to the Site 9 soil and groundwater COPCs for oral and dermal exposure and for inhalation exposure to groundwater. At this time, CSFs are not available for the dermal route of exposure; therefore, dermal slope factors were extrapolated from oral values. An adjustment factor is sometimes applied to extrapolate the dermal values from oral values, dependent on how well the chemical is absorbed via the oral route. However, no adjustment factors were required for any of the carcinogenic Site 9 COPCs; the oral CSFs were used as the dermal CSFs.

Tables C-6 through C-8 provide non-carcinogenic hazard information relevant to the Site 9 COCs for oral, dermal, and inhalation routes of exposure. The COPCs identified in groundwater have toxicity data indicating their potential for adverse non-cancer health effects in humans. The chronic toxicity data available for oral exposure to these COPCs have been used to develop oral RfDs ranging from $3x10^{-4}$ to 3×10^{-1} mg/kg-day. The available toxicity data indicate that arsenic primarily affects the skin and cardiovascular system, chromium primarily affects the kidney, manganese primarily affects the central nervous system, 2-methylnaphthalene causes weight loss, and benzene primarily affects the blood and immune system. As was the case for carcinogenic data, dermal RfDs can be extrapolated from oral RfDs by applying an adjustment factor as appropriate. For chromium and manganese, adjustment factors of 0.003 and 0.04, respectively were applied to the oral RfDs to estimate the dermal RfDs. No adjustment was necessary for the other COCs. Manganese, benzene, and chromium (subchronic target is the lung) in groundwater also contribute to non-carcinogenic effects via the inhalation exposure route. Table C-8 (Appendix C) summarizes the associated non-carcinogenic inhalation data.

Risk Characterization

During the risk characterization, the outputs of the exposure and toxicity assessments are combined to characterize the baseline risk (cancer risks and non-cancer hazards) at the site if no action was taken to address the contamination. Potential **cancer risks and non-cancer hazards** were calculated based on RME and CTE assumptions. The RME scenario assumes the maximum level of human exposure that could reasonably be expected to occur, and the CTE scenario assumes a median or average level of human exposure.

For carcinogens, risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:

$$\text{Risk} = \text{CDI} \times \text{CSF}$$

where: risk = a unitless probability (e.g., 2×10^{-5}) of an individual developing cancer
CDI = chronic daily intake averaged over 70 years (in mg/kg-day)
CSF = cancer slope factor (in mg/kg-day^{-1})

These calculated risks are probabilities that are usually expressed in scientific notation (e.g., 1×10^{-6}). An excess lifetime cancer risk of 1×10^{-6} under an RME scenario indicates that an individual experiencing the reasonable maximum exposure estimate has an “excess lifetime cancer risk” because it would be in addition to the risks of cancer individuals face from other causes such as smoking or exposure to too much sun. The chance of an individual developing cancer from all other causes has been estimated to be as high as one in three. EPA’s generally acceptable risk range for site-related exposures is 1×10^{-4} to 1×10^{-6}.

Tables C-9 through C-12 provide RME cancer and non-cancer risk estimates for industrial/commercial workers exposed to site soil and child, adult and lifetime residents exposed to groundwater through various routes of exposure. These risk estimates were developed by taking into account various conservative assumptions about the frequency and duration of exposure for each receptor and also about the toxicity of the COCs. All of the Site 9 COCs except manganese are associated with carcinogenic risk. Total cancer risk estimates for all applicable exposure routes range from 2.31×10^{-5} for current and future industrial workers exposed to subsurface soil to 1.22×10^{-3} for hypothetical future lifelong residents exposed to groundwater. These risk levels indicate that if no cleanup action was taken and groundwater at the site was used as a drinking water source, the increased probabilities of developing cancer as a result of site-related exposure would range from approximately 2 in 100,000 to 1 in 1,000. Since the upper bound limit of the range is attributable to potable use of groundwater within the area in contact with contaminated soil (Figure 2-3), the cancer risk to be managed is that for soil (2.31×10^{-5}) under the industrial scenario. This cancer risk level for soil is within the EPA acceptable risk range of $1x10^{-6}$ to $1x10^{-4}$ but slightly exceeds the RIDEM criterion of $1x10^{-5}$.

The potential for non-carcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., a lifetime) to an RfD derived for a similar exposure period. An RfD represents a level to which an individual may be exposed that is not expected to cause any deleterious effect. The ratio of exposure to toxicity is called a hazard quotient (HQ). An HQ less than 1 indicates that a receptor's dose of a single contaminant is less than the RfD and that toxic non-carcinogenic effects from that chemical are unlikely. The hazard index (HI) is generated by adding the HQs for all chemicals that affect the same target organ (e.g., liver) or that act through the same mechanism of action within a medium or across all media to which a given individual may be reasonably exposed. An HI less than 1 indicates that, based on the sum of all HQs from different contaminants and exposure routes, toxic non-carcinogenic effects from all contaminants are unlikely. An HI greater than 1 indicates that site-related exposures may present a risk to human health. The HQ is calculated as follows:

$$\text{Non-cancer HQ} = \text{CDI} / \text{RfD}$$

where: CDI = chronic daily intake
RfD = reference dose

CDIs and RFDs are expressed in the same units and represent the same exposure period (i.e., chronic, sub-chronic, or short-term).

No unacceptable non-cancer hazards were identified under the RME scenario for current or future industrial/commercial workers exposed to site soil because the HI was less than 1. Unacceptable non-cancer hazards associated with exposure to groundwater used as a drinking source were identified for hypothetical child, adult, and lifetime residents via ingestion and dermal contact.

Because of the uncertainties in the dose-response relationship between exposures to lead and biological effects, there is no EPA-derived RfD for lead. Therefore, EPA's Integrated Exposure Uptake Biokenetic, or IEUBK, model was used to evaluate residential child (age 1 to 6) exposures to lead in soil and groundwater. For hypothetical future child residents, the percentages of the population predicted to have blood-lead levels of 10 µg/dL or above ranged from 72.7 percent for surface soil and groundwater to 83.8 percent for subsurface soil and groundwater. These percentages are greater than 5-percent probability used by EPA in evaluating the potential need for cleanup actions. Exposure to the groundwater was identified as the risk driver for the majority of the blood lead risk (TtNUS, 2002). The slope-factor approach developed by the EPA Technical Review Workgroup for Lead was used to evaluate pregnant adult worker exposures to lead in soil at the study area (TtNUS, 2007). The results of the evaluation showed that the **probability of fetal blood-lead** concentration exceeding 10 µg/dL was less than the acceptable level of 5 percent established by the EPA. This indicates that adverse effects are not likely for fetuses of pregnant industrial/commercial workers exposed to lead in soil at Site 9.

Uncertainties cited included the contaminants and risks estimated for exposure to sediments and shellfish. These uncertainties did not warrant CERCLA action for the sediment adjacent to the site.

There were no other major sources of **uncertainty**, other than those typically associated with risk assessment estimates, identified for the Site 9 HHRAs.

Based on the results of the HHRA, RME risks were identified that require a response action, including cancer risks in excess of the RIDEM criterion of 1 x 10^{-5} to industrial workers from PAHs in soil and to hypothetical residents from arsenic and benzene in groundwater. RME non cancer hazards requiring a response action include predicted effects from PAHs, lead, chromium and arsenic in groundwater to hypothetical future residents.

2.7.2 Summary of Ecological Risk

The primary objective of the baseline ERA was to assess ecological risks from contaminants associated with the site to ecological receptors in the intertidal and offshore environments of Coasters Harbor and Narragansett Bay associated with the site. Based on sediment sampling results, PAHs and metals were initially identified as of possible concern and were further evaluated in the ecological risk assessment (SAIC, 2000).

Risks were estimated for each sample station, based on several tests conducted, which focused on the concentrations of contaminants present and how those contaminants might affect microorganisms, shellfish, and macroinvertebrates through ingestion, absorption etc.

The results of the ERA were used to determine the probability of adverse effects to the ecology at the site. These results are based on an interpretation of all the tests conducted at the site, including bulk sediment chemistry analysis, toxicity analysis, tissue analysis, pore water analysis, and elutriate analysis. Each sample station was given a rating of high, intermediate, low, or baseline potential for ecological risk.

The ecological risk assessment found high probability for adverse risk to ecological receptors at one sample station located near a storm drain outfall due to PAHs detected in intertidal sediment. Most sediment from this area will be removed as a part of the construction of the replacement stone revetment An intermediate probability for adverse risk to receptors was determined for several shoreline (intertidal) stations and harbor subtidal stations. Sediment at the shoreline stations will mostly be removed as part of the construction of the replacement stone revetment. A low probability for adverse risk was estimated for the remainder of the sample stations, including one reference station and the near-shore stations. A baseline condition that would be associated with relatively pristine conditions was not observed at any of the site sample stations or reference sample stations evaluated in this assessment.

Other evaluations of subtidal sediment at Coasters Harbor conducted after the baseline ERA found lower concentrations of chemical contaminants than those measured during the ERA, and evidence of a healthy ecological community, with eelgrass beds and reproductive populations of commercially important shellfish (bay scallops, oysters, clams, etc). Based on the improved conditions, the expected removal of sediment during the installation of the replacement stone revetment, and the low levels of risk measured for subtidal area adjacent to the site did not warrant CERCLA action for the sediment adjacent to the site.

2.7.3 Basis for Action

Unacceptable human health risks were estimated for current and future industrial/commercial workers based on exposure to soil and for hypothetical future residential exposure to groundwater at Site 9 mainly due to PAHs and metals, including cancer risks for industrial workers and future child, adult, and lifelong residents and non-cancer hazards for future residents (refer to FS, TtNUS December 2009). Because risks were identified under the current and reasonably anticipated future land use scenario (industrial/commercial), the response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

However, after the risk assessment was conducted, it was determined that the future use of the site will be industrial, only vadose zone soil (0 to 10 feet bgs) and groundwater were identified as media of concern for this ROD. Similarly, sediment was determined to not be a media of concern because the EPA determined that there was no Superfund risk associated that would merit a CERCLA cleanup and noted sediment at the shoreline stations beneath the revetment wall will be removed during its construction. Therefore, this section describes risks to receptors that were measured in the risk assessments and the RI, but that were later found to be extraneous to the selection of the remedy.

Not evaluated in the risk assessments, but still of concern is residual petroleum from fire fighting training operations. Petroleum is bound within the soil, particularly at the water table. Generally, petroleum is excluded from CERCLA risk calculations and CERCLA regulation and is normally remediated under other authorities, such as state regulations. However, the petroleum at this Site is comingled with other contaminants because of the routine burning of petroleum products, which occurred as part of the fire fighting training operations at this site.

The CERCLA contaminants cannot effectively be addressed separately from the petroleum. Therefore, although these petroleum products are not identified as a concern for health and ecological risk, the Navy, EPA and RIDEM have agreed that this cleanup will address the petroleum in order to effectively address the comingled CERCLA contaminants.

2.8 REMEDIAL ACTION OBJECTIVES

RAOs are medium-specific goals that define the objective of conducting remedial actions to protect human health and the environment. RAOs specify the COCs, potential exposure routes and receptors, and acceptable concentrations (i.e., cleanup levels) for a site and provide a general description of what the cleanup will accomplish. RAOs typically serve as the design basis for the remedial alternatives described in Section 2.8. The RAOs for Site 9 are as follows:

- Prevent the ingestion of and direct contact with vadose zone soil and groundwater containing COC concentrations that exceed **cleanup levels developed for the OFFTA site**.

- Identify and prevent any migration of contaminants from site soil to marine sediment via groundwater transport.

These RAOs are based on current and reasonably anticipated future industrial/commercial site use. Cleanup levels for soil were established in the FS for Site 9 under an industrial/commercial land use scenario. Cleanup levels for groundwater are based on its unlikely use as a drinking water source. However, these groundwater cleanup levels will be used solely for the purpose of comparing groundwater monitoring data collected upgradient of the site, because all contaminated groundwater is limited to within the compliance boundary established around the area of soil contamination that is being managed in place with a soil cover system, and because groundwater downgradient of the site is saline (Final Technical Memorandum for FS, Section 2.12.2).

The selected cleanup levels for Site 9 COCs were developed using the results of the risk assessment, in conjunction with established background concentrations, federal and state Applicable or Relevant and Appropriate Requirements (ARARs), Maximum Contaminant Levels and To Be Considered (TBC) criteria (risk guidances including an EPA Health advisory for manganese). The selected cleanup goals are presented in Table 2-4.

TABLE 2 4. SUMMARY OF CLEANUP LEVEL DEVELOPMENT

COC	SOIL			GROUNDWATER	
	SITE 9 BACKGROUND VALUE[1]	CLEANUP LEVEL[2]	BASIS FOR SELECTION	CLEANUP LEVEL[3]	BASIS FOR SELECTION
Arsenic	6.2	6.2	Background	0.04	Cancer Risk
Chromium	---	N/A	N/A	30	Non-Cancer Risk
Lead	15.4	500	RIDEM DEC	15	Action Level/MCL
Manganese	372	N/A	N/A	300	Health Advisory
Benzene	---	N/A	N/A	1	Cancer Risk
2-Methylnaphthalene	---	N/A	N/A	128	Non-Cancer Risk
Benzo(a)anthracene	---	2.110	Cancer Risk = 10^{-6}	N/A	N/A
Benzo(a)pyrene	---	0.211	Cancer Risk = 10^{-6}	N/A	N/A
Benzo(b)fluoranthene	---	2.110	Cancer Risk = 10^{-6}	N/A	N/A
Dibenzo(a,h)anthracene	---	0.211	Cancer Risk = 10^{-6}	N/A	N/A

Soil concentrations are in mg/kg and groundwater concentrations are in µg/L.
N/A – Not applicable. Analyte was not identified as a COC in this medium.
RIDEM DEC – RIDEM Direct Exposure Criterion.
1 95-Percent Upper Tolerance Level (UTL) of the OFFTA background data set.
2 Selected industrial soil PRG is the lowest of the risk-based values or ARAR/TBC-based values, unless the background concentration is greater.
3 Selected residential groundwater cleanup goal is the lowest of the risk-based values or ARAR/TBC-based values assuming groundwater as a drinking water source.

2.9 DESCRIPTION OF ALTERNATIVES

To address potential unacceptable human health risks associated with soil and groundwater at Site 9, a **preliminary technology screening** evaluation was conducted in the FS. A number of treatment options for soil were initially screened based on their potential effectiveness, implementability, and cost, but most were eliminated based on the type and volume of contamination at Site 9 (i.e., large volume of relatively low concentrations of metals and PAHs with relatively low toxicities).

Treatment options were initially considered for groundwater but were later eliminated because the groundwater contaminants associated with the releases at the site do not extend beyond the compliance boundary for the area where contaminants in soil will be managed in place with a cover system. It was recognized that if the soil contaminants were managed in place as a waste management unit, then groundwater treatment would not be necessary inside the unit's compliance boundary.

The general response actions for Site 9 are presented in Tables 2-5 and 2-6.

TABLE 2 5. GENERAL RESPONSE ACTIONS FOR SOIL

GENERAL RESPONSE ACTION	TECHNOLOGY	PROCESS OPTIONS
No Action	None	Not Applicable
Limited Action	LUCs	Administrative Controls: Site Use Restrictions/Access Controls
Containment	Capping	Impermeable/Permeable Cover
Removal	Bulk Excavation	Excavation
Treatment	Immobilization	Solidification/Stabilization
	Physical /Chemical Treatment	Soil Washing
		Solvent Extraction
	Thermal Treatment	Low-Temperature Thermal Stripping
Disposal	Off-Site Disposal	Off-Base Landfill
	On-Site Backfill	Backfill Following On-Site Treatment

TABLE 2 6. GENERAL RESPONSE ACTIONS FOR GROUNDWATER

GENERAL RESPONSE ACTION	TECHNOLOGY	PROCESS OPTIONS
No Action	None	Not Applicable
Limited Action	LUCs	Administrative Controls: Groundwater Use Restrictions
	Groundwater Monitoring	Long-Term Periodic Sampling and Analysis In and Near Contaminated Area

The technologies and process options retained after detailed screening were assembled into three soil alternatives. Consistent with the NCP, the no action alternatives for soil and groundwater were evaluated as a baseline for comparison with other alternatives during the comparative analysis. The groundwater alternatives included only the no action alternative and an alternative including both technologies evaluated under the limited action GRA. Because only one viable groundwater alternative was identified for the site, the limited action alternative (LUCs and groundwater monitoring) will be implemented for groundwater at Site 9, and the remainder of the discussion and comparisons in this ROD is limited to the soil alternatives. Table 2-7 describes the major components and provides estimated costs for each remedial alternative evaluated for Site 9 soil.

TABLE 2 7. SUMMARY OF SOIL REMEDIAL ALTERNATIVES EVALUATED

ALTERNATIVE	COMPONENTS	DETAILS	COST
No Action *No action to address contaminated soil and no use restrictions*	None	No action (except the required five-year reviews)	No cost (except cost of conducting five-year reviews)
Removal, On-Site Treatment, Backfilling , and LUCs *Excavation and on-site treatment to meet industrial cleanup levels, backfilling, restoration, and LUCs*	Excavation	**Excavation of approximately 62,000 cubic yards of soil** with COC concentrations exceeding industrial cleanup levels.	**Capital**: $18,475,000 **30-Year NPW of O&M Cost**: $146,000 **30-Year NPW**: $18,621,000 **Discount rate**: 2.7% **Time frame**: ~ 9 to 11 months
	On-Site Treatment	Excavated soil would be treated on site using low-temperature thermal stripping (LTTS) to remove the organic contaminants from the soil and soil washing in a water-based system with additives to remove metals.	
	Backfilling and Restoration	Backfilling of excavated areas with treated (clean) soil, along with grading, revegetation and repaving as appropriate.	
	Maintenance	Maintenance of the replacement stone revetment constructed along the shoreline to eliminate erosion potential.	
	LUCs	Implementation of LUCs to restrict future site uses to industrial activities and to prohibit soil disturbance without appropriate notifications and safety precautions.	
	Monitoring	Long-term monitoring of groundwater and sediment at the shoreline to assure contaminants are not being transported off site. Long-term monitoring of compliance with LUCs. Five-year reviews would be required.	
Removal, Off-Site Disposal, and LUCs *Excavation to meet industrial cleanup levels, backfilling, restoration, and LUCs*	Excavation and off-site disposal	**Excavation of approximately 62,000 cubic yards of soil** such that industrial cleanup levels are achieved and off-site disposal. Note that this alternative would leave small amounts of soil containing contaminants behind.	**Capital**: $14,819,000 **30-Year NPW of O&M**: $147,000 **30-Year NPW**: $14,966,000 **Discount rate**: 2.7% **Time frame**: ~6 to 8 months
	Backfilling and restoration	Backfilling excavated areas with imported clean fill and grading,	
	Maintenance	Maintenance of the new revetment constructed along the shoreline to eliminate erosion.	
	LUCs	Implementation of LUCs to restrict future site uses to industrial activities and to prohibit subsurface soil disturbance without appropriate notifications and safety precautions.	
	Monitoring	Long-term monitoring of groundwater and sediment at the shoreline to assure contaminants are not being transported off site. Long-term monitoring of compliance with LUCs. Five-year reviews would be required.	
Asphalt/Soil Cover and LUCs *Installation of asphalt/soil cover and LUCs to prevent exposure to contaminated soil*	Placement of soil and asphalt cover, and re-establishment of vegetation on non paved surfaces	Placement of a soil cover over areas that are not planned for parking, described in Section 2. 12.2.	**Capital**: $1,419,000 **30-Year NPW of O&M**: $364,000 **30-Year NPW**: $1,783,000 **Discount rate**: 2.7% **Time frame**: ~3 to 4 months
		Areas designated for vehicles and parking would be paved with asphalt (if not currently paved) to provide a cover for contaminated soil left in place	
	Installation of surface water controls	Construction of permanent surface water controls to limit run-on to the cover and to properly collect and direct runoff.	

TABLE 2 7. SUMMARY OF SOIL REMEDIAL ALTERNATIVES EVALUATED			
ALTERNATIVE	**COMPONENTS**	**DETAILS**	**COST**
Asphalt/Soil Cover and LUCs (continued)	Maintenance	Maintenance of the replacement stone revetment constructed along the shoreline to eliminate erosion potential. Maintenance of the soil and asphalt cover to assure inadvertent exposure is not occurring.	
	LUCs	Implementation of LUCs to prevent residential and recreational use of the site, to provide for maintenance of the asphalt/soil cover, and to prohibit disturbance of the cover and underlying soil without appropriate safety precautions.	
	Monitoring	Long-term monitoring of groundwater and sediment at the shoreline to assure contaminants are not being transported off site. Long-term monitoring of compliance with LUCs. Five-year reviews would be required	
	Five Year Reviews	Five year reviews will be conducted in accordance with EPA and Navy policy.	

2.10 COMPARATIVE ANALYSIS OF ALTERNATIVES

Table 2-8 and subsequent text in this section summarize the comparison of the soil remedial alternatives with respect to the **nine CERCLA evaluation criteria** outlined in the NCP at 40 Code of Federal Regulations (CFR) 300.430(e)(9)(iii) and categorized as threshold, primary balancing, and modifying. Further information on the detailed comparison of remedial alternatives is presented in the Site 9 (OFFTA) FS.

TABLE 2 8. SUMMARY OF COMPARATIVE ANALYSIS OF SOIL ALTERNATIVES

CERCLA CRITERION	ALTERNATIVE 1 NO ACTION	ALTERNATIVE 2 REMOVAL, ON SITE TREATMENT, BACKFILLING, AND LUCS	ALTERNATIVE 3 REMOVAL, OFF SITE DISPOSAL, AND LUCS	ALTERNATIVE 4 ASPHALT/SOIL COVER AND LUCS
Overall Protection of Human Health and the Environment	Ø	●	●	●
Compliance with ARARs	Ø	●	●	●
Long-Term Effectiveness and Permanence	Ø	●	●	●
Reduction of Toxicity, Mobility, and Volume through Treatment	Ø	●	Ø	Ø
Short-Term Effectiveness	Ø	○	○	●
Implementability	●	○	●	●
Total Cost (Present Net Worth)	$0	$18,621,000	$14,966,000	$1,783,000
State Acceptance	For State and Community Acceptance, see text below.			
Community Acceptance				

● - Meets Criterion ○ - Partially Meets Criterion Ø - Does Not Meet Criterion

Threshold Criteria

Overall Protection of Human Health and the Environment. The no action alternative (Alternative 1) would not achieve the RAOs and therefore does not protect human health and the environment. Alternatives 2 and 3 (the removal alternatives) and Alternative 4 (asphalt/soil cover) all achieve the soil cleanup goals, are protective of human health and the environment, and are consistent with the current and reasonably anticipated industrial land use scenario. However, the following observations are noted:

- If the Alternative 2 treatment system is effective, it would be most protective because it would permanently treat site contaminants in the excavated soil so that they no longer posed an industrial risk. Remaining risks from contamination exceeding industrial risk standards below the water table or under the revetment, as well as contaminated soils exceeding residential risk levels, would be addressed through LUCs and long-term monitoring.

- Alternative 3 does not treat contaminated soil exceeding industrial risk levels, but removes it and disposes of it off-site at a licensed disposal facility. As with Alternative 2, remaining risks from contamination exceeding industrial risk standards below the water table or under the revetment, as well as contaminated soils exceeding residential risk levels, would be addressed through LUCs and long-term monitoring.

- Alternative 4, because it relies on an engineered cover rather than treatment or off-site removal to prevent contaminants from migrating from the Site and posing a risk to human health or the environment, may be slightly less protective than Alternatives 2 and 3. However, unlike Alternatives 2 and 3, Alternative 4 does not require excavation of contaminated soil and therefore would be more protective in the short term, since there would be no exposure risk associated with excavation.

LUCs would be required under all three alternatives to restrict future site use to commercial/industrial use, and to restrict soil disturbance, and provide groundwater use restrictions to prevent use of the groundwater. Groundwater and sediment monitoring would be conducted to assure contaminants are not migrating and to document changes in site conditions (damage to the cover system, unauthorized construction, etc). There would also be long-term monitoring of the compliance with LUCs. As a result the overall protection of human health and the environment is not largely improved on by Alternative 2 (onsite treatment) or Alternative 3 (off-site disposal) over Alternative 4 (asphalt/soil cover).

Compliance with ARARs. ARARs include any federal or state standards, requirements, criteria, or limitations determined to be legally applicable or relevant and appropriate to the site or remedial action. Alternative 1 would not be compliant with the ARARs. Alternatives, 2, 3, and 4 would meet all **chemical-, location-, and action-specific ARARs** and To Be Considered (TBC) Guidances (See Appendix A).

Primary Balancing Criteria

Long-Term Effectiveness and Permanence. Alternative 1 would not provide long term effectiveness or permanence. Alternative 3 is the most permanent alternative because it permanently removes contaminated soil from the site and disposes of it in a secure licensed landfill. Alternative 2 is effective, but somewhat less permanent than Alternative 3 because it treats soil exceeding industrial risk levels and reduces the level of contamination to industrial risk levels, which requires LUCs to be established. Alternative 4 has a long term effectiveness and permanence similar to that of alternative 2, in that the contaminants are being managed on site, and through LUCs. The effectiveness of Alternative 4 relies on long-term O & M and monitoring of the cover.

Reduction in Toxicity, Mobility, or Volume Through Treatment. Only Alternative 2 would utilize treatment to reduce the toxicity, mobility, or volume of hazardous substances. Because of the type of contamination at Site 9 (PAHs and inorganics in soil and groundwater), the volume present, and the relatively low long-term threat it poses, treatment is expected to be very costly.

Short-Term Effectiveness. Alternative 1 does not provide short term effectiveness. Alternative 4 provides greater short-term effectiveness than alternatives 2 and 3 because protective covers already exist over much of the Site and the establishment of protective cover over the rest of the Site will involve much less soil disturbance and short-term exposure risk than either Alternatives 2 or 3. Alternative 4 eliminates the hazards and potential contamination issues associated with handling, treating, and moving contaminated soil within the site (alternative 2) and offsite over the road (alternative 3).

Implementability. Alternative 1 is readily implementable since it requires no action. Alternatives 3 and 4 are considered more implementable than Alternative 2 because the treatment system under Alternative 2 would require pilot testing to ensure success prior to full- scale treatment. It is possible that the treatment train would not be completely successful, and this would not be known until testing was completed. Alternative 4 would be the most easily implemented of the action alternatives because it involves a lesser amount of site work; however the established engineered covers must be permanently maintained and monitored. Although Alternative 3 is readily implementable because excavation and off-site disposal is easily carried out and achieves RAOs over a short period of time, it could be complicated by the utilities in the area and would disturb protective cover that already exists over much of the Site. LUCs for all of the alternatives can be easily implemented.

Cost. The estimated present-worth cost is greatest for Alternative 2 - excavation with on-site treatment, $18,621,000, and least for Alternative 4 - asphalt/soil cover and LUCs, $1,783,000. The estimated present-worth for Alternative 3 - excavation with off-site disposal is $14,966,000.

Modifying Criteria

State Acceptance. State involvement has been solicited throughout the CERCLA process. RIDEM, as the designated state support agency in Rhode Island, concurs with the Selected Remedy (see State concurrence letter in Appendix D.

Community Acceptance. The public was notified of a formal public comment period, as described in Section 2.3, and was encouraged to participate in the process. No written questions or comments were received during the formal public comment period (June 28 to July 27, 2010) for the Proposed Plan. The questions raised at the public meeting (informal session) on July 21, 2010 were general inquiries for informational purposes only and were addressed at the public meeting. The formal public hearing, at which attendees were asked to state their comments for the record, took place immediately after the public meeting on July 21, 2010. These formal comments/questions and the Navy responses are summarized in Section 3.0. Eight comments were made by six members of the public and were generally in support of the selected remedy. No objections to the proposed alternative were voiced. The transcript of the hearing is provided in the administrative record.

2.11 PRINCIPAL THREAT WASTE

The NCP at 40 CFR 300.430(a)(1)(iii)(A) establishes an expectation that treatment will be used to address the principal threats posed by a site wherever practicable. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or that would present a significant risk to human health or the environment should exposure occur. A source material is a material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for migration of contamination to groundwater, surface water, or air, or acts as a source for direct exposure. Principal threat wastes are not present at Site 9 because the suspected source material (buried debris, underground piping, and OWS) was removed and the residual soil contamination is not highly toxic or highly mobile.

2.12 SELECTED REMEDY

2.12.1 Rationale for Selected Remedy

The Selected Remedy for Site 9 is containment under an asphalt/soil cover (Soil Alternative 4), LUCs, monitoring of groundwater outside the site boundary (Groundwater Alternative 2), and monitoring of sediments downgradient of the site. This remedy was selected because it provides the best balance of tradeoffs with respect to the nine evaluation criteria and will allow for continued commercial/industrial use of the property. The remedy will meet the RAOs by providing a barrier between the contaminated soil and potential receptors to the extent that site-wide exposure concentrations are below cleanup goals, by implementing LUCs to restrict future site uses to non-residential activities and to prohibit excavation/disturbance of soil without appropriate safety precautions, and by long-term monitoring to ensure that contaminants do not migrate from the Site and that LUCs are being complied with.

The principal factors in the selection of this remedy included the following:

- Implementation will result in reduction of unacceptable risk (greater than the RIDEM threshold of 10^{-5}) to current and future industrial/commercial workers in a relatively short time frame (estimated 3 to 4 months).
- The remedy is consistent with the reasonably anticipated future non-residential use of the site.
- The remedy achieves similar protection at a significantly lower cost than removal and off-site disposal ($1,783,000 compared to $14,966,000), or onsite treatment ($18,621,000).
- The remedy allows for continued commercial/industrial use of the property and achieves a level of long-term effectiveness and protection similar to the excavation alternatives but without the added short-term risks inherent to excavation of contaminated soil.

2.12.2 Description of Selected Remedy

The Selected Remedy includes five components:

1. An asphalt/soil cover system will be designed and constructed over the area of contaminated soil (approximately 8.6 acres) to reduce site-wide average exposure concentrations to below soil industrial cleanup levels (Table 2-4). The cover system for areas that are not paved would receive a two foot soil cover consisting of geotextile, 18 inches of clean fill, overlain by six inches of topsoil, graded and vegetated to prevent ponding of rainwater and to prevent erosion. Areas that are currently paved (or to be paved) for parking, roadways and sidewalks would provide an effective barrier to prevent access to contaminated soil, including soil contaminated with total petroleum hydrocarbons (TPH). Areas to be paved would be provided an asphalt cover, or some other surface material providing a reduced permeability similar to that of asphalt will be used.

The geotextile will separate the clean fill from the underlying contaminated soil and serve as a marker layer if any future land-disturbing activities are conducted. Grassed traffic islands around the SWOS building parking lots will be covered with a modified permeable cap that consists of 6 inches of topsoil underlain by a geogrid that will serve as a barrier layer to incidental excavation in the area. The existing 6 inches of top soil will be stripped off, the geogrid placed, and the 6 inches of topsoil replaced. Alternatively, these grassed islands could be paved and replaced with vehicle stops.

For areas that are currently covered by pavement or sidewalks (including Taylor Drive, the SWOS parking areas, walkways etc), the existing pavement is expected to provide a suitable barrier to direct contact with the underlying soil and to infiltration of rainwater into the underlying soil.

The replacement stone revetment that is under construction along the northern perimeter of the site (as part of a separate CERCLA removal action) will protect the northern edge of the soil cover from erosion by ocean waves and provide stability during coastal flooding events, and would contain any potential migration of contaminated soil towards the sediment. Long-term maintenance of the revetment will be conducted along with the asphalt/soil cover as described elsewhere in this section.

2. Surface water control structures will be installed for areas that are paved. These structures will be designed to collect and prevent intrusion of runoff water into the subsurface and direct it to existing or new on site storm drainage systems.

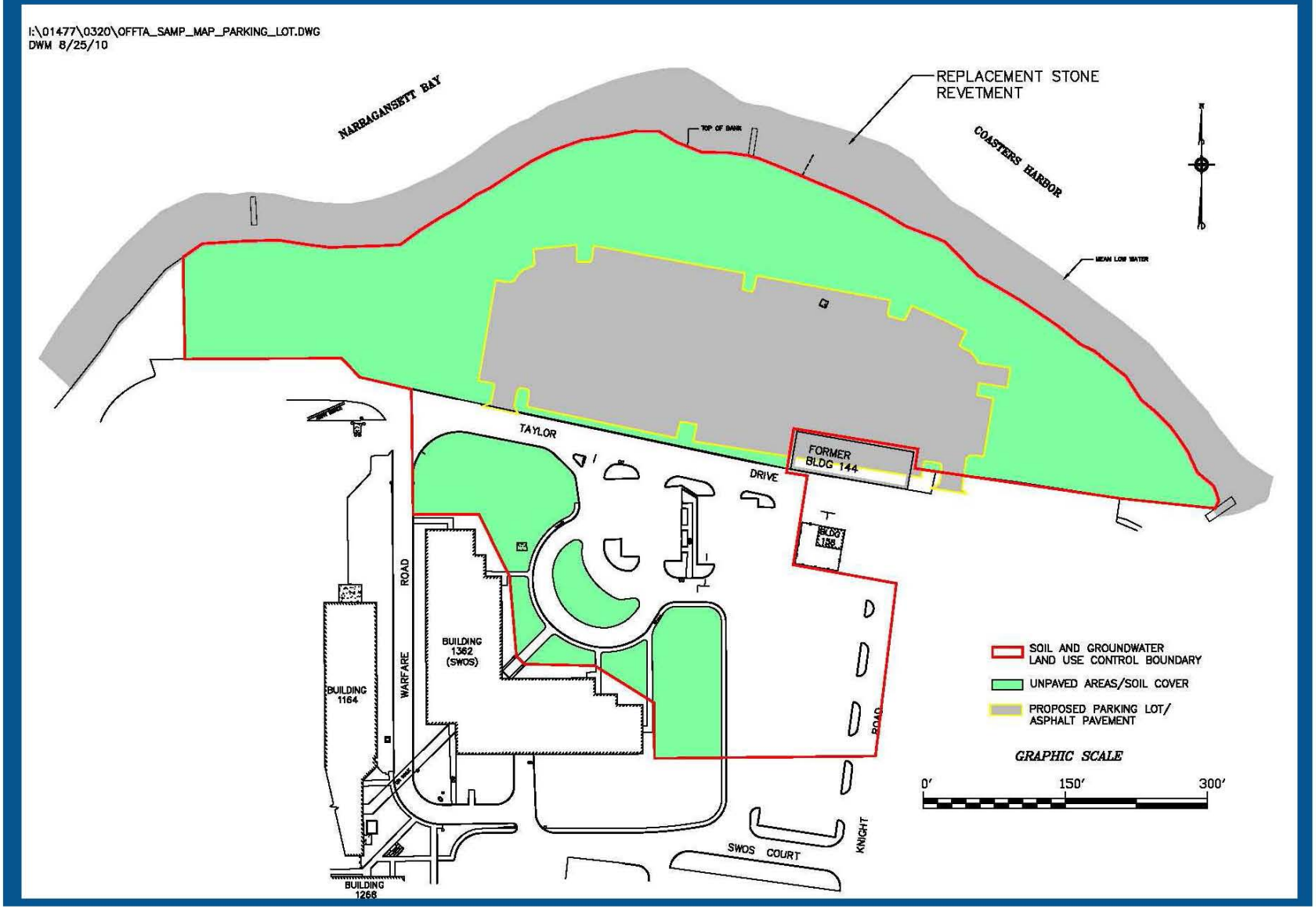
3. Develop and implement LUCs to accomplish the following:

   a. Establish a waste management area for the site where contaminants associated with the releases from the fire training operations remain in place. The waste management area will encompass all the area within the Site 9 boundary (see Figure 2-4) and be maintained and monitored by the Navy.
   b. Restrict property uses to those consistent with industrial/commercial activities, such as parking, roadways, sidewalks, material stockpiles, heavy equipment storage, etc.
   c. Prevent use of the groundwater at the property for any consumptive purpose, including for household use, drinking water supply, irrigation, or industrial use..
   d. Prevent excavation or disturbance of the asphalt/soil cover, monitoring wells, and any other components of the remedy, and prevent access to the contaminated soil by persons who are not adequately trained and properly informed of the hazards associated with such activities.
   e. Establish LUC compliance monitoring requirements described elsewhere in this section.

The LUC will be established and implemented in accordance with a post-ROD LUC Remedial Design (RD) that will be prepared by the Navy as the LUC component of the remedy. Within 90 days of ROD signature, the Navy shall develop a RD that shall contain LUC implementation actions, including maintenance, monitoring and enforcement requirements that are consistent with the requirements under this ROD. LUCs will be developed in accordance with the Principles and Procedures for Specifying, Monitoring, and Enforcement of Land Use Controls and Other Post-ROD Actions, per letter dated January 16, 2004, from Alex A. Beehler, Assistant Deputy Under Secretary of Defense (Environment, Safety and Occupational Health), and the requirements of the Naval Station Newport Federal Facilities Agreement. If the property is transferred from the Navy to another federal owner, upon meeting the requirements for transfers under the Site's Federal Facility Agreement, Navy would ensure as part of the transfer process that the gaining agency is made aware of the existing controls and would take appropriate action to ensure such controls remain in place. If the property is ever transferred to non-federal ownership, deed restrictions, meeting State property law standards, would be recorded that would incorporate the land use restrictions called for under this ROD. Although the Navy may transfer the procedural LUC responsibilities to another party by contract, property transfer agreement, or through other means, the Navy shall retain ultimate responsibility for remedy integrity. Land Use Controls will be maintained until the concentration of hazardous substances in the soil and groundwater are at such levels to allow for unrestricted use and exposure.

4. Maintenance of the cover systems will be conducted to assure continued protection to the receptors. Maintenance will be conducted as needed and as defined by the periodic inspection schedule by the Installation Commander's designee.

FIGURE 2 4. SELECTED REMEDY ASPHALT/SOIL COVER AND LAND USE CONTROL BOUNDARY



5. Monitoring will be conducted to assure that the cover system remains intact, that the revetment is not breached and is still providing protection of soil from erosion, and to assure that contaminants are not migrating beyond the property boundary. A long term Monitoring Program (LTMP) work plan will be developed to describe the monitoring parameters. At a minimum, the monitoring program will include:

a. groundwater monitoring upgradient of the compliance boundary to assure that contaminants are not migrating away from the site, into areas that have no current LUCs to prevent groundwater use;
b. sediment monitoring downgradient of the compliance boundary to assure that contaminants are not migrating into the marine ecosystem;
c. annual inspections of the cover system, the revetment, and the land use and land improvements to ensure that there are no violations of the land use restrictions. The Installation Commander or his designee will provide annual certification of the inspections to EPA and RIDEM. If a violation of the restrictions occurs, a description of the violation and the corrective actions to be taken to restore protectiveness will be reported to EPA and RIDEM.

6 Five year reviews will be required since contaminants with concentrations that exceed cleanup goals are being managed in place. The five year reviews will be prepared along with other IR Program sites, on the same cycle. Five year reviews will be conducted in accordance with current Navy and EPA guidance. The need to continue each element of the monitoring program will be revisited at each five year review cycle and the LTMP work plan will be revised as appropriate. The last five year review was conducted in 2009. The next five year review will be conducted in 2014 (final report due December 2014).

2.12.3 Expected Outcomes of Selected Remedy

The current industrial land use, which will be supported by the Selected Remedy, is expected to continue at Site 9, and there are no other planned land uses in the foreseeable future. Groundwater at the site is not used and is not expected to be used in the future, so the Selected Remedy will have no impact on current or future groundwater uses available at the site. There are no socio-economic, community revitalization, or economic impacts or benefits associated with implementation of the Selected Remedy. It is estimated that the RAOs for Site 9 will be achieved within approximately 3 to 4 months of implementation of the remedy (based on the start of construction). Table 2-9 describes how the Selected Remedy mitigates risk and achieves RAOs for Site 9.

TABLE 2 9. HOW SELECTED REMEDY MITIGATES RISK AND ACHIEVES RAOS

RISK	RAO	COMMENTS
Direct exposure to and ingestion of contaminated soil and groundwater.	Prevent the ingestion of and direct contact with vadose zone soil and groundwater containing COC concentrations that exceed cleanup levels developed for the OFFTA site	The asphalt/soil cover and LUCs will limit exposures via dermal contact and ingestion of soil that result in unacceptable risk (non-industrial uses). LUCs will also prohibit disturbance of the asphalt/soil cover, excavation of subsurface soil, and groundwater use, and will require any necessary future excavation/construction activities to be pre-approved and to be in compliance with this ROD and OSHA/PPE requirements.
	Identify and prevent migration of COCs from site soil to marine sediment via groundwater transport that would exceed CERCLA risk standards.	The shoreline revetment (under construction as part of a separate removal action) will protect contaminated soil along the northern perimeter of the site from erosion into the marine sediment at the shoreline. Long-term monitoring of the sediment downgradient and the groundwater upgradient, of the covered contaminated soil will identify if contaminants are migrating from site soil to groundwater in an area where no restrictions are established. Long-term monitoring of the cover and proper maintenance, along with compliance with LUCs, will prevent or minimize this occurrence.

Because the current industrial use of the site is expected to continue for the foreseeable future, it is not expected that modification or removal of the LUCs will be required. If proposed land use changes in the future and uses other than industrial/commercial-type activities are expected, other remedial approaches may be required. Any modifications to the LUCs will be conducted in accordance with provisions in the Site 9 LUC RD, the FFA, and this ROD.

2.13 STATUTORY DETERMINATIONS

In accordance with the NCP, the Selected Remedy meets the following statutory determinations:

- **Protection of Human Health and the Environment** – The Selected Remedy is needed to prevent estimated current and future risks associated with industrial/commercial worker exposure to contaminated surface and subsurface soil. Capping of soil to reduce exposures to industrial cleanup levels will be conducted and LUCs will be implemented to ensure protectiveness.
- **Compliance with ARARs** – The Selected Remedy will attain all identified federal and state ARARs and TBCs, as presented in Appendix A.
- **Cost-Effectiveness** – The Selected Remedy is the most cost-effective alternative that allows for continued industrial/commercial use of the property and represents the most reasonable value for the cost. The costs are proportional to overall effectiveness by achieving an adequate amount of long-term effectiveness and permanence within a reasonable time frame. Detailed costs for the Selected Remedy are presented in Appendix B.
- **Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable** – The Selected Remedy represents the maximum extent to which permanent solutions and alternative treatment technologies can be used in a practical manner at Site 9. Based on the type and volume of contamination at Site 9 (i.e., large volume of soil contaminated with PAHs and metals posing a relatively low long-term threat), only one treatment alternative was evaluated but was not selected for Site 9 soils in the FS (TtNUS, 2009). An asphalt/soil cover to manage the contaminants as waste in place with land use controls, and prevent exposure to soil with COC concentrations greater than industrial cleanup levels provides the best balance of tradeoffs for long-term effectiveness and permanence with ease of implementation for reasonable cost.
- **Preference for Treatment as a Principal Element** – Treatment is not a principal element of the Selected Remedy for soil at Site 9 because there are no principal threat wastes at the site, and an asphalt/soil cap with LUCs provides the best balance of tradeoffs with respect to long-term effectiveness and permanence at a reasonable cost.
- **Five-Year Review Requirement** – Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on site in excess of levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within 5 years after initiation of remedial action and every 5 years thereafter to ensure that the remedy is, or will be, protective of human health and the environment.

2.14 DOCUMENTATION OF SIGNIFICANT CHANGES

CERCLA Section 117(b) requires an explanation of significant changes from the selected remedy presented in the Proposed Remedial Action Plan that was published for public comment. No significant changes to the remedy, as originally identified in the Proposed Remedial Action Plan, were necessary or appropriate. The questions raised at the public meeting and responses are provided in Section 3.0, Responsiveness Summary.

3.0 Responsiveness Summary

3.1 Stakeholder Comments and Lead Agency Responses

Participants in the public meeting held on July 21, 2010, included RAB members and representatives of the Navy, EPA, and RIDEM. Questions and concerns raised at the meeting were addressed at the meeting. Following the public meeting, a public hearing was held. The comments received during the public hearing are summarized in Table 3-1, and the complete transcript of the public hearing is included in the administrative record. No additional written comments, concerns, or questions were received by the Navy, EPA, or RIDEM during the public comment period.

Table 3 1. Summary of Comments From Public Hearing and Public Comment Period

Question/ Comment	Response
	The comment is acknowledged and the acknowledgement of the work conducted is appreciated. No response is required.
Mr. John Vitkevich, referring to a previous comment/concern about the costs for long-term monitoring, compared the cost ($420,000) for monitoring at McAllister last year to the expected cost ($100,000/yr for 30+ years) for monitoring at OFFTA. Although he questioned why not just clean it up and be done, he felt that this remedy would work, especially with the land use control and the restrictions on groundwater use.	Estimated costs for Long-Term Monitoring are based on a 30 year period, as directed by the EPA RI/FS guidance and Navy policy. The estimated cost for long term monitoring at this site is likely to be adjusted. In accordance with the Navy's Optimization policy, response actions at sites are evaluated at least annually to determine if the existing remedy is making progress towards reaching cleanup goals and to recommend modifications or alternatives to enhance the performance of the remedy and reduce operating costs and cleanup time. These recommendations are provided to the regulatory agencies and based on concurrence, changes in the long term monitoring program may be conducted. The cost for monitoring at this site is expected to be lower than that for monitoring at McAllister because the ecological risk parameters (biota, toxicity, etc.) are not anticipated to be measured, and landfill gas and air monitoring are not required.

TABLE 3 1. SUMMARY OF COMMENTS FROM PUBLIC HEARING AND PUBLIC COMMENT PERIOD	
QUESTION/ COMMENT	**RESPONSE**
Mr. David Brown, a Newport resident and RAB member since its inception, said he thinks the selected alternative makes sense but added that the solution should also: 1) take into account possible underground or overland flows from the island's interior, 2) include a contingency plan in the event that monitoring shows a problem with the remedy, and 3) consider an environmentally-friendly parking lot (e.g. permeable surface) and green areas (e.g. rain garden.	The underground groundwater flow from the upland areas across the site has been taken into account for the remedy. It has been determined, based on available data, that this groundwater will not leach contaminants from soil before it reaches the shoreline. Upgradient contaminants, if present, will be identified in upgradient wells that will be monitored as part of the long-term monitoring program. The long-term monitoring program will provide contingency action statements in case it becomes evident that contaminants are leaching off site. The data will also be reviewed as part of the required Five-Year review process (next review in 2014). If protectiveness standards are not being met, the remedy can be changed or modified through a future CERCLA decision document. For installation of the parking lot, Naval Station Newport is required by Navy policy to use LID (Low Impact Development). Examples of LID practices include Rain Gardens and Bioretention Gardens, Rooftop Gardens, Sidewalk Storage, Vegetated Swales, Buffers, and Strips, Tree Preservation, Roof Leader Disconnection, Rain Barrels and Cisterns, Permeable Pavers, Soil Amendments, Impervious Surface Reduction and Disconnection, and Pollution Prevention and Good Housekeeping. Since the design of the parking lot is not fully complete, the LID feature(s) have not been selected. In addition, Navy policy requires that all Navy construction projects must be silver-certified LEED (Leadership in Energy and Environmental Design). Silver certification for new construction is obtained through a third-party rating system with point available in categories such as Location and Planning, Sustainability, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality, Innovation and Design Process.
Mr. Dan Sullivan of Middletown asked if there is an estimate of the current site contamination that will remain in place.	The contaminated soils that will remain in place are estimated to be 62,000 cubic yards. Concentrations of contaminants within these soils are described in the FS report.
Ms. Claudette Weissinger of Portsmouth expressed a desire to see the remedy be as "green" as possible, with the proper surfaces, and be aesthetically pleasing with trees to beautify the blandness of the Base.	The comment is acknowledged. It is noted that the location is a difficult area to cultivate trees due to the windswept nature of the area. However, NAVSTA is sensitive to aesthetics of the base, particularly in this area.
Mr. Manny Marques from Middletown said he hoped this phase of the project would be completed by the end of this fiscal year (September 30th). He asked if that was likely to happen and if so, would the actual work be done during the winter so as not disturb the soil and interfere with	The Navy currently expects the revetment construction to be complete by the end of the calendar year. The soil cover construction would not likely occur until the following year. Seasonality of the work to protect the environment is something that will be considered.

TABLE 3 1. SUMMARY OF COMMENTS FROM PUBLIC HEARING AND PUBLIC COMMENT PERIOD	
QUESTION/ COMMENT	RESPONSE
the growing season and wildlife presence.	
	The Navy is cognizant of the recommendations to conduct intrusive work in winter months. However, the work anticipated for the soil cover construction is not likely to impact the shoreline or the offshore areas.
Ms. Kathy Abbass, another RAB member since its inception, stated that she was curious about the land use controls (LUCs). She expressed concern (based on past observations) about the adherence to, and monitoring of the LUCs and cautioned that the Navy (or whoever will be responsible for monitoring these) strictly enforce them. She wants to see a penalty imposed for violation of the LUCs and/or the associated monitoring.	The Navy will implement, maintain and enforce land use controls in accordance with the requirements of this Record of Decision. As stated in the ROD, the Navy will prepare a LUC Remedial Design document that will contain implementation, maintenance, and enforcement requirements and will also establish procedures for Base personnel seeking to do work within the restricted area. This will require annual reporting to the regulators and notification of land use control violations. This will also be reviewed during the CERCLA-mandated five year review process. The EPA, under CERCLA, has the authority to assess penalties for noncompliance with the ROD, including LUC requirements, once it is signed. These requirements are already provided in the Federal Facilities Agreement between the Navy, EPA and RIDEM.

3.2 TECHNICAL AND LEGAL ISSUES

No additional technical or legal issues other than those previously addressed in the RI/FS associated with the Site 9 ROD were identified.

Administrative Record Reference Table

ADMINISTRATIVE RECORD REFERENCE TABLE

ITEM	REFERENCE PHRASE IN ROD	LOCATION IN ROD	LOCATION OF INFORMATION IN ADMINISTRATIVE RECORD
1	**geophysical surveys**	Table 2-1	Tetra Tech, NUS (TtNUS) Inc., 2001. Remedial Investigation for Old Fire Fighting Training Area, Naval Station Newport, Rhode Island. July. Section 2.2.1 and Appendix C.
2	**soil gas surveys**	Table 2-1	TtNUS, 2001. Section 2.2.2 and Appendix D
3	**Offshore ecological investigation**	Table 2-1	Science Applications International Corporation (SAIC), 2000. Marine Ecological Risk Assessment Report for the Old Fire Fighting Training Area. April.
4	**soil data**	Table 2-1	TtNUS, 2009. Revised Feasibility Study for Old Fire Fighting Training Area, Naval Station Newport, Rhode Island. December. Table 2-17.
5	**groundwater data**	Table 2-1	TtNUS, 2009. Table 2-18a.
6	**remedial alternatives**		TtNUS, 2009. Sections 4.0 and 5.0.
7	**Public notice**	Section 2.3	Public notice for the Proposed remedial Action for Site 9 – OFFTA published in The Newport Daily News on July 7 and July 14, 2010.
8	**RAB website**	Section 2.4	http://www.rabnewportri.org.
9	**groundwater table**	Section 2.5.1	TtNUS, 2001. Section 3.3.6 and Appendix H
10	**preliminary design investigation**	Section 2.5.2	TtNUS, 2005a. Soil Pre-Design Investigation Report, Old Fire Fighting Training Area, Naval Station Newport. April TtNUS, 2005b. Soil Pre-Design Investigation Report Addendum, Old Fire Fighting Training Area, Naval Station Newport. November.
11	**soil and groundwater COCs**	Table 2-2	TtNUS, 2009. Tables 2-5 and 2-8.
12	**arsenic, lead, and PAHs**	Section 2.5.2	Tetra Tech, NUS (TtNUS) Inc., 2005a. Soil Pre-Design Investigation Report, Old Fire Fighting Training Area, Naval Station Newport. April. Pages 5-1 to 5-3.
13	**not used for drinking water**	Section 2.6	TtNUS, 2009. Section 1.10.2
14	**exposure assessment**	Section 2.7.1	TtNUS, 2009. Appendix B and Appendix C, Section 3.0. TtNUS, 2001. Section 6.3
15	**inhalation (of air)**	Section 2.7.1	TtNUS, 2009. Appendix C: Pages 3-3 to 3-4.
16	**toxicity values**	Section 2.7.1	TtNUS, 2009. Appendix B: Tables 4-1 to 4-4. TtNUS, 2009. Appendix C: Tables 5-1 and 6-1.
17	**cancer risks and non-cancer hazards**	Section 2.7.1	TtNUS, 2009. Appendix B: Section 5.0. TtNUS, 2009. Appendix C: Section 5.0. TtNUS, 2001. Section 6.5

ITEM	REFERENCE PHRASE IN ROD	LOCATION IN ROD	LOCATION OF INFORMATION IN ADMINISTRATIVE RECORD
18	**blood lead levels**	Section 2.7.1	TtNUS, 2009. Appendix B: Sections 4.8, 5.6, and Tables 5-7 and 5-8
19	**probability of fetal blood-lead**	Section 2.7.1	TtNUS, 2009. Appendix C: Sections 4.6, 5.6, and Table 1
20	**uncertainty**	Section 2.7.1	TtNUS, 2009. Appendix B and Appendix C, Section 6.0. TtNUS, 2001. Section 6.6
21	**cleanup levels developed for the OFFTA site**	Section 2.8	TtNUS, 2009. Tables 2-5 and 2-8.
22	**preliminary technology screening**	Section 2.9	TtNUS, 2009. Section 3.2
23	**30-Year NPW**	Table 2-7	TtNUS, 2009. Appendix I and Appendix J
24	**nine CERCLA evaluation criteria**	Section 2.10	TtNUS, 2009. Sections 4.5 and 5.6
25	**chemical-, location-, and action-specific ARARs**	Section 2.10	TtNUS, 2009. Tables 4-12 to 4-14 and Tables 5-6 to 5-8

Documents and other relevant site information, including a copy of the Administrative Record Index, are available for public review at the Information Repositories. For access to the Administrative Record or additional information about the Installation Restoration (IR) Program at NAVSTA Newport, contact: Lisa Rama, Public Affairs Office, 690 Peary Street, Naval Station Newport, Newport, RI, 02841-1512, 401-841-3538.

ADDITIONAL REFERENCES

B&R Environmental, 1997. *Source Removal Evaluation for the Old Fire Fighting Training Area,* Naval Station Newport. B&R Environmental, 600 Clark Avenue King of Prussia, PA. January.

Office of Management and Budget, 2009. Circular No. A-94, Appendix C. Revised December 2009. http://www.whitehouse.gov/omb/circulars_a094_a94_appx-c/.

SAIC (Science Applications International Corporation), 2000. *Marine Ecological Risk Assessment Report*, *Final Report for the Old Fire Fighting Training Area*. Prepared under contract with Tetra Tech NUS, Inc. for the Navy. April.

TtNUS 2007. *Supplemental Risk Evaluation for Old Fire Fighting Training Area,* Naval Station Newport, Newport RI. Tetra Tech NUS, Inc. 234 Mall Blvd, Suite 260 King of Prussia, PA, November.

TtNUS, 2009a. *Five year Review Report for Naval Station Newport (Formerly NETC Newport)*, Newport, Rhode Island. Tetra Tech NUS, Inc. 234 Mall Blvd, Suite 260 King of Prussia, PA. December

Appendix A
ARARs

TABLE A - 1

ASSESSMENT OF CHEMICAL-SPECIFIC ARARs AND TBCs
SOIL ALTERNATIVE 4: SOIL COVER AND LUCS
RECORD OF DECISION
OLD FIRE FIGHTING TRAINING AREA
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

FEDERAL REQUIREMENTS

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
EPA Human Health Assessment Cancer Slope Factors (CSFs).		To Be Considered	These are guidance values used to evaluate the potential carcinogenic hazard caused by exposure to contaminants.	Used to compute the individual incremental cancer risk resulting from exposure to carcinogenic contaminants in site media. Installing and the grass/asphalt cover and revetment, along with LUCs and monitoring will prevent exposure to site contaminants exceeding risk levels.
Reference Dose (RfD)		To Be Considered	Guidance used to compute human health hazard resulting from exposure to non-carcinogens in site media.	Used to calculate potential non-carcinogenic hazards caused by exposure to contaminants. Installing and the grass/asphalt cover and revetment, along with LUCs and monitoring will prevent exposure to site contaminants exceeding risk levels.
Guidelines for Carcinogen Risk Assessment EPA/630/P-03/001F (March 2005)		To Be Considered	Guidance for assessing cancer risk.	Used to calculate potential carcinogenic risks caused by exposure to contaminants. Installing and the grass/asphalt cover and revetment, along with LUCs and monitoring will prevent exposure to site contaminants exceeding risk levels.
Recommendations of the Technical Review Workgroup for Lead for an approach to Assessing Risks Associated with Adult Exposure to Lead In soil		To Be Considered	EPA Guidance for evaluating risks posed by lead in soil.	This alternative will meet these guidelines by isolating lead impacted soil exceeding adult and child industrial and commercial risk levels below cover materials and establishing land use controls and monitoring to address remaining residential risks.
Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens EPA/630/R-03/003F (March 2005)		To Be Considered	Guidance of assessing cancer risks to children.	Used to calculate potential carcinogenic risks to children caused by exposure to contaminants. Installing and the grass/asphalt cover and revetment, along with LUCs and monitoring will prevent exposure to site contaminants exceeding risk levels.

TABLE A - 1

ASSESSMENT OF CHEMICAL-SPECIFIC ARARs AND TBCs
SOIL ALTERNATIVE 4: SOIL COVER AND LUCS
RECORD OF DECISION
OLD FIRE FIGHTING TRAINING AREA
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

STATE OF RHODE ISLAND REQUIREMENTS

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
State of Rhode Island Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases (Short Title: Remediation Regulations)	CRIR 12-180-001, Section 8; DEM-DSR-01-93, as amended February 2004	Applicable	These regulations set remediation standards for contaminated media. These standards are applicable to a CERCLA remedy when they are more stringent than federal standards. Establishes criteria for groundwater and both direct contact and leachability of contaminants in soil.	These standards were used to develop soil PRGs. This alternative meets this standard because soil exceeding PRGs is isolated from exposure to receptors with a barrier and soil cover. Long term monitoring will assess whether contamination does not migrate and LUCs will prevent residential use of property, disturbance of the cover and exposure to contaminated groundwater.

TABLE A - 2

ASSESSMENT OF LOCATION-SPECIFIC ARARs AND TBCs
SOIL ALTERNATIVE 4: SOIL COVER AND LUCS
RECORD OF DECISION
OLD FIRE FIGHTING TRAINING AREA
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

FEDERAL REQUIREMENTS

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
Coastal Zone Management Act	16 USC Parts 1451 *et. seq*.	Applicable	Requires that any actions must be conducted in a manner consistent with state-approved management programs.	The site is located next to a coastal zone management area; therefore, applicable coastal zone management requirements need to be addressed**.**
Fish and Wildlife Coordination Act	16 U.S.C. 661 et seq	Applicable	Requires Federal agencies involved in actions that will result in the control of structural modification of any stream or body of water for any purpose to take action to protect fish and wildlife resources that may be affected by the action. The Navy must coordinate with appropriate federal and state resource agencies to ascertain the mans and measures necessary to mitigate, prevent, and compensate for project related losses of fish and wildlife resources and to enhance the resources.	Measures to mitigate or compensate adverse project related impacts to fish and wildlife resources will be taken, if determined necessary. The appropriate federal and state resource agencies will be consulted, in particular regarding any revetment O&M
Endangered Species Act	16 U.S.C. 1531 et seq.; 50 CFR Parts 200 and 402	Applicable	Regulates activities affecting federally listed endangered or threatened species or their critical habitat.	The federally-listed loggerhead turtle and Kemps-ridley turtle occur in the waters of Narragansett Bay. Appropriate federal agencies will be consulted to find ways to minimize adverse effects to listed species for the O&M of the revetment.
Rivers and Harbors Act	(33 U.S.C. Section 403); Section 10	Applicable	These regulations set forth criteria from the Army Corps of Engineers (ACOE) for placing dams/structures in navigable waters of the United States.	Excavation, dredging, and habitat restoration will comply with the Act's substantive environmental standards.

TABLE A - 2

ASSESSMENT OF LOCATION-SPECIFIC ARARs AND TBCs
SOIL ALTERNATIVE 4: SOIL COVER AND LUCS
RECORD OF DECISION
OLD FIRE FIGHTING TRAINING AREA
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

FEDERAL REQUIREMENTS (CONT)

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
Clean Water Act	Section 404 (33 U.S.C. s 1344); Section 404 (b)(1) Guidelines for Specification of disposal sites for dredged or fill material (40 CFR Part 230, 231 and 33 C.F.R. Parts 320-323)."	Applicable	Under this requirement, no activity that adversely affects a wetland shall be permitted if a practicable alternative with lesser effects is available. If activity takes place, impacts must be minimized to the maximum extent. Controls discharges of dredged or fill material to protect aquatic ecosystems. Filling or discharge of dredged material will only occur where there is no other practicable alternative and any adverse impacts to aquatic ecosystems will be mitigated.	Alternatives may involve discharge of dredged material and/or excavation during O &M of the shoreline revetment. Filling or discharge of dredged material will only occur where there is no other practicable alternative and any adverse impacts to aquatic ecosystems will be mitigated.
National Historic Preservation Act	16 USC 470 *et seq.*, 26 CFR Part 800	Applicable	Requires action to take into account effects on properties included on or eligible for the National Register of Historic Places and minimizes harm to National Historic Landmarks	Historic vessels may be sunken in the area. Remedial actions may involve actions that might cause potential harm to historic sites. Such actions would be prevented.

STATE OF RHODE ISLAND REQUIREMENTS

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
Coastal Resources Management	RIGL 46-23-1 *et seq.*	Applicable	Sets standards for management and protection of coastal resources.	The entire site is located in a coastal resource management area, therefore, applicable coastal resource management requirements need to be addressed**.**
Rhode Island Endangered Species Act	RIGL 20-37-1 et seq.	Applicable	Regulates activities affecting state listed endangered or threatened species or their critical habitat.	The State listed loggerhead turtle and Kemps-ridley turtle occur in the waters of Narragansett Bay. The Navy will coordinate with appropriate agencies to find ways to minimize adverse effects to listed species for the O&M of the revetment and cover system within the 100 year flood zone.

TABLE A - 3

ASSESSMENT OF ACTION-SPECIFIC ARARs AND TBCs
SOIL ALTERNATIVE 4: SOIL COVER AND LUCs
RECORD OF DECISION
OLD FIRE FIGHTING TRAINING AREA
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

FEDERAL REQUIREMENTS

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
Clean Air Act (CAA), National Emission Standards for Hazardous Air Pollutants (NESHAPS)	42 USC 7411, 7412; 40 CFR Part 61	Applicable	NESHAPS are a set of emission standards for specific chemicals, including naphthalene, arsenic, cadmium, chromium, lead, mercury, nickel, PCBs, DDE, and hexachlorobenzene. Certain activities are regulated including site remediation.	Monitoring of air emissions during regrading will be used to assess compliance with these standards if threshold levels are reached. Operation and maintenance activities will be carried out in a manner which will minimize potential air releases.
Clean Water Act (CWA), Section 402, National Pollutant Discharge Elimination System (NPDES)	33 USC 1342; 40 CFR Parts 122-125, 131	Applicable	These standards govern discharge of water into surface waters. Regulated discharges must meet national recommended water quality criteria. Includes storm water requirements for construction projects that disturb over one acre.	Erosion and storm water from the site will be managed through best management practices. Construction and O&M of the cover, as well as O & M of the shoreline revetment will be managed so as to not discharge contaminants into adjacent waters.
Clean Water Act; General Pretreatment Regulations for Existing and New Sources of Pollution	33 U.S.C. § 1251 et seq. 40 CFR. Part 403	Applicable	Standards for direct discharge of waste water into a Publicly Owned Treatment Works (POTW).	These standards will apply if water from the remedial action such as from dewatering is discharged to a POTW.

TABLE A - 3

ASSESSMENT OF ACTION-SPECIFIC ARARs AND TBCs
SOIL ALTERNATIVE 4: SOIL COVER AND LUCs
RECORD OF DECISION
OLD FIRE FIGHTING TRAINING AREA
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

STATE OF RHODE ISLAND REQUIREMENTS

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
Clean Air Act - Fugitive Dust Control	RIGL 23-23 et seq.; CRIR 12-31-05	Applicable	Requires that reasonable precaution be taken to prevent particulate matter from becoming airborne.	Dust control measures would be incorporated during construction activities to prevent material from becoming airborne.
Clean Air Act - Emissions Detrimental to Persons or Property	RIGL 23-23 *et seq.*; CRIR 12-31-07	Applicable	Prohibits emissions of contaminants which may be injurious to humans, plant or animal life or cause damage to property or which reasonably interferes with the enjoyment of life and property.	Monitoring of air emissions during regrading will be used to assess compliance with these standards if threshold levels are reached.
Clean Air Act - Air Pollution Control	RIGL 23-23 *et seq.*; CRIR 12-31-09	Applicable	Establishes guidelines for the construction, installation, or operation of potential air emission units. Establishes permissible emission rates for some contaminants.	No emissions are expected, however, regrading activities would be monitored and any if any control system is required it will meet the substantive provisions of the standards if threshold levels are reached.
Clean Air Act - Air Toxics	RIGL 23-23 *et seq.*; CRIR 12-31-22	Applicable	Prohibits the emission of specified contaminants at rates which would result in ground level concentrations greater than acceptable ambient levels or acceptable ambient levels as set in the regulations	Monitoring of air emissions during regrading will be used to assess compliance with these standards if threshold levels are reached. Operation and maintenance activities will be carried out in a manner which will minimize potential air releases.
Water Pollution Control - Water Quality	RIGL 42-16 *et seq.*; CRIR 12-190-001	Applicable	Establishes water use classification and water quality criteria for waters of the state. Also establishes criteria for discharge to a water body.	Construction and O&M of the cover as well as O & M of the shoreline revetment that will be managed so as to not discharge contaminants into adjacent waters.

TABLE A - 3

ASSESSMENT OF ACTION-SPECIFIC ARARs AND TBCs
SOIL ALTERNATIVE 4: SOIL COVER AND LUCs
RECORD OF DECISION
OLD FIRE FIGHTING TRAINING AREA
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

STATE OF RHODE ISLAND REQUIREMENTS (con't)

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
Rhode Island Solid Waste Regulations	DEM OWM-SW04-01, 1.7.14(b)	Relevant and Appropriate	Regulation states that an approved closure plan must be implemented.	The site will be closed under a plan developed in accordance with the substantive requirements of this section of the regulations, (to be incorporated into the remedial design (RD,) and the Operations and Maintenance Plan (O&M) (including a monitoring plan).
Rhode Island Solid Waste Regulations	DEM OWM-SW04-01, 1.7.10	Relevant and Appropriate	Requires dust control.	Dust must be controlled at the site during cover construction and during maintenance activities.
Rhode Island Solid Waste Regulations	DEM OWM-SW04-01, 1.7.12 (a)	Relevant and Appropriate	Requires solid waste management facilities be designed and maintained to protect the health and safety of personnel at the facility and persons in close proximity.	Under this subsection health and safety of construction workers and persons in the proximity of the site would be maintained during construction and maintenance activities.
Rhode Island Solid Waste Regulations	DEM OWM-SW04-01, 1.8.01 (a) and 1.8.01 (b)	Relevant and Appropriate	Requires facilities to monitor groundwater and to meet closure requirements.	The substantive requirements of this section of the regulations will be met by monitoring groundwater and meeting closure requirements Because contaminants will be left in place the site the site will be closed as a waste management unit, and undergo long term monitoring. The remedial design (RD), remedial action work plan (RAWP), operations and monitoring plan (O&M) (including the long term monitoring plan [LTMP]) developed for this cleanup will contain the specific monitoring and closure requirements for the waste management unit that will comply with the substantive requirements.

TABLE A - 3

ASSESSMENT OF ACTION-SPECIFIC ARARs AND TBCs
SOIL ALTERNATIVE 4: SOIL COVER AND LUCs
RECORD OF DECISION
OLD FIRE FIGHTING TRAINING AREA
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

STATE OF RHODE ISLAND REQUIREMENTS (con't)

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
Rhode Island Solid Waste Regulations	DEM OWM-SW04-01, 2.1.04	Relevant and Appropriate	Requires a "Sedimentation and Erosion Control Plan" be developed.	An erosion and sediment control plan will be developed for this site in accordance with the substantive requirements of this section. The RD and the RAWP, to be developed for this cleanup, will contain the specific erosion and sediment controls requirements for the remedial construction.
Rhode Island Solid Waste Regulations	DEM OWM-SW04-01, 2.1.08 (a) (8)	Relevant and Appropriate	Contains requirements for construction of monitoring wells to monitor a solid waste landfill.	The substantive requirements of this section of the regulations will be met for construction of new monitoring wells.
Rhode Island Solid Waste Regulations	DEM OWM-SW04-01, 2.1.08 (c)	Relevant and Appropriate	Contains requirements for monitoring wells.	The substantive requirements of this section of the regulations will be met by maintaining monitoring wells for the purpose of monitoring groundwater conditions at the site. Because this remedy leaves contamination in place, it will be supported with a Long Term Monitoring Plan (LTMP) for groundwater. The LTMP will be directed by a work plan that will contain the specific monitoring requirements.
Rhode Island Solid Waste Regulations	DEM OWM-SW04-01, 2.2.12 (d) (1) and 2.2.12 (d) (2) (ii)(iii) and (v).	Relevant and Appropriate	Contains requirements for construction and maintenance of the vegetative cover final cover system.	Remedies including cover systems will include appropriate vegetation requirements of a soil cover in compliance with these standards.
Rhode Island Solid Waste Regulations	DEM OWM-SW04-01, 2.3.04(e), (f)	Relevant and Appropriate	Outlines the requirements for the maintenance and permeability of cover material .	The substantive requirements of this section of the regulations will be met by installing an asphalt cover that has been determined to provide an adequate barrier for specific areas to be used for parking, or a soil cover that has been determined to provide an adequate barrier for the remainder of the land within the waste management area.

TABLE A - 3

ASSESSMENT OF ACTION-SPECIFIC ARARs AND TBCs
SOIL ALTERNATIVE 4: SOIL COVER AND LUCs
RECORD OF DECISION
OLD FIRE FIGHTING TRAINING AREA
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

STATE OF RHODE ISLAND REQUIREMENTS (con't)

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
Rhode Island Solid Waste Regulations	DEM OWM-SW04-01, 2.3.05	Relevant and Appropriate	Establishes requirement for compliance boundary for pollution of ground waters or surface waters.	The substantive requirements of this section of the regulations will be met by the requirement that no contamination of groundwater be permitted outside the boundary of the waste management area. Because this remedy leaves contamination in place, groundwater and sediment monitoring will be conducted to assure that no contaminants are transported to the groundwater or surface water beyond the boundary of the waste management area.
Rhode Island Solid Waste Regulations	DEM OWM-SW04-01, 2.3.10	Relevant and Appropriate	Contains requirements for surface water drainage.	The substantive requirements of this section of the regulations will be met through design of appropriate surface drainage considerations for the WMA cover. The cover system would be designed to prevent erosion, sedimentation, and standing water on the cover. Minimum slope requirements for solid waste landfills have been determined not relevant or appropriate for a soil cover which is not intended to reduce infiltration.
Rhode Island Solid Waste Regulations	DEM OWM-SW04-01, 2.3.11	Relevant and Appropriate	Contains requirements for monitoring wells.	The substantive requirements of this section of the regulations will be met by having and maintaining monitoring wells for the purpose of monitoring groundwater conditions. Because this remedy leaves contaminants in place, it will be supported with a Long Term Monitoring Plan (LTMP) for groundwater. The LTMP will be directed by a work plan that will contain the specific monitoring well requirements.
Rhode Island Solid Waste Regulations	DEM OWM-SW04-01, 2.3.14	Relevant and Appropriate	Provides requirements for new solid waste landfill units and expansions that impact wetlands and coastal wetlands, coastal flood zones, etc.	This alternative will involve alteration of land within a 100 year coastal flood zone. The substantive requirements of this section of the regulations will be met by protecting the adjacent coastal wetland resources during construction and maintenance of a soil cover over soil containing residual contamination. The RD, RAWP, and the LTMP will be developed and provide specific requirements, to meet the substantive requirements of this section

TABLE A - 3

ASSESSMENT OF ACTION-SPECIFIC ARARs AND TBCs
SOIL ALTERNATIVE 4: SOIL COVER AND LUCs
RECORD OF DECISION
OLD FIRE FIGHTING TRAINING AREA
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

STATE OF RHODE ISLAND REQUIREMENTS (con't)

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
Rhode Island Solid Waste Regulations	DEM OWM-SW04-01, 2.3.23	Relevant and Appropriate	Provides requirements for closure of solid waste units in "unstable areas", interpreted to include 100 year flood zones.	This alternative establishes a waste management area within a 100 year coastal flood zone. The substantive requirements of this section of the regulations will be met through the closure of the waste management area. This alternative meets the intent because the waste management area will be covered in a manner that prevents the release of contaminants during a 100 year flood event and will be protected from coastal erosion by the stone revetment.
Regulations for the RI Pollutant Discharge Elimination System	RIGL 46-12, 42-17.1, 42-45	Relevant and Appropriate	Contains discharge limitations, monitoring requirements and best management practices. Substantive requirements under NPDES are written such that state and federal national recommended water quality criteria (NRWQC) are met. Permits are required for off-site discharges, RI Standards apply to POTWs. Includes storm water requirements for construction projects that disturb over one acre	Discharge of any contaminated groundwater during soil excavation or during O&M of the remedy into Narragansett Bay or POTWs will meet applicable standards. Storm water standards for construction projects over one acre will also be met.
Pretreatment Regulations	RIGL 46-12, 42-17.1, 42-45	Applicable	Rhode Island standards for discharge to POTWs.	These standards will apply if water from the remedial action such as from dewatering is discharged to a POTW.
State of Rhode Island Rules and Regulations for Dredging and Management of Dredge Materials	Rules and regulations for Dredging and Management of Dredge Materials DEM-OWR-DR-02-03	Applicable	Addresses dredging activities and disposal of dredge spoils.	Any dredging that is required for maintenance of the remedy must comply with the requirements of the regulations.

TABLE A - 4

ASSESSMENT OF CHEMICAL-SPECIFIC ARARs AND TBCs
GROUNDWATER ALTERNATIVE 2: LIMITED ACTION
RECORD OF DECISION
OLD FIRE FIGHTING TRAINING AREA
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

FEDERAL REQUIREMENTS

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
EPA Human Health Assessment Cancer Slope Factors (CSFs).		To Be Considered	These are guidance values used to evaluate the potential carcinogenic hazard caused by exposure to contaminants.	Used to compute the individual incremental cancer risk resulting from exposure to carcinogenic contaminants in site media. LUCs and monitoring will prevent exposure to site contaminants exceeding risk levels.
Reference Dose (RfD)		To Be Considered	Guidance used to compute human health hazard resulting from exposure to non-carcinogens in site media.	Used to calculate potential non-carcinogenic hazards caused by exposure to contaminants. LUCs and monitoring will prevent exposure to site contaminants exceeding risk levels.
Guidelines for Carcinogen Risk Assessment EPA/630/P-03/001F (March 2005)		To Be Considered	Guidance for assessing cancer risk.	Used to calculate potential carcinogenic risks caused by exposure to contaminants. LUCs and monitoring will prevent exposure to site contaminants exceeding risk levels.
Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens EPA/630/R-03/003F (March 2005)		To Be Considered	Guidance of assessing cancer risks to children.	Used to calculate potential carcinogenic risks to children caused by exposure to contaminants. LUCs and monitoring will prevent exposure to site contaminants exceeding risk levels.

STATE OF RHODE ISLAND REQUIREMENTS

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
Remediation Regulations DEM-DSR-01-93 Section 8.03, A to D.		To Be Considered	Sets levels for monitoring of contaminated groundwater when more stringent than federal standards.	This alternative meets these criteria using long term monitoring, maintenance of the source control remedy, and LUCs will prevent exposure to groundwater contaminants exceeding risk levels.

TABLE A - 5

ASSESSMENT OF LOCATION-SPECIFIC ARARs AND TBCs
GROUNDWATER ALTERNATIVE 2: LIMITED ACTION
RECORD OF DECISION
OLD FIRE FIGHTING TRAINING AREA
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

FEDERAL REQUIREMENTS

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
Clean Water Act	Section 404 (33 U.S.C. s 1344); Section 404 (b)(1) Guidelines for Specification of disposal sites for dredged or fill material (40 CFR Part 230, 231 and 33 C.F.R. Parts 320-323)."	Applicable	Under this requirement, no activity that adversely affects a wetland shall be permitted if a practicable alternative with lesser effects is available. If activity takes place, impacts must be minimized to the maximum extent. Controls discharges of dredged or fill material to protect aquatic ecosystems. Filling or discharge of dredged material will only occur where there is no other practicable alternative and any adverse impacts to aquatic ecosystems will be mitigated.	Alternatives may involve sediment sampling and installation/maintenance of monitoring wells along the shoreline. Monitoring activities will be conducted to minimize impact to aquatic systems and mitigate if monitoring activities cause disruption to those aquatic systems.
Coastal Zone Management Act	16 USC Parts 1451 *et. seq*.	Applicable	Requires that any actions must be conducted in a manner consistent with state approved management programs.	The site is located next to a coastal zone management area, therefore, applicable coastal zone management requirements need to be addressed**.**
Fish and Wildlife Coordination Act	16 U.S.C. 661 et seq.	Applicable	Requires Federal agencies involved in actions that will result in the control of structural modification of any stream or body of water for any purpose to take action to protect fish and wildlife resources that may be affected by the action. The Navy must coordinate with appropriate federal and state resource agencies to ascertain the means and measures necessary to mitigate, prevent, and compensate for project related losses of fish and wildlife resources and to enhance the resources.	Measures to mitigate or compensate adverse project related impacts to fish and wildlife resources will be taken, if determined necessary. The appropriate federal and state resource agencies will be consulted, in particular regarding any sediment sampling or monitoring well installation/ maintenance.
Endangered Species Act	16 U.S.C. 1531 et seq.; 50 CFR Parts 200 and 402	Applicable	Regulates activities affecting federally listed endangered or threatened species or their critical habitat.	The federally-listed loggerhead turtle and Kemps-Ridley turtle occur in the waters of Narragansett Bay. Appropriate federal agencies will be consulted to find ways to minimize adverse effects to listed species for sediment sampling or monitoring well installation/maintenance.

TABLE A - 5

ASSESSMENT OF LOCATION-SPECIFIC ARARs AND TBCs
GROUNDWATER ALTERNATIVE 2: LIMITED ACTION
RECORD OF DECISION
OLD FIRE FIGHTING TRAINING AREA
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

STATE OF RHODE ISLAND REQUIREMENTS

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
Coastal Resources Management	RIGL 46-23-1 *et seq.*	Applicable	Sets standards for management and protection of coastal resources.	The entire site is located in a coastal resource management area; therefore, applicable coastal resource management requirements need to be addressed**.**
Rhode Island Endangered Species Act	RIGL 20-37-1 et seq.	Applicable	Regulates activities affecting state listed endangered or threatened species or their critical habitat.	The State listed loggerhead turtle and Kemps-ridley turtle occur in the waters of Narragansett Bay. Navy will coordinate with appropriate agencies to find ways to minimize adverse effects to listed species for sediment sampling or monitoring well installation/maintenance.

TABLE A – 6

ASSESSMENT OF ACTION-SPECIFIC ARARs AND TBCs
GROUNDWATER [(1)] ALTERNATIVE 2: LIMITED ACTION
RECORD OF DECISION
OLD FIRE FIGHTING TRAINING AREA
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

FEDERAL REQUIREMENTS

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
Safe Drinking Water Act Maximum Contaminant Levels (MCLs)	40 CFR 141.11-141.16, Subpart B	Relevant and Appropriate	These standards are for protection of drinking water sources. MCLs consider health factors as well as economic and technical feasibility of removing a contaminant.	MCLs were considered in development of PRGs, . The PRGs will be used to determine whether contamination has migrated outside of the compliance zone or if contamination levels have been reduced enough and that no site risk remains and monitoring can be ended.

STATE OF RHODE ISLAND REQUIREMENTS

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
Water Pollution Control - Water Quality	RIGL 42-16 *et seq.*; CRIR 12-190-001	Applicable	Establishes water use classification and water quality criteria for waters of the state.	Groundwater concentrations will be compared against these criteria during the long-term monitoring events.

[(1)] Action-specific standards for establishing monitoring goals, well installation and maintenance, and handling/disposal of contaminated media from monitoring activities are included with the soil ARARs (Table A-3).

Appendix B
Cost Estimate

NAVAL STATION NEWPORT

Newport, Rhode Island

Feasibility Study OFFTA

Alternative 4: Soil Cover and LUCS

Present Worth Analysis

Year	Capital Cost	Annual Cost	Total Year Cost	Annual Discount Rate 2.7%	Present Worth
0	$1,418,624		$1,418,624	1.000	$1,418,624
1		$16,000	$16,000	0.974	$15,579
2		$16,000	$16,000	0.948	$15,170
3		$16,000	$16,000	0.923	$14,771
4		$16,000	$16,000	0.899	$14,383
5		$26,000	$26,000	0.875	$22,757
6		$16,000	$16,000	0.852	$13,636
7		$16,000	$16,000	0.830	$13,278
8		$16,000	$16,000	0.808	$12,929
9		$16,000	$16,000	0.787	$12,589
10		$26,000	$26,000	0.766	$19,919
11		$16,000	$16,000	0.746	$11,936
12		$16,000	$16,000	0.726	$11,622
13		$16,000	$16,000	0.707	$11,316
14		$16,000	$16,000	0.689	$11,019
15		$26,000	$26,000	0.671	$17,435
16		$16,000	$16,000	0.653	$10,447
17		$16,000	$16,000	0.636	$10,172
18		$16,000	$16,000	0.619	$9,905
19		$16,000	$16,000	0.603	$9,645
20		$26,000	$26,000	0.587	$15,260
21		$16,000	$16,000	0.572	$9,144
22		$16,000	$16,000	0.556	$8,904
23		$16,000	$16,000	0.542	$8,670
24		$16,000	$16,000	0.528	$8,442
25		$26,000	$26,000	0.514	$13,357
26		$16,000	$16,000	0.500	$8,004
27		$16,000	$16,000	0.487	$7,793
28		$16,000	$16,000	0.474	$7,588
29		$16,000	$16,000	0.462	$7,389
30		$26,000	$26,000	0.450	$11,691
			TOTAL PRESENT WORTH		**$1,783,373**
					$1,783,000

Discount rate of 2.7% as per Office of Management and Budget, Circular No. A-94, December, 2009.

Present Worth Analysis
Groundwater Alternative 2 - Limited Action
OFFTA Feasibility Study
NAVSTA Newport
Newport, Rhode Island
7/17/2002 (updated 12/11/2009)

PRESENT WORTH ANALYSIS

YEAR	PRESENT WORTH FACTOR 2.7%	CAPITAL COSTS	O & M COSTS	5-YEAR COSTS	PRESENT WORTH
0	1.000	$75,810			$75,810
1	0.974		$75,000		$73,028
2	0.948		$75,000		$71,108
3	0.923		$75,000		$69,239
4	0.899		$75,000		$67,419
5	0.875		$75,000	$31,000	$92,780
6	0.852		$3,180		$2,710
7	0.830		$3,180		$2,639
8	0.808		$3,180		$2,570
9	0.787		$3,180		$2,502
10	0.766		$75,000	$31,000	$81,208
11	0.746		$3,180		$2,372
12	0.726		$3,180		$2,310
13	0.707		$3,180		$2,249
14	0.689		$3,180		$2,190
15	0.671		$75,000	$31,000	$71,080
16	0.653		$3,180		$2,076
17	0.636		$3,180		$2,022
18	0.619		$3,180		$1,969
19	0.603		$3,180		$1,917
20	0.587		$75,000	$31,000	$62,215
21	0.572		$3,180		$1,817
22	0.556		$3,180		$1,770
23	0.542		$3,180		$1,723
24	0.528		$3,180		$1,678
25	0.514		$75,000	$31,000	$54,456
26	0.500		$3,180		$1,591
27	0.487		$3,180		$1,549
28	0.474		$3,180		$1,508
29	0.462		$3,180		$1,469
30	0.450		$75,000	$31,000	$47,664
		TOTAL PRESENT WORTH =			$806,638
					$807,000

Discount rate of 2.7% as per Office of Management and Budget, Circular No. A-94, December, 2009.

Tetra Tech NUS		*Calculation Sheet*	
Client: Navy CLEAN	File No.	**By:** RD, PJ, TJR	**Page** 1 of 1
Subject: Assumptions and Cost Basis, Groundwater Alternative 2, OFFTA FS		**Checked by:** JD, SSP, DCW	**Date:** July 17, 2002 December 11, 2009

Groundwater Alternative 2: Limited Action

CAPITAL COST ASSUMPTIONS:

1. Groundwater Use Restrictions

   Assume 500 hours Level of Effort (LOE) @ $100/hr to implement. Approx. $2500 ODCs.
   - Total = $52,500.

O&M COST ASSUMPTIONS:

1. Sampling for long-term monitoring will be conducted at 20 wells annually for years 1-5 and every five years thereafter. A total of 24 samples will be collected at each event and will be analyzed for DRO, GRO, SVOCs, and metals. Analysis costs will be $822.42 for each sample ($86.25+97.75+348.75+289.67 = $822.42. Source: Recent analysis cost, E-2000-33021619, 33021621). Sampling effort will be at 300 Level of Effort (LOE) @$100/hr. Total cost for event: $49,738. Cost include data validation and report.

2. Annual report to RIDEM for use restriction monitoring will be 20 Level of Effort (LOE) @ $100/hr to implement. Approx. $200 ODCs. Total = $2,200.

5-YEAR COST ASSUMPTIONS:

1. 5-year review at 200 LOE @ $100/hr. Approx. $1500 ODCs. Total = $ 21,500 per event. Reviews to occur in years 5, 10, 15, 20, 25, and 30.

NOTE: Cost update to 2009 pricing by 1.444 (from Means Historical Cost Indexes, 2002 to 2009).

CAPITAL COST ASSUMPTIONS:
$52,500 * 1.444 = $75,810

O&M COST ASSUMPTIONS:
$49,738 * 1.444 = $71,820
$2,200 * 1.444 = $3,180

5-YEAR COST ASSUMPTIONS:
$21,500 * 1.444 = $31,000

Appendix C
Human Health Risk Assessment Summary Tables

TABLE C-1

SOIL EXPOSURE POINT CONCENTRATION SUMMARY
OLD FIRE FIGHTING TRAINING AREA
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Vadose Zone Soil (0-maximum10 ft)

Chemical of Concern	Units	Arithmetic Mean	95% UCL of Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Lead	mg/kg	281	844	8250		mg/kg	844	97.5% Chebyshev(Mean, Std) UCL	(1)	844	97.5% Chebyshev(Mean, Std) UCL	(1)
Benzo(a)anthracene	ug/kg	1114	2683	18000	*	ug/kg	2683	97.5% Chebyshev(Mean, Std) UCL	(1)	2683	97.5% Chebyshev(Mean, Std) UCL	(1)
Benzo(a)pyrene	ug/kg	969	2277	15000	*	ug/kg	2277	97.5% Chebyshev(Mean, Std) UCL	(1)	2277	97.5% Chebyshev(Mean, Std) UCL	(1)
Benzo(b)fluoranthene	ug/kg	1099	2589	17000	*	ug/kg	2589	97.5% Chebyshev(Mean, Std) UCL	(1)	2589	97.5% Chebyshev(Mean, Std) UCL	(1)
Dibenzo(a,h)anthracene	ug/kg	295	619	4000	J	ug/kg	619	97.5% Chebyshev(Mean, Std) UCL	(1)	619	97.5% Chebyshev(Mean, Std) UCL	(1)

For non-detects, 1/2 sample quantitation limit was used as a proxy concentration; for duplicate sample results, the average value was used in the calculation.

(1) ProUCL
(2) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for RME EPC and average used for CTE.
(3) ProUCL recommended either the student -t or the Modified-t-UCL, the greater of the two was selected.

TABLE C-2
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - GROUNDWATER
OLD FIRE FIGHTING TRAINING AREA - GROUNDWATER RISK EVALUATION
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Contact with tap water

Chemical of Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Arsenic	ug/L	8.32	27.3	49.8		ug/L	49.8	Max	GW, use Max	5.04	Mean-T	Mean-T <=Max
Chromium	ug/L	15.2	52.8	39.9		ug/L	39.9	Max	GW, use Max	17.1	Mean-T	Mean-T <=Max
Lead	ug/L	22.5	149	207	J	ug/L	207	Max	GW, use Max	16.2	Mean-T	Mean-T <=Max
Manganese	ug/L	3820	11300	12500	J	ug/L	12500	Max	GW, use Max	3910	Mean-T	Mean-T <=Max
2-Methylnaphthalene	ug/L	19.2	25.8	190		ug/L	190	Max	GW, use Max	10.3	Mean-T	Mean-T <=Max
Benzene	ug/L	7.38	9.56	33		ug/L	33	Max	GW, use Max	6.81	Mean-T	Mean-T <=Max

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-H); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

TABLE C-3

CANCER TOXICITY DATA – ORAL/DERMAL
OLD FIRE FIGHTING TRAINING AREA
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Chemical of Concern	Oral Cancer Slope Factor (1)	GI Absorption in Toxicity Study	Adjusted Dermal Cancer Slope Factor (2)	Units	Weight of Evidence Narrative Descriptor	Source	Date (MM/DD/YY)	Dermal Absorption Factor for Soils (DABS)	Oral Absorption Factor for Soils (OABS)
Lead	NA	N/A	NA	NA	(4)	IRIS	2/2/2007	NA	1.0
Benzo(a)anthracene	7.3E-01	1.0	7.3E-01	1/(mg/kg-day)	(4)	EPA-NCEA		0.13	1.0
Benzo(a)pyrene	7.3E+00	1.0	7.3E+00	1/(mg/kg-day)	(4)	IRIS	2/2/2007	0.13	1.0
Benzo(b)fluoranthene	7.3E-01	1.0	7.3E-01	1/(mg/kg-day)	(4)	EPA-NCEA		0.13	1.0
Dibenzo(a,h)anthracene	7.3E+00	1.0	7.3E+00	1/(mg/kg-day)	(4)	EPA-NCEA		0.13	1.0

IRIS = Integrated Risk Information System
HEAST= Health Effects Assessment Summary Tables
NCEA=National Center for Environmental Assessment
(1) To be used for oral pathway only. Based on administered dose.
(2) Adjusted slope factor (CSF) = oral CSF x GI absorption value in toxicity study upon which the CSF is based. To be used for dermal pathway only.

Weight of Evidence Narrative Descriptions:
(3) - Carcinogenic to Humans
(4) - Likely to be Carcinogenic to Humans
(5) - Suggestive of Carcinogenic Potential
(6) - Inadequate Information to Assess Carcinogenic Potential
(7) - Not Likely to be Carcinogenic to Humans
(8) - Not assessed under the IRIS program

TABLE C-4
CANCER TOXICITY DATA – ORAL/DERMAL
OLD FIRE FIGHTING TRAINING AREA - GROUNDWATER RISK EVALUATION
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Chemical of Concern	Oral Cancer Slope Factor	Oral to Dermal Adjustment Factor	Adjusted Dermal Cancer Slope Factor (1)	Units	Weight of Evidence/ Cancer Guideline Description	Source Target Organ	Date (MM/DD/YY)
Arsenic	1.50E+00	1.00E+00	1.50E+00	1/(mg/kg-day)	A	IRIS	08/16/01
Chromium	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lead	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Manganese	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2-Methylnaphthalene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzene	5.50E-02	1.00E+00	5.50E-02	1/(mg/kg-day)	A	IRIS	08/16/01

IRIS = Integrated Risk Information System
HEAST= Health Effects Assessment Summary Tables

Weight of Evidence:
- Known/Likely
- Cannot be Determined
- Not Likely

EPA Group:
- A - Human carcinogen
- B1 - Probable human carcinogen - indicates that limited human data are available
- B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
- C - Possible human carcinogen
- D - Not classifiable as a human carcinogen
- E - Evidence of noncarcinogenicity

(1) Adjusted SF dermal = oral SF/GI absorption value in toxicity study upon which the SF is based. To be used for dermal pathway only.
(2) IRIS - Integrated Risk Information System (EPA, 2001)
HEAST - Health Effects Assessment Summary Tables (EPA, 1997)

TABLE C-5
CANCER TOXICITY DATA – INHALATION
OLD FIRE FIGHTING TRAINING AREA - GROUNDWATER RISK EVALUATION
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Chemical of Concern	Unit Risk	Units	Adjustment	Inhalation Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date (MM/DD/YY)
Arsenic	---	---	---	1.51E+01	1/(mg/kg-day)	A	IRIS	08/16/01
Chromium	---	---	---	4.10E+01	1/(mg/kg-day)	A	IRIS	08/16/01
Lead	---	---	---	N/A	N/A	N/A	N/A	N/A
Manganese	---	---	---	N/A	N/A	N/A	N/A	N/A
2-Methylnaphthalene	---	---	---	N/A	N/A	N/A	N/A	N/A
Benzene	---	---	---	2.90E-02	1/(mg/kg-day)	A	IRIS	08/16/01

IRIS = Integrated Risk Information System
HEAST= Health Effects Assessment Summary Tables

Weight of Evidence:

EPA Group:
A - Human carcinogen
B1 - Probable human carcinogen - indicates that limited human data are available
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
C - Possible human carcinogen
D - Not classifiable as a human carcinogen
E - Evidence of noncarcinogenicity

(1) IRIS - Integrated Risk Information System (EPA, 2001)
HEAST - Health Effects Assessment Summary Tables (EPA, 1997)

TABLE C-6

NON-CANCER CHRONIC TOXICITY DATA – ORAL/DERMAL
OLD FIRE FIGHTING TRAINING AREA
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Chemical of Concern	Chronic/ Subchronic	Oral RfD Value (1)	Oral RfD Units	GI Absorption in Toxicity Study	Adjusted Dermal RfD (2)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ (MM/DD/YY)	Dermal Absorption Factor for Soils (DABS)	Oral Absorption Factor for Soils (OABS)
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0
Benzo(a)anthracene	NA	NA	NA	1.0	NA	NA	NA	NA	NA	NA	0.13	1.0
Benzo(a)pyrene	NA	NA	NA	1.0	NA	NA	NA	NA	NA	NA	0.13	1.0
Benzo(b)fluoranthene	NA	NA	NA	1.0	NA	NA	NA	NA	NA	NA	0.13	1.0
Dibenzo(a,h)anthracene	NA	NA	NA	1.0	NA	NA	NA	NA	NA	NA	0.13	1.0

IRIS = Integrated Risk Information System
HEAST= Health Effects Assessment Summary Tables
NCEA=National Center for Environmental Assessment
Reg IX = EPA Region IX PRG table, 2004
Reg I = EPA Region I Risk Update #5, August 1999
NA = Not Applicable
(1) To be used for oral pathway only. Based on administered dose.
(2) Adjusted RfD = oral RfD x GI absorption value in toxicity study upon which the RfD is based. To be used for dermal pathway only.
(3) Toxicity values for naphthalene also used for 1-methylnaphthylene.

TABLE C-7
NON-CANCER TOXICITY DATA - ORAL/DERMAL
OLD FIRE FIGHTING TRAINING AREA - GROUNDWATER RISK EVALUATION
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Chemical of Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal RfD (2)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ (3) (MM/DD/YY)
Aluminum	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chromium	Chronic	3.00E-03	mg/kg-day	2.50E-02	7.50E-05	mg/kg-day	Kidney	900	IRIS	08/16/01
Lead	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Manganese	Chronic	2.40E-02	mg/kg-day	4.00E-02	9.60E-04	mg/kg-day	CNS	1	IRIS	08/16/01
2-Methylnaphthalene	Chronic	2.00E-02	mg/kg-day	1.00E+00	2.00E-02	mg/kg-day	Weight Loss		EPA-NCEA	05/01/01
Benzene		3.00E-03	mg/kg-day	1.00E+00	3.00E-03	mg/kg-day	Blood/Immune		EPA-NCEA	05/01/01

N/A = Not Applicable

(1) Refer to RAGS, Part A

(2) Adjusted RfD = oral RfD x GI absorption value in toxicity study upon which the RfD is based. To be used for dermal pathway only.

(3) IRIS - Integrated Risk Information System (EPA, 2001)
HEAST - Health Effects Assessment Summary Tables (EPA, 1997)

TABLE C-8
NON-CANCER TOXICITY DATA -- INHALATION
OLD FIRE FIGHTING TRAINING AREA - GROUNDWATER RISK EVALUATION
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Chemical of Concern	Chronic/ Subchronic	Value Inhalation RfC	Units	Adjusted Inhalation RfD	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfC:RfD: Target Organ	Dates (MM/DD/YY)
Arsenic	N/A	---	---	N/A	N/A	N/A	N/A	N/A	N/A
Chromium	Subchronic	---	---	2.86E-05	mg/kg-day	Lung	300	IRIS	08/16/01
Lead	N/A	---	---	N/A	N/A	N/A	N/A	N/A	N/A
Manganese	Chronic	---	---	1.43E-05	mg/kg-day	CNS	1000	IRIS	08/16/01
2-Methylnaphthalene	N/A	---	---	N/A	N/A	N/A	N/A	N/A	N/A
Benzene		---	---	1.70E-03	mg/kg-day	Blood		EPA-NCEA	05/01/01

N/A = Not Applicable

(1) IRIS - Integrated Risk Information System (EPA, 2001)

TABLE C-9

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COCs - INDUSTRIAL/COMMERCIAL WORKER EXPOSURE TO SOIL
REASONABLE MAXIMUM EXPOSURE
OLD FIRE FIGHTING TRAINING AREA
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future
Receptor Population: Industrial/Commercial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
		Vadose Zone Soil (0-maximum 10 ft)	Lead	--	--	--	--	Lead	NA	--	--	--	--
			Benzo(a)anthracene	6.84E-07	--	5.87E-07	1.27E-06	Benzo(a)anthracene	NA	--	--	--	--
			Benzo(a)pyrene	5.81E-06	--	4.98E-06	1.08E-05	Benzo(a)pyrene	NA	--	--	--	--
			Benzo(b)fluoranthene	6.60E-07	--	5.67E-07	1.23E-06	Benzo(b)fluoranthene	NA	--	--	--	--
			Dibenzo(a,h)anthracene	1.58E-06	--	1.35E-06	2.93E-06	Dibenzo(a,h)anthracene	NA	--	--	--	--
			(Total)	1.43E-05	0.00E+00	8.84E-06	2.31E-05	(Total)		1.05E-01	0.00E+00	1.81E-02	1.23E-01
							Total Risk Across Soil: 2.31E-05						Total Hazard Index Across Soil: 1.23E-01
							Total Risk Across All Media and All Exposure Routes: 2.31E-05						Total Hazard Index Across All Media and All Exposure Routes: 1.23E-01

Total Skin HI =	3.86E-02
Total Blood HI =	9.74E-02
Total Lungs HI =	2.55E-02

TABLE C-10
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COCs - CHILD RESIDENT EXPOSURE TO GROUNDWATER
REASONABLE MAXIMUM EXPOSURE
OLD FIRE FIGHTING TRAINING AREA - GROUNDWATER RISK EVALUATION
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water Contact with Groundwater	Arsenic	4.77E-04	--	2.06E-06	4.79E-04	Arsenic	Skin/Vascular	1.24E+01	--	5.34E-02	1.24E+01
			Chromium	--	--	--	--	Chromium	Kidney	9.91E-01	--	3.42E-01	1.33E+00
			Lead	--	--	--	--	Lead	N/A	--	--	--	--
			Manganese	--	--	--	--	Manganese	CNS	3.88E+01	--	4.19E+00	4.30E+01
			2-Methylnaphthalene	--	--	--	--	2-Methylnaphthalene	Weight Loss	7.08E-01	--	7.76E-01	1.48E+00
			Benzene	1.16E-05	--	1.32E-06	1.29E-05	Benzene	Blood/Immune	8.20E-01	--	9.33E-02	9.13E-01
			(Total)	4.89E-04	--	3.38E-06	4.92E-04	(Total)		5.61E+01	--	6.06E+00	6.22E+01
							Total Risk Across Groundwater	4.92E-04					Total Hazard Index* Across Groundwater	6.22E+01
							Total Risk Across All Media and All Exposure Routes	4.92E-04					Total Hazard Index* Across All Media and All Exposure Routes	6.22E+01

Total Blood HI =	1.30E+00
Total CNS HI =	4.30E+01
Total Immune HI =	9.13E-01
Total Kidney HI =	2.67E+00
Total Skin HI =	1.24E+01
Total Vascular HI =	1.24E+01
Total Weight Loss HI =	2.32E+00

*- Total Hazard Index by itself is not an indicator of unacceptable risk but rather is a criterion for requiring that noncancer risks should be examined separately for chemicals affecting the same target organ.

TABLE C-11
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COCs - ADULT RESIDENT EXPOSURE TO GROUNDWATER
REASONABLE MAXIMUM EXPOSURE
OLD FIRE FIGHTING TRAINING AREA - GROUNDWATER RISK EVALUATION
NAVSTA NEWPORT - NEWPORT, RHODE ISLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water Contact with Groundwater											
			Arsenic	7.02E-04	--	1.59E-06	7.03E-04	Arsenic	Skin/Vascular	4.55E+00	--	1.03E-02	4.56E+00
			Chromium	--	--	--	--	Chromium	Kidney	3.64E-01	--	6.61E-02	4.31E-01
			Lead	--	--	--	--	Lead	N/A	--	--	--	--
			Manganese	--	--	--	--	Manganese	CNS	1.43E+01	--	8.09E-01	1.51E+01
			2-Methylnaphthalene	--	--	--	--	2-Methylnaphthalene	Weight Loss	2.60E-01	--	1.85E-01	4.46E-01
			Benzene	1.70E-05	--	9.05E-07	1.80E-05	Benzene	Blood/Immune	3.01E-01	--	1.60E-02	3.17E-01
			(Total)	7.19E-04	--	2.50E-06	7.21E-04	(Total)		2.06E+01	--	1.23E+00	2.19E+01
	Air	Inhalation of Groundwater Vapors During Showering											
			Arsenic	--	NA	--	--	Arsenic	N/A	--	--	--	--
			Chromium	--	NA	--	--	Chromium	Lung	--	NA	--	--
			Lead	--	--	--	--	Lead	N/A	--	--	--	--
			Manganese	--	--	--	--	Manganese	CNS	--	NA	--	--
			2-Methylnaphthalene	--	--	--	--	2-Methylnaphthalene	N/A	--	--	--	--
			Benzene	--	1.08E-05	--	1.08E-05	Benzene	Blood	--	6.36E-01	--	6.36E-01
			(Total)	--	1.08E-05	--	1.08E-05	(Total)		--	4.00E+00	--	4.00E+00
						Total Risk Across Groundwater	7.32E-04					Total Hazard Index Across Groundwater	2.59E+01
						Total Risk Across All Media and All Exposure Routes	7.32E-04					Total Hazard Index Across All Media and All Exposure Routes	2.59E+01

Total Blood HI =	1.10E+00
Total CNS HI =	1.51E+01
Total Immune HI =	3.17E-01
Total Kidney HI =	8.91E-01
Total Respiratory HI =	3.36E+00
Total Skin HI =	4.56E+00
Total Vascular HI =	4.56E+00
Total Weight Loss HI =	7.17E-01

TABLE C-12
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COCs - LIFETIME RESIDENT EXPOSURE TO GROUNDWATER
REASONABLE MAXIMUM EXPOSURE
OLD FIRE FIGHTING TRAINING AREA - GROUNDWATER RISK EVALUATION
NAVSTA NEWPORT - NEWPORT, RHODE ISLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water Contact with Groundwater											
			Arsenic	1.18E-03	--	3.65E-06	1.18E-03	Arsenic	N/A	N/A	--	N/A	--
			Chromium	--	--	--	--	Chromium	N/A	N/A	--	N/A	--
			Lead	--	--	--	--	Lead	N/A	N/A	--	N/A	--
			Manganese	--	--	--	--	Manganese	N/A	N/A	--	N/A	--
			2-Methylnaphthalene	--	--	--	--	2-Methylnaphthalene	N/A	N/A	--	N/A	--
			Benzene	2.86E-05	--	2.22E-06	3.09E-05	Benzene	N/A	N/A	--	N/A	--
			(Total)	1.21E-03	--	5.87E-06	1.21E-03	(Total)		--	--	--	--
	Air	Inhalation of Groundwater Vapors During Showering											
			Arsenic	--	--	--	--	Arsenic	N/A	--	N/A	--	--
			Chromium	--	--	--	--	Chromium	N/A	--	N/A	--	--
			Lead	--	--	--	--	Lead	N/A	--	N/A	--	--
			Manganese	--	--	--	--	Manganese	N/A	--	N/A	--	--
			2-Methylnaphthalene	--	--	--	--	2-Methylnaphthalene	N/A	--	N/A	--	--
			Benzene	--	1.08E-05	--	1.08E-05	Benzene	N/A	--	N/A	--	--
			(Total)	--	1.08E-05	--	1.08E-05	(Total)		--	--	--	--
							Total Risk Across Groundwater	1.22E-03					Total Hazard Index Across Groundwater	--

Appendix D
Rhode Island Department of Environmental Management Concurrence Letter

RHODE ISLAND
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
235 Promenade Street, Providence, RI 02908-5767 TDD 401-222-4462

24 September 2010

Mr. James T. Owens, III, Director
U.S. EPA – New England Region
Office of Site Remediation and Restoration
5 Post Office Square
Suite 100 (OSRR 07-3)
Boston, MA 02109-3912

RE: Record of Decision for Site 9 (OU3), Old Fire Fighting Training Area at Naval Station Newport, RI

Dear Mr. Owens:

On 23 March 1992 the State of Rhode Island entered into a Federal Facilities Agreement (FFA) with the Department of the Navy and the Environmental Protection Agency. One of the primary goals of the FFA is to insure that the environmental impacts associated with past activities at the Naval Station Newport located in Newport, Rhode Island are thoroughly investigated and that appropriate actions are taken to protect human health and the environment.

In accordance with the FFA, the Department of Environmental Management (Department) has completed its review of the Record of Decision (ROD) for the Site 9 (OU3), Old Fire Fighting Training Area dated September 2010 at Naval Station Newport, RI. The Department of the Navy's selected alternative for the Site, as presented in the ROD, is a geotextile-lined soil and asphalt cover, land use restrictions to restrict groundwater and land use, long term operation and maintenance of the revetment and cover, and long term monitoring of groundwater and sediment.

The Department has worked on this Site with your Agency from the early investigatory stages up through this current decision milestone. Based upon this Department's review of this ROD and the results of the remedial investigation activities conducted to date, we offer our concurrence on the decision.

The Department wishes to emphasize the following aspects of the ROD:

- Placement of a geotextile-lined soil cover over contaminated areas that are not planned for parking. Areas designated for vehicles and parking would be paved with asphalt (if not currently paved) to provide a cover for contaminated soil left in place. As agreed to by the Navy on 3 February 2010, the Navy agreed to address subsurface TPH contamination that exceeded 2500 mg/kg in two locations (B-9 and SB-512) by covering these two areas with an impermeable surface such as asphalt. It is this Department's understanding that these covered areas will be inspected and maintained by the Navy, which includes land use controls to ensure that future use of the property is limited to non-residential activities, and to ensure the soil cover and subsurface soils are not disturbed;

- Surface water control structures will be installed for areas that are paved. These structures will be designed to collect and prevent intrusion of runoff water into the subsurface and direct it to existing or new on Site storm drainage systems;

- It is this Department's understanding that the Navy will implement groundwater use restrictions and a long term monitoring program. The use restrictions would prevent the installation of wells for any consumptive, irrigational, or industrial purpose. Long-term monitoring will evaluate whether Site contamination has migrated to off-shore sediments or to groundwater outside of the compliance boundary for the contamination being managed in place; and

- Navy will conduct five-year reviews to ensure that the remedial actions for the Site continue to provide adequate protection of human health and the environment.

Thank you for providing us with an opportunity to review and concur with this important ROD.

Sincerely,

W. Michael Sullivan, PhD
Director

cc: Terrence Gray, RIDEM
Leo Hellested, RIDEM
Matthew DeStefano, RIDEM
Gary Jablonski, RIDEM
Bryan Olson, USEPA
Robert Lim, USEPA
Winoma Johnson, Navy

ROD RIDEM Conc ltr