

Final

Second Five-Year Review

**Norfolk Naval Shipyard
Portsmouth, Virginia**

Contract Task Order WE58

August 2016

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Prepared by



Virginia Beach, Virginia

Final

Second Five-Year Review

Norfolk Naval Shipyard
Portsmouth, Virginia

DATE: August 2016

This report documents the Second Five-Year Review for Sites 10, 17, and OU2 (soils), at Norfolk Naval Shipyard as required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) in accordance with CERCLA §121(c), as amended, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), Part 300.430(f)(4)(ii) of the Code of Federal Regulations (CFR).

Approved by:

A handwritten signature in dark ink, appearing to read "Scott M. Brown", is written over a horizontal line.

Scott M. Brown
August 8, 2016
Captain, US Navy
Commander Norfolk Naval Shipyard
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Executive Summary

The United States Navy (Navy) conducted this Five-Year Review for Norfolk Naval Shipyard (NNSY) in Portsmouth, Virginia, as required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) in accordance with CERCLA §121(c), as amended, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), Part 300.430(f)(4)(ii) of the Code of Federal Regulations (CFR). The Report has been prepared in accordance with the United States Environmental Protection Agency (USEPA) 2001 guidance, and summarizes the evaluation of remedies and remedial actions that resulted in hazardous substances, pollutants, or contaminants remaining at sites above levels that allow for unlimited use and unrestricted exposure, and for which there is a Final Record of Decision (ROD). A ROD requiring a Five-Year Review has been finalized for the following NNSY sites:

- Site 17 (USEPA Operable Unit (OU) 4)—Building 195 Plating Shop, August 2006
- Site 10 (USEPA OU6)—1927 Landfill, September 2008
- OU2 (Soils)—Paradise Creek Disposal Area, May 2010
 - Site 3—Sanitary Landfill (High Dump)
 - Site 4—Chemical Holding Ponds
 - Site 5—Oil Reclamation Area
 - Site 6—East Dump

This is the second Five-Year Review for these sites at NNSY. The objective of this Five-Year Review is to evaluate the selected remedies at these sites and determine whether the remedies remain protective of human health and the environment in accordance with the requirements set forth in each of the RODs. The principal method used to evaluate the protectiveness of the remedies was a review of various documents pertaining to site activities, analytical data, and findings. The methods, findings, and conclusions from the document reviews are presented in this Five-Year Review report. In addition, this report is intended to identify issues that may prevent a particular remedy from functioning as designed or appropriately, which could endanger the protection of human health and the environment. The overall evaluations of the effectiveness of each remedy are presented as protectiveness statements in the Five Year Review Summary Form provided below.

Five-Year Review Summary Form**Site Identification**

Site Name: Norfolk Naval Shipyard

USEPA Identification (ID): VA1170024813

Region: 03 State: VA

City/County: Portsmouth

Site Status

National Priorities List (NPL) Status: Final

Remediation Status: Ongoing Operation

Multiple Operable Units (OUs): Yes

Construction Completion Date: Not Applicable (N/A)

Has the site been put into reuse? Sites 10 and 17 land use remains industrial (ongoing industrial activities). OU 2 is a former disposal area managed under CERCLA, the site is currently vacant as Land Use Controls (LUCs) restrict its use. Access is restricted by perimeter fencing.

Review Status

Lead Agency: United States Navy

Who conducted the review? (USEPA Region, State, Federal Agency): Federal Facility

Author Name: CH2M HILL

Author Title: Navy Comprehensive Long-term Environmental Action—Navy (CLEAN) Contractor

Author Affiliation: CH2M HILL, Inc.

Review Period: From: 2011

To: 2016

Date(s) of Site Inspection: February 18, 2016

Type of Review: Statutory

Review Number: 2

Triggering Action: Signature of 2011 Five-Year Review

Trigger Action Date: August 10, 2011

Due Date: August 10, 2016

Contaminants of Concern and Selected Remedy:

- Site 17 (OU4) – Soil: LUCs due to the assumed potential for exposure to site soil by future residents (since the risk was assumed, no COCs were identified). No ecological risks were identified since there is no exposure pathway for ecological receptors. Groundwater: No selected remedy due to the agreement that human health risks associated with the potable use of groundwater are not unacceptable.
- Site 10 (OU6) – Soil: LUCs due to the potential for exposure to lead by future hypothetical adult/child residents. There are limited ecological exposure routes because of the industrial nature of the site, and any minimal exposure would not pose unacceptable ecological risk. Groundwater: No selected remedy due to the absence of potential unacceptable site-related risk to future residents.
- OU 2 (Soil at Sites 3 through 6) – Soil: LUCs due to the potential for exposure to benzo(a)anthracene, antimony, chromium, copper, iron, zinc (within the waste but below the soil cover) by future hypothetical adult/child residents and to waste by all human health receptors. No ecological risks were identified since the soil cover eliminates the identified potential risk.

Issues:

The following issues were identified during the Five-Year Review that may affect the protectiveness of the site remedies:

- Site 17 (OU2) – Perfluorinated compounds (PFCs) have been identified by the USEPA as an emerging contaminant. Based on site history, these constituents have the potential to be present in site groundwater. In addition, the potential impacts of groundwater discharge to surface water bodies has not been evaluated for this site.
- Site 10 (OU6) – Toxicity values were established for dioxins and furans. Based on site history, these constituents have the potential to be present in site groundwater. In addition, the potential impacts of groundwater discharge to surface water bodies has not been evaluated for this site.
- OU 2 (Soil at Sites 3 through 6) – None

Recommendations and Follow-up Actions:

- Site 17 (OU4) – Though there is no current pathway for direct exposure, determine the presence or absence of PFCs in site groundwater. In addition, the Navy, at the request of the EPA, will initiate an evaluation of the groundwater discharge to surface water pathway through an assessment of available groundwater data and refinement of the CSM.
- Site 10 (OU6) – Though there is no current pathway for direct exposure, determine if dioxins and furans are present in site groundwater above established screening values. In addition, the Navy, at the request of the EPA, will initiate an evaluation of the groundwater discharge to surface water pathway through an assessment of available groundwater data and refinement of the CSM.
- OU 2 (Soil at Sites 3 through 6) – None

Protectiveness Statement(s):

The protectiveness of the remedy for each site is summarized as follows:

- Site 17 (OU4) – The remedy at Site 17, consisting of LUCs for soil is currently protective for human health and the environment. There are no current exposure pathways to groundwater and exposure pathways that could result in an unacceptable risk from exposure to soil are being controlled through LUCs (to prohibit development and use of the property for residential housing, elementary and secondary schools, child care facilities, or a playground). There are no current exposure pathways for groundwater as it is not currently used as a potable drinking water source. However, in order to ensure the continued protectiveness of the remedy, a groundwater evaluation should be completed to determine the presence/absence of PFCs in site groundwater. In addition, the Navy at the request of the EPA, will initiate an evaluation of the groundwater discharge to surface water pathway through an assessment of available groundwater data and refinement of the CSM.
- Site 10 (OU6) – The remedy at Site 10, consisting of LUCs is currently protective for human health and the environment. There are no current exposure pathways to groundwater and exposure pathways that could result in an unacceptable risk from exposure to soil are being controlled through LUCs (to prohibit development and use of the property for residential housing, elementary and secondary schools, child care facilities, or a playground) and there are no current exposure pathways for groundwater as it is not currently used as a potable drinking water source. However, in order to ensure the continued protectiveness of the remedy, a soil and groundwater evaluation should be completed to determine if dioxins and furans are present in site soil and groundwater at concentrations potentially posing risk to human health. In addition, the Navy at the request of the EPA, will initiate an evaluation of the groundwater discharge to surface water pathway through an assessment of available groundwater data and refinement of the CSM.
- OU 2 (Soil at Sites 3 through 7) – The selected remedy for OU2 is protective of human health and the environment. Exposure pathways that could result in unacceptable risk are controlled through maintenance of the soil cover (as warranted), enforcement of LUCs, and access restrictions (locked fence). LUCs have been imposed to prevent residential land use at the site and the Navy adheres to LUC-related procedures pertaining to ground-disturbing activity and changes in land use. LUC objectives are annotated in the Navy GIS database and real estate summary map for the installation.

Anticipated Timeframe to Complete Recommendations and Follow-up Actions:

- Site 17 (OU4) – 2019
- Site 10 (OU6) – 2018
- OU 2 (Soil at Sites 3 through 6) – Not Applicable

Other Comments:

None

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Acronyms and Abbreviations

ABM	abrasive blast material
ARAR	applicable or relevant and appropriate requirements
ARF	Administrative Record File
BERA	Baseline Ecological Risk Assessment
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIA	Controlled Industrial Area
CLEAN	Comprehensive Long-term Environmental Action—Navy
COC	constituent of concern
CTO	Contract Task Order
°F	degrees Fahrenheit
DoD	Department of Defense
EE/CA	Engineering Evaluation/Cost Analysis
ER	Environmental Restoration
ERA	Ecological Risk Assessment
ERP	Environmental Restoration Program
FFA	Federal Facilities Agreement
FFS	Focused Feasibility Study
FS	Feasibility Study
ft/day	feet per day
ft/ft	feet per foot
HHRA	Human Health Risk Assessment
HI	hazard index
HRS	Hazard Ranking System
IAS	Initial Assessment Study
IRI	Interim Remedial Investigation
IRP	Installation Restoration Program
LEL	lower explosive limit
LTM	long-term monitoring
LUC	land use control
msl	mean sea level
NACIP	Navy Assessment and Control of Installation Pollutants
NAVFAC	Naval Facilities Engineering Command
Navy	Department of the Navy
NCP	National Contingency Plan
NFA	no further action
NNSY	Norfolk Naval Shipyard
NPL	National Priorities List
NTCRA	Non-Time-Critical Removal Action
ORA	Oil Reclamation Area
OU	Operable Unit

OWS	oil-water separator
PA	Preliminary Assessment
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCP	pentachlorophenol
PMT	Project Management Team
POL	petroleum, oil, and lubricants
PP	Proposed Plan
RAB	Restoration Advisory Board
RACR	Remedial Action Completion Report
RAO	Remedial Action Objective
RBC	risk-based screening criteria
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RFA	RCRA Facility Assessment
RFA-S	Supplement to Interim Final RFA
RI	Remedial Investigation
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SI	Site Investigation
SMP	Site Management Plan
SSP	Site Screening Process
SVOC	semivolatile organic compound
SWMU	solid waste management unit
TPH	total petroleum hydrocarbon
USCS	Unified Soil Classification System
USEPA	United States Environmental Protection Agency
UST	underground storage tank
VDEQ	Virginia Department of Environmental Quality
VOC	volatile organic compound

SECTION 1

Introduction

The Department of the Navy (Navy) conducted this Five-year Review for Norfolk Naval Shipyard (NNSY) in Portsmouth, Virginia, as required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) in accordance with CERCLA §121(c), as amended, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), Part 300.430(f)(4)(ii) of the Code of Federal Regulations (CFR). This report has been prepared in accordance with the United States Environmental Protection Agency (USEPA) *Comprehensive Five-Year Review Guidance* (USEPA, 2001), as amended, and summarizes the evaluation of remedies and Remedial Actions (RAs) that resulted in hazardous substances, pollutants, or contaminants remaining at sites above levels that allow for unlimited use and unrestricted exposure (UU/UE), and for which there is a Record of Decision (ROD) or Decision Document (DD) in place. The NNSY sites included in this Five-Year Review Report are listed below and shown on **Figure 1-1**.

- Site 17 (USEPA OU4)—Building 195 Plating Shop
- Site 10 (USEPA OU6)—1927 Landfill
- OU2 (soils) (USEPA OU2)—Paradise Creek Disposal Area
 - Site 3—Sanitary Landfill (High Dump)
 - Site 4—Chemical Holding Ponds
 - Site 5—Oil Reclamation Area
 - Site 6—East Dump

No action RODs were signed for two sites:

- Site 2 (USEPA OU1), Scott Center Landfill, signed October 2005
- Site 7, Bermed Chemical Pits, no action documentation contained within the OU2 (Soils) ROD signed May 2010

No hazardous substances, pollutants, or contaminants remain at Sites 2 and 7 above levels that prevent unlimited use and unrestricted exposure. Therefore, Five-Year Reviews are not required for Sites 2 and 7.

Two OUs have been addressed to date by removal actions; Site 1 (USEPA OU5), Former New Gosport Landfill, was addressed by a Non-Time-Critical Removal Action (NTCRA) completed in June 2001 and documented in a Decision Document (DD) (July 2004); Site 9 (USEPA OU3), Former Acetylene Waste Lagoon, was addressed by an NTCRA completed in November 2003 and documented in a DD (May 2004). Sites 1 and 9 were included in the Federal Facilities Agreement (FFA) signed by the Navy, USEPA, and VDEQ as no further action (NFA) sites (**Appendix C**).

Additionally, the NNSY FFA includes a list of 152 other previously investigated sites for which NFA under CERCLA is required (USEPA/Navy, 2004).

The objective of this Five-year Review is to evaluate current remedies at Site 17, Site 10, and OU 2 and determine whether the remedies are protective of human health and the environment in accordance with the requirements established in the RODs and preceding DDs (where applicable). The principal method used to evaluate the protectiveness of the remedies was a thorough review of reports, analytical data, and documents pertaining to site activities and findings. The methods, findings, and conclusions from the document reviews are presented in this Five-year Review. In addition, the objective of this report is to ensure all remedies are functioning as intended and identify any issues that may prevent a particular remedy from functioning as designed. As noted in this document, all remedies addressed in this FYR are functioning as intended and are protective.

This Five-year Review was prepared pursuant to CERCLA §121 and NCP requirements. A Five-year Review is required 5 years from the initiation of the first RA that leaves hazardous substances, pollutants, or contaminants remaining at sites above levels that allow for UU/UE. If a site contains multiple RODs, all remedies implemented in accordance with the RODs are subject to a Five-year Review when at least one remedy is triggered. NNSY has

elected to follow Navy recommendations of conducting an installation-wide Five-year Review that includes all sites RODs and with remedies in place with the Five-year trigger date based on the remedy initiation trigger date for the first ROD and remedy implementation.

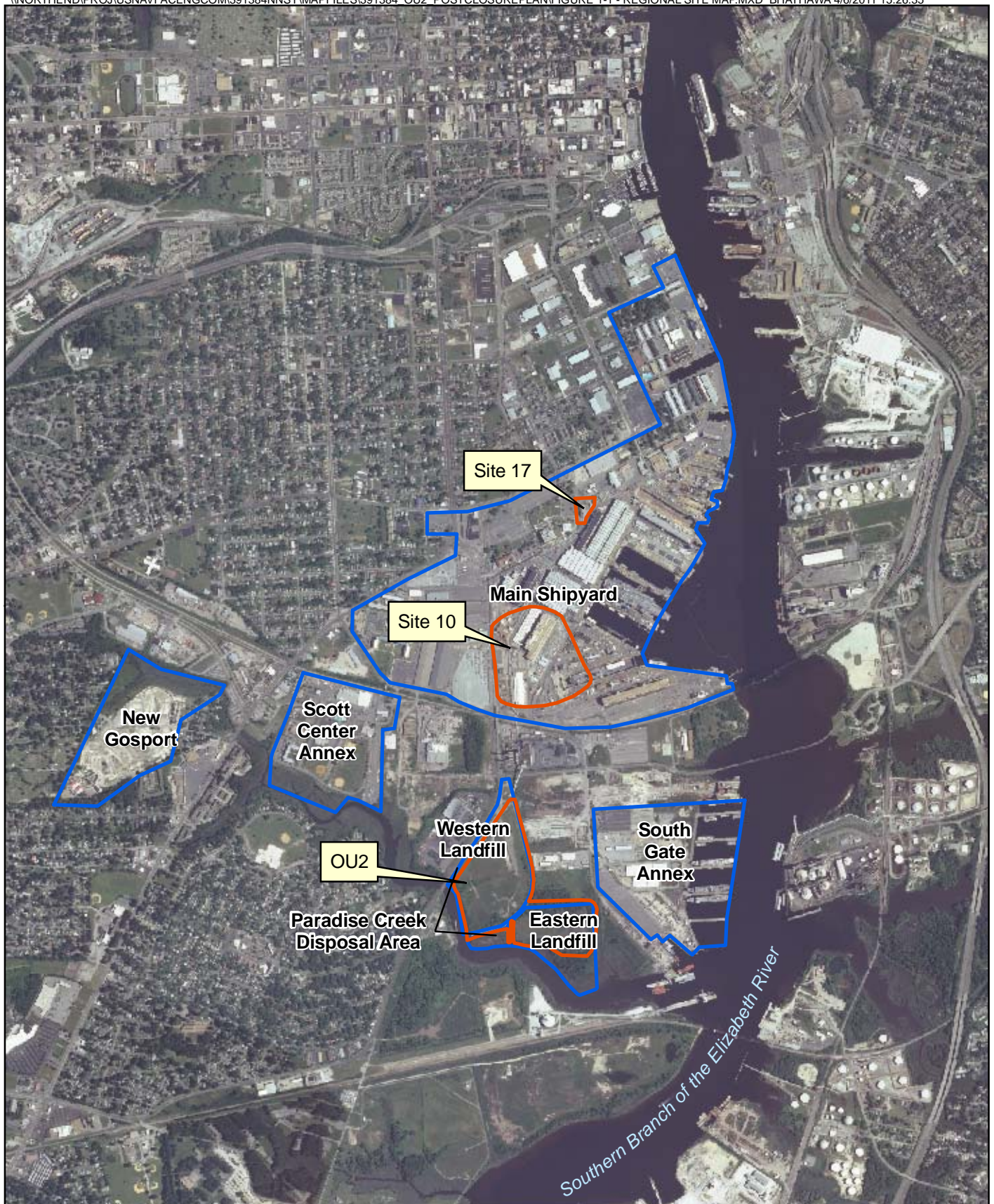
This Five-year Review was prepared pursuant to CERCLA 121 and the NCP. CERCLA 121 states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

USEPA interpreted this requirement further in the NCP; 40 CFR 300.430 (f)(4)(ii), which states:

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

The triggering action of the statutory review process is signature of the Site 17 ROD in August 2006 by the Navy (Navy, 2006b). The first Five-Year Review Report was finalized in August 2011 (CH2M HILL, 2011). This second Five-year review is required because hazardous contaminants remain at sites at NNSY above levels that allow for UU/UE.



Legend

- Site Boundary
- Norfolk Naval Shipyard



0 1,000 2,000
Feet

Figure 1-1
Regional Site Map
Norfolk Naval Shipyard
Portsmouth, Virginia

Facility Background and History

2.1 Facility Description

NNSY is located along the Southern Branch of the Elizabeth River in Portsmouth, Virginia (**Figure 1-1**). The NNSY is the oldest continuously operated shipyard in the United States, with origins dating back to 1767 when it was a merchant shipyard under British rule. During the American Revolution in 1775, the Shipyard was confiscated by the Commonwealth of Virginia. In 1801, the Shipyard was purchased by the federal government.

After World War II, NNSY became primarily an overhaul and repair facility. NNSY has remained such to this day. The facility's current mission is to provide logistic support for assigned ships and service craft; perform authorized work in connection with construction, conversion, overhaul, repair, alteration, dry docking, and outfitting of ships and other watercraft; perform manufacturing, research, development, and test work; and provide services and material to other activities and units. The Navy is the lead agency under CERCLA and provides funding for site remediation. NNSY (USEPA ID# VA1170024813) was placed on USEPA's National Priorities List (NPL) on July 22, 1999. NNSY was included under the Federal Facilities section of the NPL in which federal agencies are considered responsible for conducting response actions at the facilities under their jurisdiction. An FFA between USEPA Region III, VDEQ, and NNSY was finalized in September 2004 (USEPA/Navy, 2004). USEPA and VDEQ oversee the Navy's management and cleanup of the ERP sites and former solid waste management units (SWMUs) at NNSY. NNSY properties listed in the National Priorities List include five non-contiguous parcels of land: the Main Shipyard, Southgate Annex, Scott Center Annex, former New Gosport Landfill, and the Paradise Creek Disposal Area.

The present shipyard and the nearby Navy-owned non-contiguous areas include the following (**Figure 1-1**):

- **Main Shipyard**—533 acres of waterfront ship repair facilities (dry docks, wet slips, berths, etc.), a Controlled Industrial Area, public works, administration and supply facilities, housing, medical facilities, and personnel and community support services.
- **Southgate Annex**—63 acres used primarily for storage.
- **Scott Center Annex**—a 63-acre recreational complex for NNSY personnel. The former Scott Center Landfill was remediated in 2005 with the removal of waste and the creation of sustainable tidal wetlands.
- **Paradise Creek Disposal Area**—91-acre hydraulic fill area formerly used for landfilling, solid waste disposal, and petroleum reclamation (storage of petroleum products and the maintenance and storage of waste-handling vehicles and equipment). A soil cover was installed in 2010 over the entire Paradise Creek landfill boundary (access is controlled with a chain-link fence) and low lying areas have been restored to tidal wetland areas or have stabilized slopes along Paradise Creek.
- **New Gosport**—57-acre military housing area; an area immediately to the north is the former New Gosport Landfill, which was remediated in 2001 with the removal of waste and the creation of sustainable tidal wetlands.

2.1.1 Physical Characteristics

NNSY lies within the Atlantic Coastal Plain Physiographic Province. The topography at NNSY is relatively flat, which is typical in the Tidewater Region of Virginia. Land surface elevations at NNSY range from sea level to approximately 20 feet above mean sea level (msl). Most of the high areas of the NNSY are manmade and underlain by a variety of fill materials used to reclaim land.

NNSY is situated on the outer part of the Atlantic Coastal Plain, which is characterized by unconsolidated sediments several thousand feet in thickness (Water and Air Research, Inc. 1983). The upper most geologic formations consist of alluvial, colluvial, and marsh deposits which are composed of silt, sand, and pebbles with some clay. The aquifers and confining/ semiconfining units relevant to CERCLA investigations at NNSY are, from

youngest to oldest: the Columbia aquifer, Yorktown confining unit, and the Yorktown-Eastover aquifer. Groundwater flow directions for the aquifers are controlled by topography and surface water bodies with the primary discharge direction being east and south towards the Southern Branch of the Elizabeth River and Paradise Creek.

The Tidewater Region is characterized by long, temperate summers and mild winters. The average annual temperature is 60.7 degrees Fahrenheit (°F) with average monthly temperatures ranging from 43.1°F in January to 78.7 °F in July. Precipitation averages 43 inches annually and is distributed evenly over the year. Winds are generally easterly and range from 6 to 11 knots.

2.1.2 Land and Resource Use

The main portion of the shipyard includes more than 100 buildings, five active dry docks, and three repair piers. Included within NNSY are the Controlled Industrial Area (CIA), public works, administration, supply facilities, housing, medical facilities, and personnel and community support facilities. Roadways and parking areas at the NNSY are primarily asphalt paved with some outlying areas gravel surfaced. Exposed ground surfaces are vegetated with introduced grasses, deciduous trees, and pine trees.

The current land use of the nearby Navy-owned non-contiguous areas are described in Section 2.1 and are not expected to change in the foreseeable future.

In southeastern Virginia, the Columbia aquifer may be utilized as a potable water source of domestic supply for watering lawns or filling swimming pools. However, groundwater in the Columbia aquifer has poor yield and is of poorer quality than the underlying Yorktown aquifer and is generally not utilized in the area. Throughout the eastern portion of the Coastal Plain, the Yorktown aquifer is used extensively for domestic and public water supply, as well as for industrial purposes.

There are surface water bodies adjacent to the NNSY and its annexes. The main surface water drainage receptors for NNSY are the Southern Branch of the Elizabeth River and Paradise Creek, which are used for commercial, industrial, and recreational purposes.

2.2 Environmental History

Comprehensive environmental restoration (ER) activities at NNSY began in 1983 under the Navy Assessment and Control of Installation Pollutants (NACIP) Program, termed the Installation Restoration Program (IRP) in 1986 when changed to reflect the requirements of CERCLA as amended by SARA. The purpose of the NACIP Program and IRP was to identify, assess, characterize, and cleanup or control contamination from past waste management activities at Navy and Marine Corps facilities.

Given the nature and extent of its operations, the Navy has been involved with toxic and hazardous materials for several decades at NNSY. The Department of Defense (DoD), as well as general industry, has realized that previously acceptable methods of disposal are no longer sufficient, and actions are being taken, through these programs, to clean up Navy sites that pose a threat to human health or the environment. Current Navy waste management operations are expected to comply with all federal, state, and Navy regulations to ensure safe operation and disposal of hazardous substances.

Various facility-wide studies and detailed investigations have been completed at the NNSY since 1983 in response to the Navy's ERP. PAs conducted to identify and assess sites posing a potential threat to human health or the environment resulting from past or current operations or waste management activities have included:

- Initial Assessment Study (IAS) (Water and Air Research, 1983)
- Phase I Interim Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) (NUS Corporation, 1986)
- Supplement to Interim Final RFA (RFA-S) (A. T. Kearney, 1987)
- Aerial Photographic Site Analysis (EPIC Study) (USEPA, 1994)

A total of 218 potentially contaminated sites, areas, or SWMUs at NNSY were identified for evaluation in the IAS, RFA, RFA-S, EPIC Study, and/or other NNSY assessments. Due to the inconsistent numbering and nomenclature of the 218 units in these reports, the PMT developed a correlation to group these units into discrete and individual areas of potential contamination that were actually identified for evaluation. This correlation showed that there are a total of 163 potentially contaminated areas at NNSY. **Table 2-1** provides the correlated listing of NNSY sites, SWMUs, and areas of concern.

Some of the investigations included multiple sites and were not focused on a specific site assessment. These major investigations included:

- Interim Remedial Investigation (IRI) (IT Corp., 1989)
- Site Screening Assessment (Baker, 1999b)
- Basewide Background Investigation (CH2M HILL, 2002a)
- Paradise Creek Ecological Risk Assessment (ERA) (CH2M HILL, 2001)

The details and results of these investigations, along with site-specific investigations, are summarized in previous versions of the Site Management Plan (SMP), most recently the Site Management Plan, Fiscal Year 2016 (CH2M HILL, 2016). A list of the previous investigations conducted, by individual ERP site, along with the current site status, is provided in each annual SMP.

On March 6, 1998, the USEPA proposed that NNSY be added to the National Priorities List (NPL). The USEPA evaluates industrial sites using the Hazard Ranking System (HRS), and those facilities with HRS scores exceeding 28.5 are proposed for the NPL. A HRS score of 70 was assigned by the USEPA to NNSY. The proposed listing was followed by a 60-day review and comment period prior to NNSY's inclusion on the NPL on July 22, 1999. An FFA between USEPA Region III, VDEQ, and NNSY was finalized in September 2004 (USEPA/Navy, 2004).

TABLE 2-1
Site Status Summary
Norfolk Naval Shipyard
Portsmouth, Virginia

Site ID	IAS Site #	RFA-SWMU #	RFA-S-SWMU #	EPIC Study Site ID	Other AOCs	OU #	FFA Status	Building #	Name / Description	Location	Study Area Location	Active Unit	SSA Visit 1998 (Baker)	Assoc. Storm Drains	Env. Program	Program Documentation	Project Management Team Comments
Site 17	17	17	2-21			4	Findings of Fact-Site 17	195	Outside WAA (sumps & tanks)	Bldg. 195	Bldg. 236 /IR Site 17	Yes	No		IR Site	Inspection Log & correspondence IR Program files	This area was a coal pile for a power plant and is the area around Building 195 plating shop. The area was last used for coal storage in 1966. Bldg 195 is an active RCRA site. RFA recommended verifying integrity of piping. The site was evaluated as part of an RI/FS. ROD signed August 2006.
Site 3	3	3	3-03			2 (soil); 7 (groundwater)	Findings of Fact-Site 03		High Dump Sanitary Landfill; Paradise Creek Disposal Area	Adjacent to Southgate	Paradise Creek IR Site 3 Area	No	No		IR Site	IR Program	Under IR Program, RI/FS conducted. PP for soil finalized, ROD (soil) completed May 2010. Groundwater currently in RI/FS stage.
Site 3		30	3-04			2 (soil); 7 (groundwater)	Findings of Fact-Site 03		Temporary Waste Piles	Paradise Creek Area	Paradise Creek IR Site 3 Area	No	Yes		IR Site	IR Program	Temporary waste piles ABM dirt & concrete, waste removed 1986, area graded and covered with fill from power plant excavation, area covered under IR Program, Site 5. PP for soil finalized. ROD (soil) completed May 2010. Groundwater currently in RI/FS stage.
Site 3		22	3-05			2 (soil); 7 (groundwater)	Findings of Fact-Site 03	431	Old Incinerator	Bldg. 431	Paradise Creek IR Site 3 Area	No	Yes		IR Site	IR Program	Operated 1943-1947, bldg and incinerator have been demolished and removed, RFA recommended NFA, site is in area of Site 3 IR Program RI/FS
Site 4	4	4	3-14			2 (soil); 7 (groundwater)	Findings of Fact-Site 04		Chemical Waste Pits	Oil Reclamation Area	Oil Reclamation area of Paradise Creek IR Site 3	No	No		IR Site	IR Program	Inactive unit, site is in area of Site 3 IR Program RI/FS Paradise Creek Disposal Area. PP for soil finalized, ROD (soil) completed May 2010. Groundwater currently in RI/FS stage.
Site 5		31	3-09			2 (soil); 7 (groundwater)	Findings of Fact-Site 05		Fillport/Concrete Pad	Oil Reclamation Area	Oil Reclamation area of Paradise Creek IR Site 3	Yes	No		IR Site	IR Program	Inactive unit, site is Site 5 in area of Site 3 IR Program RI/FS Paradise Creek Disposal Area. PP for soil finalized, ROD (soil) completed May 2010. Groundwater currently in RI/FS stage.
Site 5			3-10			2 (soil); 7 (groundwater)	Findings of Fact-Site 05		Waste Oil Storage Pads	Oil Reclamation Area	Oil Reclamation area of Paradise Creek IR Site 3	Yes	No		IR Site	IR Program	Inactive unit, site is in area of Site 3 IR Program RI/FS Paradise Creek Disposal Area. PP for soil finalized, ROD (soil) completed May 2010. Groundwater currently in RI/FS stage.
Site 5	5	5	3-11			2 (soil); 7 (groundwater)	Findings of Fact-Site 05		Underground Storage Tank	Oil Reclamation Area	Oil Reclamation area of Paradise Creek IR Site 3	No	No		IR Site	IR Program	Inactive unit, site is in area of Site 3 IR Program Paradise Creek Disposal Area. PP for soil finalized, ROD (soil) completed May 2010. Groundwater currently in RI/FS stage.
Site 5		32	3-12			2 (soil); 7 (groundwater)	Findings of Fact-Site 05		Temporary Storage Pad for Freon	Oil Reclamation Area	Oil Reclamation area of Paradise Creek IR Site 3	No	Yes		IR Site	IR Program	Inactive unit, site is in area of Site 3 IR Program RI/FS, Paradise Creek Disposal Area. PP for soil finalized, ROD (soil) completed May 2010. Groundwater currently in RI/FS stage..
Site 5			3-13			2 (soil); 7 (groundwater)	Findings of Fact-Site 05	431	Oil/Water Separator	Oil Reclamation Area	Oil Reclamation area of Paradise Creek IR Site 3	No	No		IR Site	IR Program	Inactive unit, site is in area of Site 3 IR Program RI/FS Paradise Creek Disposal Area. PP for soil finalized, ROD (soil) completed May 2010. Groundwater currently in RI/FS stage.
Site 5			3-15			2 (soil); 7 (groundwater)	Findings of Fact-Site 05		Temporary Container Storage Shack	Oil Reclamation Area	Oil Reclamation area of Paradise Creek IR Site 3	No	Yes		IR Site	IR Program	Inactive unit, site is in area of Site 3 IR Program RI/FS Paradise Creek Disposal Area. PP for soil finalized, ROD (soil) completed May 2010. Groundwater currently in RI/FS stage.
Site 6	6	6	3-06			2 (soil); 7 (groundwater)	Findings of Fact-Site 06		East Dump	SE of Bldg. 431	Paradise Creek IR Site 3 Area	No	No		IR Site	IR Program	Inactive landfill, site is in area of Site 3 IR Program RI/FS Paradise Creek Disposal Area. PP for soil finalized, ROD (soil) completed May 2010. Groundwater currently in RI/FS stage.
Site 7	7	7	3-07			2	Findings of Fact-Site 07		Bermed Chemical Dump Site	Paradise Creek Area	Paradise Creek IR Site 3 Area	No	No		IR Site	IR Program	Inactive dump site, site is in area of Site 3 IR Program RI/FS Paradise Creek Disposal Area. PP for soil finalized, NFA ROD completed May 2010.
Site 10	10	10	2-17			6	Appendix A-Site 10		1927 Landfill	Near Bldgs. 260 and 510	1927 Landfill Area	No	Yes		CERCLA	RFA & SSA Reports	Review existing data assoc. with RCRA closure of SWMU 2-91& EPIC study; SSP Investigation 2001concluded additional investigation was warranted. RI/HHRA/FFS finalized May 2006. ROD signed September 2008.
There are No Appendix B Sites Identified for Desktop Review.							Appendix B					Yes	No	Yes			
Site 1	1	1	3-01			5	Appendix C-NFA Site 01		Former New Gosport Landfill	Adjacent to Former New Gosport housing and Paradise Creek	Paradise Creek	No	Yes		IR Site 1	LANTDIV IR Site (8/99)	Site Investigation and waste delineation study in 2000. Removal action in 2001. Project Management Team consensus for NFA June 2004. Site Closeout Document July 2004.
Site 2	2	2	3-02			1	Appendix C-NFA Site 02		Scott Center Landfill	South of Scott Center	Scott Center	No	No		IR Site	IR Program	Site Closeout via no further action ROD October 2005.
Site 9	9		3-16			3	Appendix C-NFA Site 09		Acetylene Waste Lagoon	Southgate Annex	Southgate Annex	No	No		IR Site	IR Program	Former calcium hydroxide area delineated in 1996 and 2001, removal actions and wetlands creation for site restoration conducted in 2003. Site Closeout Document for NFA May 2004.
Site 15	15						Appendix A - Site 15		Past Pier Side Maintenance Operations	Eastern boundary of NNSY	Piers and wharfs along NNSY waterfront	No	No	Yes			Feb 01 1999 PMT meeting added AOC to the list. Consensus April 01 1999 mtg for further review. Desktop review June 2004, PMT consensus for Appendix A investigation. Final Preliminary Assessment submitted December 2006. PMT consensus for NFA December 2006.
SWMU 4			2-52				Appendix C- NFA	174	Soot Hopper	NW of Bldg. 174	Bldg 174	No	No		CERCLA	RFA & SSA Reports	Inactive, Soot Hopper and boilers were removed in 1993-1994, RFA noted potential for release if soot is hazardous, staining evident 1987 RFA indicated further research for the site was warranted. June 2004 DEQ and NNSY site visit. Desktop review June 2004 PMT meeting and consensus for NFA based on site history, current site conditions (paved parking), and June 2004 site visit.

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SWMU 5			2-7A				Appendix C- NFA	202	Shop 56, Caustic Cleaning Area	SW side of Bldg. 202	Bldg 202	Yes	No	Yes	RCRA, Clean Water Act, and Clean Air Act	Title V Permit, VPDES	RFA recommended sampling, Title V Permit, facility re-done, new concrete, excavation removed tanks. Piping in floor drains to IWTP, active site managed under Clean Air, Clean Water, and RCRA. DEQ & NNSY Site visit June 2004 and no sign of release. Desktop review June 2004 PMT meeting and consensus for NFA.
SWMU 6				DSA-E			Appendix C- NFA		Operated 1971-1980 storage area	Grass border of Elm Ave	1941 Ldf/ RDF Plant/SPSA	No	Yes		CERCLA	RFA & SSA Reports & Epic Study	Currently concrete sidewalks and asphalt roads, area is former salvage yard, Review SPSA EBS report. Desktop review June 2004 PMT meeting and consensus for NFA based on current site conditions and June 2004 site visit.
SWMU 7					AOC 04		Appendix C- NFA		PCB Storage	Southgate Annex Bldg 381	Southgate Annex	No	Yes		CERCLA	RFA & SSA Reports,	PCB storage from Annual Inventory of PCBs 7/7/80 (Askeral mineral oil storage for transformers), This building is no longer present, based on employee interviews the site was out of service 1984/1985 and no recollection of spills. All contents removed prior to 1984 demo. PCB inventory reports note "liquid level "N"" indication no PCB oils present. Concrete floor still present, now fenced storage piping, RR ties, tires, batteries. Desktop review June 2004 PMT meeting and consensus for NFA.
SWMU 8					AOC 07		Appendix C- NFA		Facility Storm Sewer	Throughout NNSY	NNSY	Yes	No		Clean Water Act, VPDES, CERCLA	RFA & SSA Reports,	Active storm sewers, Managed under Clean Water Act and monitoring by VPDES with monthly discharge reporting to DEQ. Dye testing of storm water system preformed in March 2004. Updated drawings of system in July 2004. No non-compliance reports. Desktop review June 2004 PMT meeting and consensus for NFA.
SWMU 9			2-92				Appendix C- NFA		Industrial Waste Piping System (input to IWTP)	Various locations	NNSY	Yes	No		Clean Water Act, VPDES, CERCLA	RFA & SSA Reports	Piping from Bldgs. 163, 171, 172, 202, 234, 268 & 510. Piping should be investigated per 5/99 SSA mtg, review controls for leak detection, Investigate waste handling (Aug 99) - waste stream constituents identified, Preventative maintenance requires annual inspection, visual inspection conducted on exposed parts of piping. Pumping station inspected 3 x/day, periodic hydrostatic testing of system, piping is double walled and volumes monitored. Desktop review June 2004. Consensus June 2004 PMT meeting for NFA.
Site 8	8	8	2-15				Appendix C- NFA		1941 Landfill	SW of Bldg. 1545	1941 Ldf/ RDF Plant/SPSA	No	Yes		CERCLA	RFA & SSA Reports	Reviewed EBS report, use existing data, EPA toxicologist review risk, FAR needed in a streamlined RA/FS process. For purpose of SSA no additional investigation needed, (NFA Consensus for SSA). Consensus for NFA April 01 mtg
Site 11	11	11	2-01A				Appendix C- NFA		Old Gantry Pickling Tanks	South end of Bldg. 202	Bldg 202	No	No		CERCLA	RFA & SSA Reports	Inactive unit` site has been removed, review site report, Refer to Conclusions, Section 3.3 of the Final HW Permit, 3/21/98. RFA recommended NFA, NFA consensus at August 99 SSA Mtg.
Site 12	12	12					Appendix C- NFA	510	Pickling Tanks Building 510	Building 510		Yes	No			IAS and SSA Reports	Currently concrete sidewalks and asphalt roads, area is former salvage yard, Reviewed EBS report, use existing data, consensus NFA
Site 13	13	13	2-03A				Appendix C- NFA	369	Pickling Tanks	Bldg. 369	Bldg 369 Area	No	No		CERCLA	RFA & SSA Reports	Inactive unit site has been removed, need to obtain site report, RFA recommended NFA, NFA consensus at August 99 SSA Mtg.
Site 14	14	14	2-02A				Appendix C- NFA		PCB Spill, Berth 42	West end of Bldg. 369	Bldg 369 Area	No	Yes		CERCLA	RFA & SSA Reports	PCB spill 1979, pavement and soil removed, new asphalt in area, review soil removal documentation, consensus to NFA soils at 5/99 99 SSA Mtg., cross reference with Bldg 369 area where groundwater sampling is proposed, NFA consensus at August 99 SSA Mtg.
Site 16	16	16					Appendix C- NFA	202	Pickling Tanks Building 202	Building 201		Yes	No			IAS and SSA Reports	NFA Consensus April 1999.
Site 18	18	18					Appendix C- NFA		1914 Landfill	SE of Bldg. 163		No	No				NFA Consensus April 1999
Site 19	19	19	3-08				Appendix C- NFA		1942-54 Landfill	SPSA Area	SPSA Area South	No	Yes		IR Site	IR Program	Inactive landfill, extensive excavation during construction of SPSA, , existing wells in area, review EBS report, April 01 PA- ICs in place with property under SPSA consider NFA RODs if LUCAP implemented first,. Consensus for NFA April 01 mtg
Site 20			2-46				Appendix C- NFA	236	Shop 02, WAA	West of Bldg. 236	SSP Bldg. 236 area; Bldg. 236 /IR Site 17	No	Yes		CERCLA	RFA & SSA Reports	Previous < 90 day accumulation point for drums. Inactive unit, area is sandy soil/gravel, in area of bldg 236 where existing data review and additional sampling was conducted as Part of 2001 SSP Investigation of Bldg 236 area. NFA consensus July 2003 based on risk screening and absence of CERCLA release
Site 20			2-48				Appendix C- NFA	236	Underground Oil Water Separator Tank	SW corner of Bldg. 236	Bldg. 236 /IR Site 17	No	Yes	Sanitary Sewer	CERCLA	RFA & SSA Reports	Inactive unit, concrete below ground o/w separator, RFA recommended investigating integrity of oil water separator, research NCAP for site information. Part of 2001 SSP Investigation of Bldg 236 area, NFA consensus July 2003 based on risk screening and absence of CERCLA release

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Site 21			2-59				Appendix C- NFA	369	Hydraulic Fluid Drums Collection Area	East of Bldg. 369	Bldg 369 Area	No	Yes		CERCLA	RFA & SSA Reports	Inactive drum storage on pallets on paved surface, now a fenced nuclear area, part of bldg 369 area with proposed soil sampling and well installation, MILCON in the area. Part of 2001 SSP Investigation of Bldg. 369 area. NFA consensus July 2003 based on risk screening and absence of CERCLA release
Site 21			2-86				Appendix C- NFA	369	Drum Holding Area	SE corner of Bldg. 369	Bldg 369 Area	No	Yes		CERCLA	RFA & SSA Reports	Inactive drum storage on pallets on pavement, some drums were noted to be in poor condition in 1987, now a fenced nuclear area, part of bldg 369 area with proposed soil sampling and well installation. Part of 2001 SSP Investigation of Bldg. 369 area. NFA consensus July 2003 based on risk screening and absence of CERCLA release
SWMU 10		21	2-18				Appendix C- NFA	166	Old Incinerator	Bldg. 166	Bldg. 184 Area	No	Yes		CERCLA	RFA & SSA Reports	Bldg 166 demo 1951, now concrete/asphalt parking. RFA recommended. researching data on wastes managed. Site is nearby MILCON (AOC3) and Site 10. Included in 2001 SSP investigation of 1927 Landfill . NFA consensus July 2003 based on risk screening and absence of CERCLA release, groundwater will be addressed as part of Site 10
SWMU 11		23	2-27				Appendix C- NFA	1460	Salvage Fuel Boiler Plant & the Refuse Transfer Station	Bldg. 1460	Bldg 212 & 1460, W of 1927 Ldf.	Boiler-No/ Refuse-Yes	Yes		Solid Waste/PWC	PWC	Site visit 5/99, concrete containment area (former AST) . Site in State Permit process, NFA consensus at Sept 99 SSA Mtg
SWMU 12		24	2-62				Appendix C- NFA	202	Shop 56, Freon Recovery Still	Bldg. 202	Bldg 202	Yes	No		RCRA	Inspection Log	Inactive under RCRA, no RCRA closure, RFA recommended NFA, NFA consensus at August 99 SSA Mtg.
SWMU 13		25	2-32				Appendix C- NFA	1499	Paint Room/Solvent Recovery Still	Bldg. 1499	Bldg 1499	No	Yes		CERCLA	RFA & SSA Reports	Inactive unit 1995, 1998 site visit, asphalt area, no evidence of release, NFA consensus at Sept 99 SSA Mtg
SWMU 15		26	2-73				Appendix C- NFA	1485	IWTP Cyanide Pretreatment Tank	Fac. 1485	IWTP Fac. 1485	No	No		Clean Water Act	NPDES Permit	Active IWTP, operated under Clean Water Act, IWTP in area of Bldg 236 and IR Site 17, Air emissions, NFA consensus at August 99 SSA Mtg.
SWMU 16		26	2-74				Appendix C- NFA	1485	IWTP Chromium Pretreatment Tank	Fac. 1485	IWTP Fac. 1485	Yes	No		Clean Water Act	NPDES Permit	Active IWTP, operated under Clean Water Act, IWTP in area of Bldg 236 and IR Site 17, RFA recommended NFA, NFA consensus at August 99 SSA Mtg.
SWMU 17		26	2-75				Appendix C- NFA	1485	IWTP Primary Reaction Tank	Fac. 1485	IWTP Fac. 1485	Yes	No		Clean Water Act	NPDES Permit	Active IWTP, operated under Clean Water Act, IWTP in area of Bldg 236 and IR Site 17, RFA recommended NFA, NFA consensus at August 99 SSA Mtg.
SWMU 18		26	2-76				Appendix C- NFA	1485	IWTP Primary Clarifier Tank	Fac. 1485	IWTP Fac. 1485	Yes	No		Clean Water Act	NPDES Permit	Active IWTP, operated under Clean Water Act, IWTP in area of Bldg 236 and IR Site 17, RFA recommended NFA, NFA consensus at August 99 SSA Mtg.
SWMU 19		26	2-77				Appendix C- NFA	1485	IWTP Primary Clarifier Effluent Sump	Fac. 1485	IWTP Fac. 1485	Yes	No		Clean Water Act	NPDES Permit	Active IWTP, operated under Clean Water Act, IWTP in area of Bldg 236 and IR Site 17, RFA recommended NFA, NFA consensus at August 99 SSA Mtg.
SWMU 20		26	2-78				Appendix C- NFA	1485	IWTP Oily Waste Scum Tank	Fac. 1485	IWTP Fac. 1485	Yes	No		Clean Water Act	NPDES Permit	Active IWTP, operated under Clean Water Act, IWTP in area of Bldg 236 and IR Site 17, RFA recommended NFA NFA consensus at August 99 SSA Mtg.
SWMU 21		26	2-79				Appendix C- NFA	1485	IWTP Oily Waste Holding Tank	Fac. 1485	IWTP Fac. 1485	Yes	No		Clean Water Act	NPDES Permit	Active IWTP, operated under Clean Water Act, IWTP in area of Bldg 236 and IR Site 17, RFA recommended NFA, NFA consensus at August 99 SSA Mtg.
SWMU 22		26	2-80				Appendix C- NFA	1485	IWTP Initial pH Adjustment Tank	Fac. 1485	IWTP Fac. 1485	Yes	No		Clean Water Act	NPDES Permit	Active IWTP, operated under Clean Water Act, IWTP in area of Bldg 236 and IR Site 17, RFA recommended NFA, NFA consensus at August 99 SSA Mtg.
SWMU 23		26	2-81				Appendix C- NFA	1485	IWTP Thickener Tank	Fac. 1485	IWTP Fac. 1485	Yes	No		Clean Water Act	NPDES Permit	Active IWTP, operated under Clean Water Act, IWTP in area of Bldg 236 and IR Site 17, RFA recommended NFA, NFA consensus at August 99 SSA Mtg.
SWMU 24		26	2-82				Appendix C- NFA	1485	IWTP Final pH Adjustment Tank	Fac. 1485	IWTP Fac. 1485	Yes	No		Clean Water Act	NPDES Permit	Active IWTP, operated under Clean Water Act, IWTP in area of Bldg 236 and IR Site 17, RFA recommended NFA, NFA consensus at August 99 SSA Mtg.
SWMU 25		26	2-83				Appendix C- NFA	1485	IWTP Sludge Conditioner Tank	Fac. 1485	IWTP Fac. 1485	Yes	No		Clean Water Act	NPDES Permit	Active IWTP, operated under Clean Water Act, IWTP in area of Bldg 236 and IR Site 17, RFA recommended NFA, NFA consensus at August 99 SSA Mtg.
SWMU 26		26	2-84				Appendix C- NFA	1485	IWTP Sludge Drying and Loading Area	Fac. 1485	IWTP Fac. 1485	Yes	No		Clean Water Act	NPDES Permit	Active IWTP, operated under Clean Water Act, IWTP in area of Bldg 236 and IR Site 17, RFA recommended NFA, NFA consensus at August 99 SSA Mtg.
SWMU 27		27	2-55				Appendix C- NFA	291	Old Transformer Storage Bldg.	Inside Bldg. 291	Bldg 291	No	Yes		CERCLA	RFA & SSA Reports	Transformers containing PCBs were stored within this building and disposed of through DRMO Inactive unit, concrete floor, RFA recommended NFA, site visit 5/99, NFA consensus at April 99 SSA Mtg.
SWMU 28		28	2-06				Appendix C- NFA	79	Old Transformer Storage Building	Bldg. 79	S of Bldg 74	No	Yes		CERCLA	RFA & SSA Reports	NFA consensus at April 99 SSA Mtg.
SWMU 29		29	2-85				Appendix C- NFA	1512	RCRA Interim Status Hazardous Waste Drum Storage Shed	Bldg 1512	Bldg. 236 /IR Site 17	No/C	Yes		RCRA	Closure Reports	RCRA closure, site inactive, no evidence of release 1998 site visit, within area of Bldg 236 and IR Site 17 which is proposed for study, RFA recommended NFA, NFA consensus at August 99 SSA Mtg.

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SWMU 30		34	2-91				Appendix C- NFA	260	Drum Accumulation Area/Container Storage Slab	Bldg. 260	1927 Landfill Area	Yes/C	Yes	Yes	RCRA	Closure Reports	Asphalt drum storage, RCRA closure, cross reference with 1927 landfill , Also discussed in 3/21/98 VDEQ Final Hazardous Waste Permit. NFA consensus at Sept 99 SSA Mtg
SWMU 31			2-01				Appendix C- NFA	59	Shop 07 (PWC Maintenance), WAA	Inside Bldg. 59		Yes	No		RCRA	Inspection Log	NFA Consensus April 1999
SWMU 32			2-10				Appendix C- NFA	236	Shop 02, Forklift Shop WAA	West end of Bldg. 236	Bldg. 236 /IR Site 17	No	Yes	Yes	CERCLA	RFA & SSA Reports	Exact location in Bldg. 236 unknown, site visit ('87) stained floor, site visit (5/99) no evidence of concern, research/document floor drains, cross reference with storm drains, NFA consensus at Sept 99 SSA Mtg.
SWMU 33			2-10A				Appendix C- NFA	2611	Fuel Tanks Leak/Spill Area	SE of Bldg. 261	Slip 3 / Davis Ave. Area	No	Yes		CERCLA	RFA & SSA Reports	Petroleum spill area, tanks removed, under UST program, SWMU removed as part of water front MILCON, Site visit 5/99 NFA consensus at August 99 SSA Mtg.
SWMU 34			2-11				Appendix C- NFA	236	Shop 02, Expended Battery Collection Point	Outside west end of Bldg. 236	Bldg. 236 /IR Site 17	No	Yes		CERCLA	RFA & SSA Reports	site visit (5/99) no evidence of concern, RFA recommended NFA, NFA consensus at April 99 SSA Mtg.
SWMU 35			2-11A				Appendix C- NFA		Sand Blast Residues	Various dock areas	NNSY	Yes	No		NNSY Env.	Industrial Process Instructions/ DEQ MOU	NNSY paved over most of facility, NFA consensus at August 99 SSA Mtg. Obtain documentation of sandblast use and summary of system - shrink wrap activity all water is contained - dry dock maintenance procedures, DEQ MOU
SWMU 36			2-12				Appendix C- NFA	236	Shop 02, Mobile Crane Shop (Code 900) WAA	Inside west end of Bldg. 236	Bldg. 236 /IR Site 17	Yes	Yes		CERCLA	RFA & SSA Reports	site visit (5/99) no evidence of concern. NFA consensus at April 99 SSA Mtg.
SWMU 37			2-13				Appendix C- NFA	236	Equipment Steam Cleaning Pads	West of Bldg. 236	Bldg. 236 /IR Site 17	No	Yes		CERCLA	RFA & SSA Reports	Discharge was into O/W separator and then to the sanitary sewer. The pads have been removed and the O/W separator could not be located. Site visit (5/99) no evidence of concern for soil exposure, NFA consensus at Sept 99 SSA Mtg. Also included in 2001 SSP for Bldg. 236 are with NFA consensus
SWMU 38			2-14				Appendix C- NFA	212	Battery Shop	Bldg. 212	Bldg 212 & 1460, W of 1927 Ldf.	No	Yes		CERCLA	RFA & SSA Reports	Bldg is being demolished, FONSI. NFA consensus at April 99 SSA Mtg.
SWMU 39			2-16				Appendix C- NFA		Chemical Lab Drum Accumulation Area	West side of Bldg. 184	Bldg. 184 Area	No	Yes		CERCLA	RFA & SSA Reports	5/99 site visit no signs of release, area concrete NFA consensus at April 99 SSA Mtg.
SWMU 40			2-19				Appendix C- NFA		Main Railcar Area	Near Bldg. 369	Bldg 369 Area	Yes	No		NA	Site operations	Active unit, staging area only, no transfer of materials, NFA consensus
SWMU 41			2-02				Appendix C- NFA		Tanker trailers for Collecting/Handling Industrial Wastes	Throughout NNSY	NSSY	Yes	No		RCRA	Inspection Log	NFA consensus at April 99 SSA Mtg.
SWMU 42			2-20				Appendix C- NFA		Concrete Bunker Storage House	Bldg. 1541	1941 Ldf/ RDF Plant/SPSA	No	Yes		CERCLA	RFA & SSA Reports	Previous temporary storage area. Review EBS report, use existing data, cross reference with 1941 Landfill, NFA consensus at Sept SSA mtg
SWMU 43			2-22				Appendix C- NFA	195	Spill Drum Accumulation Area	Corner of Bldg. 195	Bldg. 236 /IR Site 17	No	Yes		CERCLA	RFA & SSA Reports	This area was inside loading entrance shop 56, Pipe Shop, for accumulating drums. It was a temporary storage area Inactive WAA area bldg 195, vicinity of active RCRA site and IR Site 17, review existing IR 17 data, now concrete floor. NFA consensus at Sept 99 SSA Mtg
SWMU 44			2-23				Appendix C- NFA	195	Annex Chromic Acid Sump Area	Bldg. 195	Bldg. 236 /IR Site 17	Yes	No		CERCLA	9/2 NNSY Meeting	Side room extension. Active unit bldg 195, vicinity of IR Site 17, review existing IR 17 data, cross reference with SWMU 2-21, NFA consensus at Sept 99 SSA Mtg. SWMU 2-23 is handled under RCRA, surrounding soils are CERCLA
SWMU 45			2-24				Appendix C- NFA	195	Ventilation Scrubbers	Bldg. 195	Bldg. 236 /IR Site 17	Yes	No		Clean Air Act	Title V Permit	Located outside. Active unit bldg 195, vicinity of IR Site 17. NFA consensus at Sept 99 SSA Mtg
SWMU 46			2-25				Appendix C- NFA	195	Electroplating Containment Area	Bldg. 195	Bldg. 236 /IR Site 17	Yes	No		Clean Air Act	Title V Permit	Main plating shop. Active unit bldg 195, within current RCRA or IR Site 17. NFA consensus at Sept 99 SSA Mtg
SWMU 47			2-26				Appendix C- NFA		Drum/Railcar/Truck Transfer Operations	NNSY	NNSY	Yes	No	Yes	Some areas in RCRA	Inspection Log	Active operations, may be in RCRA, RFA addressed surface runoff control for rail cars. Activities addressed in NNSY Process Instructions for railcar transfers, NFA consensus at Sept 99 SSA Mtg
SWMU 48			2-28				Appendix C- NFA	260	Dumpster Area	West of Bldg. 260	Bldg 260	Yes	No	Yes	Solid Waste/PWC	PWC	Active units, dumpsters solid waste, NFA consensus at April 99 SSA Mtg.
SWMU 49			2-29				Appendix C- NFA	1499	Indoor Sandblasting Baghouses	Bldg. 1499	Bldg 1499	Yes	No		Clean Air Act	Title V Permit	Active unit, NFA consensus at Sept 99 SSA Mtg
SWMU 50			2-03				Appendix C- NFA		Waste Oil Boxes	Throughout NNSY	NNSY	Yes	No		RCRA	Inspection Log	NFA consensus at April 99 SSA Mtg.
SWMU 51			2-30				Appendix C- NFA	1499	Drum Accumulation Area for Sandblasting Dust	Bldg. 1499	Bldg 1499	No	Yes	Yes	RCRA	Inspection Log	Inactive under RCRA, no RCRA closure, NFA consensus at June 99 SSA Mtg.
SWMU 52			2-31				Appendix C- NFA	1499	Outdoor Baghouses	Bldg. 1499	Bldg 1499	No	Yes		CERCLA	RFA & SSA Reports	Inactive unit, NFA consensus at Sept 99 SSA Mtg
SWMU 53			2-33				Appendix C- NFA	1499	Drum Accumulation Area for Paint Waste	Outside of Bldg. 1499	Bldg 1499	No	Yes	Yes	CERCLA	RFA & SSA Reports	Inactive unit, concrete pad, DEQ close-out, NFA consensus at July mtg.
SWMU 54			2-34				Appendix C- NFA	1499	Steel Dust Vacuum Unit	Bldg. 1499	Bldg 1499	Yes	No		CERCLA	RFA & SSA Reports	Active unit, NFA consensus at July mtg. Document how disposal is regulated
SWMU 55			2-35				Appendix C- NFA	171	Inside Machine Shop (Shop 31)	Bldg. 171	Bldg 171/ Bldg 268 /Bldg 172	Yes	No		CERCLA	RFA & SSA Reports	Active unit, NFA consensus at July mtg.

TABLE 2-1
Site Status Summary
Norfolk Naval Shipyard
Portsmouth, Virginia

Site ID	IAS Site #	RFA-SWMU #	RFA-S-SWMU #	EPIC Study Site ID	Other AOCs	OU #	FFA Status	Building #	Name / Description	Location	Study Area Location	Active Unit	SSA Visit 1998 (Baker)	Assoc. Storm Drains	Env. Program	Program Documentation	Project Management Team Comments
SWMU 56			2-36				Appendix C- NFA	171	Storage Accumulation Area for Bldg. 171, Inside Machine Shop	Bldg. 171	Bldg 171/ Bldg 268 /Bldg 172	Yes	No		RCRA	Inspection Log	Active unit RFA recommended. Secondary containment, under RCRA program, NFA consensus at Sept 99 SSA Mtg. Site paved and drums in good condition, verify secondary containment
SWMU 57			2-37				Appendix C- NFA	268	Outside Machine Shop	West inside end of Bldg. 268	Bldg 171/ Bldg 268 /Bldg 172	No	Yes		CERCLA	RFA & SSA Reports	Inactive area, concrete floor in bldg, 1998 site visit no evidence of release, NFA consensus at July mtg.
SWMU 58			2-38				Appendix C- NFA	268	Outside Machine Shop Accumulation Area (Shop 38)	SW corner of Bldg. 268	Bldg 171/ Bldg 268 /Bldg 172	No	Yes		RCRA	Inspection Log	Inactive under RCRA, no RCRA closure, previous SSA (Satellite Storage Area - <90 day accumulation area for oils and corrosives), 1998 site visit no evidence of release, NFA consensus at Sept 99 SSA Mtg
SWMU 59			2-39				Appendix C- NFA	369	Woodcraft & Fiberglass Shop, Suction Hopper & Drum Staging Area	Bldg. 369	Bldg 369 Area	No	Yes		CERCLA	RFA & SSA Reports	Previous < 90 day accumulation point for drums. Inactive unit, NFA consensus at July 99 mtg.
SWMU 60			2-04				Appendix C- NFA		Shop 06, Temp. Drum Accumulation Point	East side of Bldg. 42	N of slip 1	No	Yes	Yes	CERCLA	RFA & SSA Reports	NFA consensus at April 99 SSA Mtg.
SWMU 61			2-40				Appendix C- NFA	369	Drum Accumulation Area (outside)	NW corner of Bldg. 369	Bldg 369 Area	No	Yes		CERCLA	RFA & SSA Reports	Inactive unit, asphalt area, NFA consensus at July 99 mtg.
SWMU 62			2-41				Appendix C- NFA	300	Drum Storage Area (DSA) Outside of Bldg. 300 Cage	West end of Bldg. 300	Bldg 300	No	Yes		CERCLA	RFA & SSA Reports	Inactive unit, RFA recommended NFA, now asphalt parking area, NFA consensus at July 99 mtg.
SWMU 63			2-42				Appendix C- NFA	300	Storage Annex	Bldg. 300	Bldg 300	No	Yes		CERCLA	RFA & SSA Reports	Inactive unit, RFA recommended NFA, now asphalt area, NFA consensus at July 99 mtg.
SWMU 64			2-43				Appendix C- NFA	1485	Industrial Waste Water Treatment Plant Storage Area	Bldg. 1512	Bldg. 236 /IR Site 17	No	No		RCRA	Closure Reports	Inactive site under RCRA closure, in area of IR Site 17 where existing data will be reviewed, NFA consensus at July 99 mtg.
SWMU 65			2-44				Appendix C- NFA	172	Foundry Waste Accumulation Areas, Shop 06	West outside end of Bldg 172	Bldg 171/ Bldg 268 /Bldg 172	No	Yes		CERCLA	RFA & SSA Reports	Used as a < 90 day accumulation point for cutting fluids and lubricants Bldg 172 housed former foundry, RFA recommended NFA, concrete floor, 1998 visit staining on concrete, NFA consensus at Sept 99 SSA Mtg
SWMU 66			2-45				Appendix C- NFA	172	Foundry Baghouse	Bldg. 172	Bldg 171/ Bldg 268 /Bldg 172	No	Yes		CERCLA	RFA & SSA Reports	Foundry was torn down and bag house was removed. Inactive unit, floor is concrete, 1998 site visit no evidence of release, RFA recommended NFA, NFA consensus at July 99 mtg.
SWMU 67			2-47				Appendix C- NFA	517	Recovered Material DSA	West of Bldg. 517	Bldg. 236 /IR Site 17	No	Yes		CERCLA	RFA & SSA Reports	No longer used for storage. Containment area is covered with a metal storage box. RFA recommended NFA, concrete containment area, site visit 5/99, NFA consensus at July 99 mtg.
SWMU 68			2-49				Appendix C- NFA	236	Supply Department DSA	West of Bldg. 236	Bldg. 236 /IR Site 17	No	Yes		CERCLA	RFA & SSA Reports	Inactive unit, drums on pallets in 1987, NFA consensus at July 99 mtg.
SWMU 69			2-04A				Appendix C- NFA	234	Shop 17, Sheet Metal Dip Tanks	Bldg. 234	Bldg 234	No/C	Yes		RCRA	Closure Reports	open-top tanks for acid cleaning solution, these tanks are no longer active, steel gridwork over concrete floor, inactive, tanks removed, sandblasted floor, RFA recommended NFA, RCRA closure, NFA consensus at August 99 SSA Mtg.
SWMU 70			2-05				Appendix C- NFA		Trash Dumpsters	Throughout NNSY	NNSY	Yes	No		Solid Waste	PWC	NFA consensus at April 99 SSA Mtg.
SWMU 71			2-50				Appendix C- NFA	174	Shop 03, Cation Exchange Resin Sump	Bldg. 174	Bldg 174	No	No	Sanitary Sewer	CERCLA	RFA & SSA Reports	Inactive, Bldg. 174 no longer exists, this sump was removed, existing data IT Report 1988 to be reviewed, RFA recommended NFA, NFA consensus at July 99 mtg.
SWMU 72			2-51				Appendix C- NFA	174	Shop 03 Accumulation Area	West of Bldg. 174	Bldg 174	No	No		CERCLA	RFA & SSA Reports	Inactive, Bldg. 174 no longer exists, no signs of this area are present. existing data IT Corp. Environmental Investigations Report, Demolition of Old Power Plant, May 1988. to be reviewed, RFA recommended NFA, NFA consensus at July 99 mtg.
SWMU 73			2-53				Appendix C- NFA	174	Utility Shop Accumulation Point #2	West of Bldg. 174	Bldg 174	No	No		CERCLA	RFA & SSA Reports	Inactive, existing data IT Report 1988 to be reviewed, RFA recommended NFA, NFA consensus at July 99 mtg.
SWMU 74			2-54				Appendix C- NFA	234	Shop 17, Waste Oil Accumulation Point	Between Bldgs. 234 & 163	Bldg 234	No	Yes	Yes	CERCLA	RFA & SSA Reports	This was a one time temporary storage point. Inactive area, concrete pad with drums on pallets, exact site could not be located during 1998 site visit, no evidence of release in general area. NFA consensus at August 99 SSA Mtg.
SWMU 75			2-56				Appendix C- NFA	298	Shop 71, Paint WAA	East of Bldg. 299	Bldg 299 E of 1927 Ldf	Yes	No		RCRA	Inspection Log	Active unit < 90 day Accumulation Area under RCRA, RFA recommended secondary containment, Bldg 298 aerosol can recovery and paint crusher, NFA consensus at August 99 SSA Mtg.
SWMU 76			2-57				Appendix C- NFA	163	Shop 11, WAA	East of Bldg. 163	Slip 3 / Davis Ave. Area	No	Yes		RCRA	Inspection Log	Inactive under RCRA, no RCRA closure, previous storage area, RFA recommended NFA, 1998 Site Visit, reviewed EPIC and current photos, NFA consensus at August 99 SSA Mtg.
SWMU 77			2-58				Appendix C- NFA	163	Shop 41, WAA	NW corner of Bldg. 163	Bldg 163/174	No	Yes		CERCLA	RFA & SSA Reports	Previously a < 90 day accumulation point. Inactive unit drums on pallets on asphalt surface, RFA recommended NFA NFA consensus at August 99 SSA Mtg.
SWMU 78			2-05A				Appendix C- NFA	234	Shop 71, Paint Shop Spray Booth	Bldg. 234	Bldg 234	Yes	No		Clean Air Act	Title V Permit	RFA recommended NFA, NFA consensus at August 99 SSA Mtg.

TABLE 2-1
Site Status Summary
Norfolk Naval Shipyard
Portsmouth, Virginia

Site ID	IAS Site #	RFA-SWMU #	RFA-S-SWMU #	EPIC Study Site ID	Other AOCs	OU #	FFA Status	Building #	Name / Description	Location	Study Area Location	Active Unit	SSA Visit 1998 (Baker)	Assoc. Storm Drains	Env. Program	Program Documentation	Project Management Team Comments
SWMU 79			2-60				Appendix C- NFA	369	PCB Contaminated Material Collection Point	East of Bldg. 369	Bldg 369 Area	No	Yes		CERCLA	RFA & SSA Reports	This collection area was near Unit 2-59 and was a one time event for the temporary storage of a transformer. Inactive drum storage on pallets on ground surface, now a fenced nuclear area, part of bldg 369 area with proposed soil sampling and well installation, cross reference with SWMU 2-59, NFA consensus at August 99 SSA Mtg.
SWMU 80			2-61				Appendix C- NFA	202	Shop 56, WAA	NW side of Bldg. 202	Bldg 202	No	Yes	Yes	CERCLA	RFA & SSA Reports	Previous < 90 drum storage area, a conex box is currently in this area. Inactive unit asphalt surface, drums on pallets, RFA recommended NFA, NFA consensus at August 99 SSA Mtg.
SWMU 81			2-63				Appendix C- NFA	202	Shop 26, Wheelabrator Cleaning Unit	Bldg. 202	Bldg 202	Yes	No		RCRA	Inspection Log	Inactive under RCRA, no RCRA closure, RFA recommended air sampling, Inside Bldg 202, possible dust release, NNSY Industrial Hygiene Program, NFA consensus at Sept 99 SSA Mtg
SWMU 82			2-64				Appendix C- NFA	202	Shop 26, Wheelabrator Waste Drum Accumulation Point	Bldg. 202	Bldg 202	Yes	No		RCRA	Inspection Log	Inactive under RCRA, no RCRA closure, RFA recommended NFA, NFA consensus at August 99 SSA Mtg.
SWMU 83			2-65				Appendix C- NFA		Shop 64/07, Asbestos Waste Collection Points	Various locations	NSSY	Yes	No		CERCLA	RFA & SSA Reports	Active unit , RFA recommended NFA, controlled environmental operations NFA consensus at August 99 SSA Mtg.
SWMU 84			2-66				Appendix C- NFA	510	Shops 51 & 67, WAA	North of Bldg. 510	1927 Landfill Area	No	Yes	Yes	CERCLA	RFA & SSA Reports	Previous < 90 day accumulation point for drums.. Inactive drum storage on pallets on concrete surface, Concrete in good condition 1998 site visit, 3 storm grates in area, RFA recommended NFA, NFA consensus at August 99 SSA Mtg.
SWMU 85			2-67				Appendix C- NFA	510	Shop 51, Below Ground Effluent Collection Tanks	East side of Bldg. 510	1927 Landfill Area	Yes	No		CWA	Inspection Log	Cross reference with Site 10 (RFA-S SWMU# 2-17), RFA recommended NFA, NFA consensus at August 99 SSA Mtg.
SWMU 86			2-68				Appendix C- NFA	510	Shop 67, Effluent Collection Tank	West side of Bldg. 510	1927 Landfill Area	Yes	No		CERCLA	RFA & SSA Reports	Active unit cross reference with Site 10 RFA-S SWMU# 2-17, RFA recommended NFA, NFA consensus at August 99 SSA Mtg.
SWMU 87			2-69				Appendix C- NFA	510	Shop 67, Drum Collection Area	Between Bldgs. 510 & 297	1927 Landfill Area	No	Yes	Yes	CERCLA	RFA & SSA Reports	Inactive drum storage on pallets on asphalt surface, 5/99 site visit no evidence of release, two storm drains in area, one time storage area, within 1927 landfill area which includes bldg 510 and is being investigated as SWMU 2-17, NFA consensus at August 99 SSA Mtg.
SWMU 88			2-06A				Appendix C- NFA	163	Shop 41, Boiler Tubes Cleaning Tanks	Bldg. 163	Bldg 163	Yes	No		Clean Air Act	Title V Permit	Included in Title V Permit, NFA consensus at Sept 99 SSA Mtg
SWMU 89			2-07				Appendix C- NFA	236	Shop 02, Parts Washer Units	Bldg. 236	Bldg. 236 /IR Site 17	No	Yes		CERCLA	RFA & SSA Reports	Exact location in Bldg. 236 unknown, site visit (5/99) no evidence of concern. NFA consensus at April 99 SSA Mtg.
SWMU 90			2-70				Appendix C- NFA	60	Shop 51, Sulfuric Acid Waste Collection Sump and Tank	Bldg. 60	Bldg 60	No	Yes		CERCLA	RFA & SSA Reports	Former sump and collection tank for dilute sulfuric acid wastes, concrete area, diked and in good condition 1998 visit, RFA recommended NFA, NFA consensus at August 99 SSA Mtg.
SWMU 91			2-71				Appendix C- NFA	163	Shop 56, Asbestos Removal Unit	North side of Bldg. 163	Bldg 163/174	No	Yes		CERCLA	RFA & SSA Reports	Metal bldg next to Bldg 163 for removal of asbestos insulation, bldg now gone, RFA recommended NFA, NFA consensus at August 99 SSA Mtg.
SWMU 92			2-08				Appendix C- NFA	236	Shop 02, Automotive Shop WAA	North side of Bldg. 236	Bldg. 236 /IR Site 17	No	Yes		CERCLA	RFA & SSA Reports	Exact location in Bldg. 236 unknown, site visit (5/99) no evidence of concern. NFA consensus at April 99 SSA Mtg.
SWMU 93			2-87				Appendix C- NFA	261	Drum Accumulation Area	South of Bldg. 261	Slip 3 / Davis Ave. Area	No/C	Yes		RCRA	Closure Reports	Concrete slab for drum storage, RCRA closure, 32 samples collected, no samples from RCRA closure exceed TCLP, NFA consensus at August 99 SSA Mtg.
SWMU 94			2-88				Appendix C- NFA		Floating Oil Holding Donuts	Various pier areas	Piers	Yes	No		CERCLA	RFA & SSA Reports, DEQ notification Donuts gone	Used only on contingency basis, if in use it is regulated under VDPES, RFA recommended NFA, Donuts removed, NFA consensus at August 99 SSA Mtg.
SWMU 95			2-89				Appendix C- NFA	275	Shop 64, WAA	NW of Bldg. 275	Bldg 275	Yes	No		RCRA	Inspection Log	Active unit under RCRA, RFA recommended secondary containment, NFA consensus at Sept 99 SSA Mtg
SWMU 96			2-08A				Appendix C- NFA		Discarded Drums (near Berth 43)	Near Berth 43	Bldg 369 Area	No	Yes		CERCLA	RFA & SSA Reports	Drums on pallets on asphalt, This area is no longer used as a drum storage area, exact location could not be verified, RFA recommended NFA, cross reference with Bldg 369, Site visit 5/99 NFA consensus at August 99 SSA Mtg.
SWMU 97			2-09				Appendix C- NFA	236	Shop 02 Construction Equipment Shop WAA	Bldg. 236	Bldg. 236 /IR Site 17	No	Yes	Yes	CERCLA	RFA & SSA Reports	Exact location in Bldg. 236 unknown, site visit (5/99) no evidence of concern, research/document floor drains, Used for equipment maintenance on pay-loaders and fork lifts, drums of used oil, anti-freeze, and fuels were collected inside the building. NFA consensus at Sept 99 SSA Mtg.
SWMU 98			2-90				Appendix C- NFA		Sand Blast Residues Drum Collection Area	North of Wet Slip #2	Slip 2	No	No		CERCLA	RFA & SSA Reports	Sand storage bins have been removed. Temporary one time storage area for blastgrit, 5/99 site visit, NFA consensus at April 99 SSA Mtg.
SWMU 99			2-93				Appendix C- NFA		Shipyard Sanitary Sewer System	Various locations	NNSY	Yes	Yes	Sanitary Sewer	HRSD	PWC	Active sanitary sewer system, system clean out in progress, cross referenced with AOC 7- facility storm sewer, NFA consensus at Sept 99 SSA Mtg

TABLE 2-1
Site Status Summary
Norfolk Naval Shipyard
Portsmouth, Virginia

Site ID	IAS Site #	RFA-SWMU #	RFA-S-SWMU #	EPIC Study Site ID	Other AOCs	OU #	FFA Status	Building #	Name / Description	Location	Study Area Location	Active Unit	SSA Visit 1998 (Baker)	Assoc. Storm Drains	Env. Program	Program Documentation	Project Management Team Comments
SWMU 100			2-09A				Appendix C- NFA		Oil Spill Area	North side of Pier 3	Slip 3 / Davis Ave. Area	No	Yes		CERCLA	RFA & SSA Reports	Stained soil in 1987, area now paved, Site visit 5/99 NFA consensus at August 99 SSA Mtg.
SWMU 101			3-17				Appendix C- NFA		Temporary Overflow Storage Area	Southgate Annex	Southgate Annex	No	No	Yes	RCRA	Closure Reports	Cross reference with AOC 2 under RCRA closure, Site visit 5/99, document closure information
SWMU 102					AOC 01		Appendix C- NFA		Shop 06 Insecticide Mixing	Bldg 17A, between Bldgs 17 & 39	N of slip 1	No	Yes	Yes	CERCLA	RFA & SSA Reports,	Insecticide mixed for NNSY application - containers triple rinsed, punctured and disposed. Bldg demolished, area asphalt, storm drain in area, Site visit 5/99, NFA consensus at Aug 99 SSA Mtg.
SWMU 103					AOC 02		Appendix C- NFA		Bldg 383 Tanks	Southgate Bldg 383	Southgate Annex	No	Yes		RCRA	Closure Reports	4 ASTs at loading dock have been removed under RCRA closure, Site visit 5/99, area now storage of booms, pallets, cylinders, NFA consensus at Aug 99 SSA Mtg.
SWMU 104					AOC 03		Appendix C- NFA		Previous Abrasive Blast Recycling Facility	S of Bldg 172	Bldg 1499; SSP 1927 Landfill area	No	Yes		CERCLA	RFA & SSA Reports,	MILCON soil samples indicated hydrocarbons in soils and groundwater. Area now asphalt parking. Included in 2001 SSP Investigation of 1927 Landfill area. NFA consensus July 2003 based on risk screening and absence of CERCLA release, groundwater will be addressed as part of Site 10
SWMU 105					AOC 05		Appendix C- NFA		Mil Con P-331 Crane Rail	E of Bldgs 163 & 202	Slip 3 / Davis Ave. Area	No	Yes		CERCLA	RFA & SSA Reports,	Environmental sampling FY90 MCON Report of Findings, 11/18/88 associated with construction at IR Site 18, Samples show metals TCLP below levels of concern, Construction project to go forward, NFA consensus at Aug 99 SSA Mtg.
SWMU 106					AOC 06		Appendix C- NFA		Former Gyro Facility	Next to Chaplain Office Bldg 67	Chapel E of Slip 2 and Bldg 73	No	Yes		CERCLA	RFA & SSA Reports,	Mercury from electronics shop, facility has been removed. Exact location uncertain, some grass areas near Chapel, Site visit 5/99, review EPIC photos, no area of concern, NFA consensus at Aug 99 SSA Mtg.
SWMU 107				DSA-A			Appendix C- NFA	464	Operated 1963-1980	NE corner of Bldg 464	Bldg 464-424 Area	No	Yes	Yes	CERCLA	Epic Study	Identified in EPIC study, review photos, no areas of concern noted , NFA consensus at Aug 99 SSA Mtg.
SWMU 108				DSA-B			Appendix C- NFA		Operated 1976-1980	Area of Bldg 1515 of SPSA	1941 Ldf/ RDF Plant/SPSA	No	Yes		CERCLA	RFA & SSA Reports & Epic Study	Currently concrete sidewalks and asphalt roads, area is former salvage yard, Review EBS report, use existing data, NFA SSA, cross reference with IR Site 8, NFA Consensus at Sept SSA Mtg
SWMU 109				DSA-C			Appendix C- NFA		Operated 1971	Area of Bldg 1521/1545 & 1517/1518 & 1519	1941 Ldf/ RDF Plant/SPSA	No	Yes		CERCLA	RFA & SSA Reports & Epic Study	Currently concrete sidewalks and asphalt roads, area is former salvage yard, Review EBS report, use existing data, NFA SSA, cross reference with IR Site 8, NFA Consensus at Sept SSA Mtg
SWMU 110				DSA-D			Appendix C- NFA		Operated 1976	Area of Bldg 1517/1519 & along RR track near Bldg 1522/1520	1941 Ldf/ RDF Plant/SPSA	No	Yes		CERCLA	RFA & SSA Reports & Epic Study	Currently concrete sidewalks and asphalt roads, area is former salvage yard, Review EBS report, use existing data, NFA SSA, cross reference with IR Site 8, NFA Consensus at Sept SSA Mtg
SWMU 111				DSA-F			Appendix C- NFA		Operated 1971	East side Bldg 1452	Bldg 1452	No	Yes		CERCLA	RFA & SSA Reports	Temporary one time storage event, NFA consensus at Aug 99 SSA Mtg.
SWMU 112				DSA-G			Appendix C- NFA		Operated 1971	SW corner Bldg 172 E-SE Stevens St	Bldg 171/ Bldg 268 /Bldg 172	No	Yes		CERCLA	RFA & SSA Reports	Bldg 172 housed former foundry, RFA recommended NFA, Currently asphalt road surface, drums stored for limited- one- time only 1998 visit staining on concrete, cross ref with SWMU 2-44 NFA consensus at Aug 99 SSA Mtg.
SWMU 113				DSA-H			Appendix C- NFA		Operated 1985-1986	W-SW corner Bldg 1499	Bldg 1499	No	Yes		RCRA	Inspection Log	Inactive under RCRA, no RCRA closure, identified in EPIC Study, Concrete surface in fair condition, NFA consensus at Aug 99 SSA Mtg.
SWMU 114				DSA-I			Appendix C- NFA		Operated 1971-1985	W Bldg 152 E of Bldg 1499	Bldg 171/ Bldg 268 /Bldg 172	No	Yes		CERCLA	RFA & SSA Reports & Epic Study	Bldg 172 housed former foundry, RFA recommended NFA, Now concrete parking area, concrete in fair condition,1998 visit staining on concrete cross reference with SWMU 2-45, NFA consensus at Sept SSA Mtg
SWMU 115				DSA-J			Appendix C- NFA		Operated 1971-1985	S end Bldg 510	1927 Landfill Area	No	Yes	Yes	CERCLA	RFA & SSA Reports, Epic Study & Site Photos	< 90 day storage for shops 51 a & 67, drum storage on S side of bldg 510, area in vicinity of 1927 landfill, cross reference with SWMU 2-66 NFA consensus at Aug 99 SSA Mtg.
SWMU 116				DSA-K			Appendix C- NFA		Operated 1985	SW corner Bldg 268	Bldg 171/ Bldg 268 /Bldg 172	No	Yes		CERCLA	RFA & SSA Reports, Epic Study & Site Photos	< 90 day drum storage for oils and corrosive, drum storage on S side of bldg 268, Inactive area, concrete floor in bldg, 1998 site visit no evidence of release, cross reference with SWMU 2- 38 RFA recommended NFA, NFA consensus at Aug 99 SSA Mtg.
SWMU 117				DSA-L			Appendix C- NFA		Operated 1980-1982	IWTP	Bldg. 236 /IR Site 17	No	Yes		CERCLA	RFA & SSA Reports, Epic Study & Site Photos	Active IWWTP storage, in area of IR Site 17 reviewed existing data and site photos, NFA consensus at Aug 99 SSA Mtg. DSA-L is handled under RCRA, surrounding area is CERCLA
SWMU 118				DSA-M			Appendix C- NFA		Operated 1980	S of fuel storage tanks 1250 to 1255	Bldg. 236 /IR Site 17	No	Yes		CERCLA	RFA & SSA Reports, Epic Study & Site Photos	Drum storage south of fuel tanks 1250 to 1255, concrete surface in fair condition, surface staining noted, In area of IR Site 17, reviewed existing data and site photos, NFA consensus at Aug 99 SSA Mtg.
SWMU 119				DSA-N			Appendix C- NFA		Operated 1982	SW Bldg 174	Bldg 163/174	No	Yes		CERCLA	RFA & SSA Reports, Epic Study & Site Photos	Surface concrete in fair condition, few drums temporarily stored outside Bldg 174, no evidence of release, reviewed site photos, NFA consensus at Aug 99 SSA Mtg.
SWMU 120				DSA-O			Appendix C- NFA		Operated 1982	Adjacent to Bldg 1512 XFER Facility	Bldg. 236 /IR Site 17	No	Yes		RCRA	Closure Reports	RCRA closure, site inactive, no evidence of release 1998 site visit, RFA recommended NFA, reviewed site photos, NFA consensus at Aug 99 SSA Mtg.

TABLE 2-1
Site Status Summary
Norfolk Naval Shipyard
Portsmouth, Virginia

Site ID	IAS Site #	RFA-SWMU #	RFA-S-SWMU #	EPIC Study Site ID	Other AOCs	OU #	FFA Status	Building #	Name / Description	Location	Study Area Location	Active Unit	SSA Visit 1998 (Baker)	Assoc. Storm Drains	Env. Program	Program Documentation	Project Management Team Comments
SWMU 121				DSA-P			Appendix C- NFA		Operated 1980	W of Bldg 236	Bldg. 236 /IR Site 17	No	Yes		CERCLA	RFA & SSA Reports, Epic Study & Site Photos	Inactive unit < 90 day accumulation point for drums. Adjacent to SWMU 2-46 area is sandy soil/gravel, site will be addressed with SWMU 2-46, reviewed site photos, NFA consensus at Aug 99 SSA Mtg.
SWMU 122				OSA #10			Appendix C- NFA		Operated 1944-1970	S and W of Bldg 212	Bldg 212 & 1460, W of 1927 Ldf.	No	Yes	Yes	CERCLA	RFA & SSA Reports,	Various open storage areas noted in EPIC study, No visible environmental concerns noted in 1998 site visit, currently asphalt and concrete misc. storm drains, Cross-reference with SWMU 2-27, Reviewed recent site photos, NFA consensus at Aug 99 SSA Mtg.
SWMU 123				OSA #11			Appendix C- NFA		Operated 1944-1990	E of Harrington Ave, N Bldg 260, SW of Bldgs 297/510, Farquhar Ave as E boundary, current Bldg 1341	1927 Landfill Area	No	Yes		CERCLA	RFA & SSA Reports,	Various open storage areas noted in EPIC study, Cross-reference with RCRA closure at SWMU 2-91, currently asphalt and concrete and acid storage tanks 1341,Reviewed recent site photos, NFA consensus at Aug 99 SSA Mtg.
SWMU 124				OSA #12			Appendix C- NFA		Operated 1944-1990	E of Bldg 510 & W of Hitchcock St	1927 Landfill Area	No	Yes		CERCLA	RFA & SSA Reports,	Various open storage areas noted in EPIC study, currently asphalt soil and concrete in area of 1927 landfill, Reviewed recent site photos, cross reference with 1927 landfill, NFA consensus at Sept SSA Mtg
SWMU 125				OSA #15			Appendix C- NFA		Operated 1944-1970	E of Bldg 298 & W of Dry Dock 8	Area East of Bldg 298	No	Yes		CERCLA	RFA & SSA Reports,	Various open storage areas noted in EPIC study, currently asphalt Reviewed recent site photos, NFA consensus at Aug 99 SSA Mtg.
SWMU 126				OSA #16			Appendix C- NFA		Operated 1944-1990	N-NW of Dry Dock 8	Area East of Bldg 298	No	Yes		CERCLA	RFA & SSA Reports,	Various open storage areas noted in EPIC study, Currently asphalt, Near Dry Dock 8, no environmental concern noted in 1998 site visit, Reviewed recent site photos, NFA consensus at Aug 99 SSA Mtg.
SWMU 127				OSA #17			Appendix C- NFA		Operated 1944-1980	SE NNSY N of Atlantic Wood Now parking and Bldgs 1513/1523/1554	North of Atlantic Wood	No	Yes		CERCLA	RFA & SSA Reports,	Various open storage areas noted in EPIC study, Currently asphalt parking, No environmental concern noted in 1998 site visit, Reviewed recent site photos, NFA consensus at Aug 99 SSA Mtg.
SWMU 128				OSA #18			Appendix C- NFA		Operated 1944-1990	N of Bldg 435	Slip 3 / Davis Ave. Area	No	Yes		CERCLA	RFA & SSA Reports,	Various open storage areas noted in EPIC study, Currently asphalt parking and roadway and fenced area for tool box storage. Same area of SWMU 2-57 where RFA recommended NFA, Reviewed recent site photos, NFA consensus at Aug 99 SSA Mtg.
SWMU 129				OSA #20			Appendix C- NFA		Operated 1944-1985	SW of Dry Dock 4, NE of Bldg 261, current Bldg 1539	Slip 3 / Davis Ave. Area	No	Yes	Yes	CERCLA	RFA & SSA Reports,	Various open storage areas noted in EPIC study, Currently asphalt roadway and staging area, Utility vaults and storm drains in area, no environmental concerns noted in 1998 site visit, MILCON Dry dock improvements with soil samples collected, Reviewed recent site photos, NFA consensus at Aug 99 SSA Mtg.
SWMU 130				OSA #21			Appendix C- NFA		Operated 1944-1990	Adjacent to Bldg 300	Bldg 300	No	Yes		CERCLA	RFA & SSA Reports,	Various open storage areas noted in EPIC study, Currently asphalt roadway, Storm drains in area, no environmental concerns noted in 1998 site visit, Cross-reference with SWMU 2-41, Reviewed recent site photos, NFA consensus at Aug 99 SSA Mtg.
SWMU 131				OSA #22			Appendix C- NFA		Operated 1944-1990	E of Bldg 1575	S of Slip 1 and Berth 6	No	Yes		CERCLA	RFA & SSA Reports,	Various open storage areas noted in EPIC study, Currently asphalt parking, No environmental concerns noted in 1998 site visit, Reviewed recent site photos, NFA consensus at Aug 99 SSA Mtg.
SWMU 132				OSA #24			Appendix C- NFA		Operated 1952-1982	SW of Pier 5 (Berths 38/39), current Bldgs 271/1301/1527/544/502	Area East of Bldg 298	No	Yes		CERCLA	RFA & SSA Reports,	Various open storage areas noted in EPIC study, Currently asphalt parking and roadway, No environmental concerns noted in 1998 site visit, Reviewed recent site photos, NFA consensus at Aug 99 SSA Mtg.
SWMU 133				OSA #26			Appendix C- NFA		Operated 1982-1990	Between Dry Dock 4 and Pier 3, S-SE of Bldg 261, current Bldgs 247/1263/193/45	Slip 3 / Davis Ave. Area	No	Yes		CERCLA	RFA & SSA Reports,	Various open storage areas noted in EPIC study, Currently asphalt and soil, now storage of trailers, concrete debris, and satellite accumulation area, No environmental concerns noted in 1998 site visit, Cross-reference with SWMU 2-87 & 10A RCRA Closure. Reviewed recent site photos, NFA consensus at Aug 99 SSA Mtg.
SWMU 134				OSA #27			Appendix C- NFA		Operated 1982-1990	S of Bldg 260	Bldg 212 & 1460, W of 1927 Ldf.	No	Yes		CERCLA	RFA & SSA Reports,	Open storage noted in EPIC study, Currently worn and cracked concrete, 1998 visit noted rail cars containing bilge water and sodium nitrate. Reviewed recent site photos, NFA consensus at Aug 99 SSA Mtg.
SWMU 135				OSA #28			Appendix C- NFA		Operated 1990	NE of Dry Dock 1, S-SW of Bldg 62	N of Dry Dock 1	No	Yes		CERCLA	RFA & SSA Reports,	Open storage noted in EPIC study, Currently asphalt, 1998 visit noted concrete and brick debris, No environmental concerns identified in 1998 site visit, Reviewed recent site photos, NFA consensus at Aug 99 SSA Mtg.

TABLE 2-1
Site Status Summary
Norfolk Naval Shipyard
Portsmouth, Virginia

Site ID	IAS Site #	RFA-SWMU #	RFA-S-SWMU #	EPIC Study Site ID	Other AOCs	OU #	FFA Status	Building #	Name / Description	Location	Study Area Location	Active Unit	SSA Visit 1998 (Baker)	Assoc. Storm Drains	Env. Program	Program Documentation	Project Management Team Comments
SWMU 136				OSA #29			Appendix C- NFA		Operated 1990	Between Dry Dock 4 and Dry Dock 3	N of Dry Dock 4	No	Yes		CERCLA	RFA & SSA Reports,	Open storage noted in EPIC study, Currently concrete, asphalt, and cinders. 1998 visit noted cylinders, tankers of sodium nitrate and misc. storage, No environmental concerns identified in 1998 site visit, Reviewed recent site photos, NFA consensus at Aug 99 SSA Mtg.
SWMU 137				OSA #03			Appendix C- NFA		Operated 1937-1961	Bldg 369	Bldg 369 Area	No	Yes		CERCLA	RFA & SSA Reports,	Various storage areas around bldg 369 identified in EPIC Study, Cross reference with SWMUs 2-2A, 2-39, 2-40, 2-59, 2-60, In area of Bldg 369, NFA consensus at Aug 99 SSA Mtg.
SWMU 138				OSA #3A			Appendix C- NFA		Operated 1963-1990	SW dry dock 8 and W Bldg 369	Bldg 369 Area	No	Yes		CERCLA	RFA & SSA Reports,	Various storage areas around bldg 369, Currently asphalt parking, cross-reference with SWMU 2-40, NFA consensus at Aug 99 SSA Mtg.
SWMU 139				OSA #3B			Appendix C- NFA		Operated 1963-1970	S of Bldg 369	Bldg 369 Area	No	Yes		CERCLA	RFA & SSA Reports,	storage area around bldg 369, Currently asphalt parking, items stored as noted in EPIC study should not have impacted the site, NFA consensus at Aug 99 SSA Mtg.
SWMU 14		26	2-72				Appendix C- NFA	1485	IWTP Tanker Dumping Station	Fac. 1485	IWTP Fac. 1485	Yes	No		Clean Water Act	NPDES Permit	Active IWTP, operated under Clean Water Act, IWTP in area of Bldg 236 and IR Site 17, RFA recommended NFA, NFA consensus at August 99 SSA Mtg.
SWMU 140				OSA #3C			Appendix C- NFA		Operated 1937-1961	E of Bldg 369 to end of berth 43	Bldg 369 Area	No	Yes		CERCLA	RFA & SSA Reports,	Various storage areas near Berth 43 in vicinity of bldg 369. In MILCON area near bldg 369, Currently asphalt surface, RR tracks traverse the area, Cross-reference with SWMUs 2-59, 2-60, & 2-86, NFA consensus at Aug 99 SSA Mtg.
SWMU 141				OSA #04			Appendix C- NFA		Operated 1944-1990	W of Bldg 280 where Bldg 1567 is now	Bldg 1567	No	Yes		CERCLA	RFA & SSA Reports,	Various open storage areas noted in EPIC study, Currently active storage area of items that do not represent environmental concern, Reviewed recent site photos NFA consensus at Aug 99 SSA Mtg.
SWMU 142				OSA #6A			Appendix C- NFA		Operated 1949-1990	N of Bldg 463/464/424, S of Beaty St W to Black Lane	Bldg 464-424 Area	No	Yes		CERCLA	RFA & SSA Reports,	Various open storage areas noted in EPIC study, currently asphalt for parking, Cross-reference with DSA-A, Reviewed recent site photos, NFA consensus at Aug 99 SSA Mtg.
SWMU 143				OSA #09			Appendix C- NFA		Operated 1949-1976	NE of Bldg 1499 bordered by Green St/Old Williams Ave on W, Pennock St N-NW, Stevens St on SE,	Bldg 1499	No	Yes	Yes	CERCLA	RFA & SSA Reports,	Various open storage areas noted in EPIC, No visible environmental concerns noted in 1998 site visit, currently asphalt for parking, existing RR tracks paved over, misc. storm drains, Reviewed recent site photos, NFA consensus at Aug 99 SSA Mtg.
SWMU 144				Pit #1			Appendix C- NFA		1937 Impoundment	SW of Bldg 510 open area N of Hitchcock St		No	No		CERCLA	RFA & SSA Reports,	Identified in EPIC Study, Area filled in, NFA consensus at Aug 99 SSA Mtg.
SWMU 145				Pit # 2			Appendix C- NFA		Impoundment	Berths 42/43		No	No		CERCLA	RFA & SSA Reports,	Site no longer exists, Berths 42/43 possibly Eliz River from dredging for dry dock8 & Bldg 369, NFA consensus at Aug 99 SSA Mtg.

ABM- Abrasive Blast Material
AOC- Area of Concern
CERCLA- Comprehensive Environmental Response Compensation and Liability Act
DSA- Drum Storage Area
EPIC- Environmental Photographic Interpretation Center
FFA- Federal Facility Agreement
IAS- Initial Assessment Study
IR- Installation Restoration
IWTP- Industrial Waste Water Treatment Plant
MILCON- Military Construction Project

Appendix A Site Screening Areas Under Site Screening Process
Appendix B Preliminary Screening Areas
Appendix C No Further Action Sites

SECTION 3

Five-Year Review Process

The Five-year Review process for the sites at NNSY is described below. This process includes establishing the review team and the review schedule; notifying and presenting the findings to the community; and a review of all relevant documents.

3.1 Administrative Component

The NNSY Five-year Review team is led by Ms. Cecilia Landin, Remedial Project Manager (RPM) for the ERP at NNSY. In addition to Ms. Landin, the Five-year Review team consists of the following members:

- Mr. James Cutler/RPM for VDEQ
- Ms. Rashmi Mathur/RPM for USEPA

The sites were reviewed by the team between November 2015 and February 2016 to prepare this report. The review included evaluation of existing documents, data, inspection checklists, operation and maintenance (O&M) activities, Applicable or Relevant and Appropriate Requirement (ARARs), and risk assessment methodologies. Sections 4 through 6 of this Five-year Review report describe in detail the review process and findings for each site included in this report.

3.2 Community Involvement

NNSY established a Restoration Advisory Board (RAB) for the Navy installation, comprised of community members as well as representatives of the VDEQ and USEPA in 1995. As outlined in the 2005 Community Relations Plan (CH2M, 2005), the NNSY RAB meets as required to ensure the members are kept informed of on-going activities. All RAB meetings are open to the general public and are announced through advertisements in local papers. Typically, RAB meetings were held annually. The most recent RAB meeting was held on June 22, 2010. A RAB meeting has not been held within this FYR period. In an effort to re-engage the community in the CERCLA process at NNSY, an update to the January 2005 Community Relations Plan is planned for completion in 2017. The update will document local community issues of concern related to the NNSY ERP and provide an avenue to express their ideas and concerns. The Community Relations Plan update will also inform the local community of on-going ERP activities, assure the community that the health, welfare, and safety of their environment is of the utmost importance, and provide information in non-technical terms in a proactive manner.

Members of the community were notified of the initiation of the Five-year Review on March 12 & 13, 2016 via a notification in the *Virginian Pilot* (Appendix A). No comments or questions were received from the public related to the Five-year Review. When the Five-year Review has been finalized, a notice will be sent to the newspaper indicating the results and that the final report is available to the public.

3.3 Document Review

This Five-year Review consisted of a review of relevant documents such as Remedial Investigations (RIs), Feasibility Studies (FSs), Engineering Evaluations/Cost Analyses (EE/CAs), DDs, and RODs as applicable for each site included in this review. These documents are located in the Administrative Record which is available to the public at:

NAVFAC Mid Atlantic
Public Affairs Office
9324 Virginia Avenue
Norfolk, VA 23511-3095
757.341.1410
NAVFAC_ML_PAO@navy.mil

The Information Repository is located at:

Portsmouth Public Library
601 Court Street
Portsmouth, Virginia 23704
Phone (757) 393-8501

3.4 Interviews

Interviews were conducted with NNSY Facility Planning on August 3, 2016 as part of the Five-year Review process. The interview summary is provided in Appendix B. In general, no significant concerns with the environmental restoration program were expressed. Recommendation was made for the site LUC boundaries to be more readily accessible within the Navy's geo-spatial mapping program capable of projecting land features, boundaries, land restrictions, etc.

Site 17—Building 195 – Plating Shop

4.1 Site Chronology

Date	Event
1983	IAS (Water and Research, Inc., 1983)
1986	RFA (NUS Corporation, 1986)
1987	RFA-S (A. T. Kearney, 1987)
1989	IRI (IT Corp., 1989)
1994	EPIC Study (USEPA, 1994)
1995	Phase I Remedial Investigation (RI)/Feasibility Study (FS) (Baker, 1995)
1999	Phase II RI (Baker, 1999a)
1999	NNSY on NPL
2005	Revised FFS/HHRA (CH2M HILL, 2005)
2006	Proposed Plan (PP) (Navy, 2006a)
2006	ROD (Navy, 2006b)
2010	Remedial Design (RD) for Land Use Controls (LUCs) (Navy, 2010c)
2011	Limited Remedial Action Completion Report (RACR) (Navy, 2011c)

4.2 Background

4.2.1 Site Description

Site 17 (USEPA OU4), Building 195—Plating Shop was the main plating shop at the NNSY (**Figure 3-1**). Spills onto the concrete floor of the building and the land surface adjacent to the building may have occurred from the early 1970s through the mid-1980s and may have involved plating solutions containing metals and cyanide. The formerly unpaved area north of Building 195 was used for coal storage from the 1920s until approximately 1966.

Building 195 is an unoccupied brick building located within the CIA portion of NNSY. The ground surface surrounding Building 195 is completely paved with asphalt with a chain link fence west and north of Building 195. North of Building 195 is a small parking lot, also paved with asphalt. Arsenic-contaminated soils determined to pose risk during the Phase II RI were excavated as part of railroad track refurbishment activities.

4.2.2 Geology and Hydrogeology

Site 17 is relatively flat with a gentle slope towards the south/southwest. It is covered by a paved surface of asphalt and stone. Beneath the asphalt and stone surface is sand and clayey silt fill, ranging in thickness from one to three feet. Site 17 is underlain by silty/clayey sands and sandy silt and clay. Unified Soil Classification System (USCS) classifications for the surficial soils identified at the site are SM (silty sand) and CL (silty clays, and silt and clays). Surface water runoff flows into catch basins that connect to the NNSY stormwater system, which discharges into the Southern Branch of the Elizabeth River.

Groundwater, encountered at depths ranging from 3 to 5 feet below ground surface (bgs), flows east to discharge to the Southern Branch of the Elizabeth River. The hydraulic gradient of the water table aquifer (Columbia aquifer) is very flat (0.004 feet per foot [ft/ft]) from northwest to southeast. The average estimated hydraulic conductivity is 2.80 feet per day (ft/day), and the estimated average linear groundwater velocity is 0.032 ft/day.

4.2.3 Land and Resource Use

Site 17 was historically used for plating operations and is currently vacant. The Navy plans to demolish Building 195 in the foreseeable future; however, the land use will remain industrial. The entire surface of Site 17 is paved; surface water runoff flows into catch basins that connect to the NNSY stormwater system, which discharges into the Southern Branch of the Elizabeth River.

LUCs are currently maintained at Site 17 to prohibit development and use of the property for unrestricted access to the site and to prohibit the development and use of the property for residential housing, elementary and secondary schools, childcare facilities, or a playground. The current land use is industrial. There are no other foreseeable future land uses other than industrial.

4.2.4 History of Contamination

The remedy for Site 17 is LUCs to prevent unrestricted exposure to contaminated soil.

Soil samples were collected for analysis of metals, cyanide, and hexavalent chromium during the IRI between 1986 and 1988 based on the use of the site as a plating shop. The IRI concluded that metals were present in the soil at levels posing a potential risk to human health, and recommended additional investigation of Site 17.

Soil samples were collected for analysis for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides/polychlorinated biphenyls (PCBs), and metals during the Phase II RI in 1999 (CH2M HILL, 2002b). One soil sample had a single SVOC (benzo(a)pyrene) detected above Industrial Risk-Based Concentrations (RBCs). Arsenic was the only metal detected in soil above the Industrial RBCs.

4.2.4.1 Initial Response

Site 17 was identified in the IAS (Water and Air Research, 1983). An IRI occurred in 1989 (IT Corp., 1989) followed by a two-phase RI (including an FS) in 1995 (Baker, 1995) and 1999 (Baker, 1999a). An FFS was completed in 2003 based on the information gathered in the RI. After two additional supplemental investigations, the FFS was revised in 2005. Based on the recommendations in the FFS and subsequent PP (Navy, 2006a), a ROD was signed in 2006 (Navy, 2006b) followed by the implementation of LUCs at the site.

4.2.4.2 Site Risks

The potential human health risks associated with exposure to soil within Site 17 were quantitatively evaluated for industrial land use exposure scenarios as part of the Phase I and Phase II RI Report, and subsequent 2001 and 2004 supplemental data collection efforts. Potential human health risks associated with residential soil exposure scenarios were qualitatively evaluated and assumed to be unacceptable for Site 17.

Human Health Risk

The Human Health Risk Assessment (HHRA) in the Revised FFS (CH2M HILL, 2005) evaluated the data from the 2004 Supplemental Investigation and the Phase I RI data set. The HHRA concluded that there is no unacceptable risk to current/future onsite industrial workers or future construction workers exposed to Site 17 soils; hence, there are no constituents of concern (COCs) for these receptors in the soils. An unacceptable human health risk associated with future residential exposure to soil is assumed based on a qualitative evaluation; therefore, a quantitative risk assessment, with risk characterization, was not completed for this exposure scenario, and no COCs were identified. The preliminary evaluation of the future residential exposure scenario indicated unacceptable adverse health hazards for the residential child potentially exposed to surface soil. The risk to potential future residents was not quantified since residential development of Site 17 is highly unlikely and LUCs to prohibit this type of development would be effective to mitigate such exposure and any related potential site risk.

Based on the evaluation of groundwater data from monitoring wells at Site 17 in the Revised FFS/HHRA (CH2M HILL, 2005), as documented in the ROD, based on the comparison to MCLs and an evaluation of NNSY background concentration of metals naturally occurring in groundwater, the Navy in partnership with EPA and VDEQ agreed that human health risks associated with potable use of groundwater are not unacceptable (Navy, 2006b). As such, there are no COCs in the Site 17 groundwater for any human receptors.

Ecological Risk

Site 17 is an industrial site. Because the site is entirely paved or covered with a building, it provides no viable ecological habitat. As such, there is no direct exposure pathway for ecological receptors at Site 17. Therefore, Site 17 currently poses no unacceptable ecological risk; however, the groundwater discharge to surface water pathway was not evaluated.

4.2.5 Basis for Remedial Action

Based on the results of previous investigations and actions conducted to date, only a potential unacceptable risk to future residents from exposure to soil is present. Based on a comparison to the MCLs and an evaluation of NNSY background concentration of metals naturally occurring in groundwater, the Navy in partnership with EPA and VDEQ agreed that human health risks associated with potable use of groundwater were not unacceptable (Navy, 2006b) and other media (surface water or sediment) are associated with the site. No specific COCs were identified in Site 17 soils because an unacceptable risk is assumed for residential receptor exposure. No unacceptable risks were identified for current receptors (industrial workers or future construction workers) for exposure to soil.

4.3 Remedial Actions

4.3.1 Remedy Selection

A ROD for Site 17 was signed in August 2006. The ROD report summarized the risks to human health and ecological receptors, established RAOs, and defined the selected remedy. The selected remedy for Site 17 was defined as LUCs to meet the following RAO:

- Prevent unrestricted exposure to contaminated soil

The following LUC objectives for Site 17 were selected in the ROD:

- Prohibit unrestricted access to the site and to prohibit the development and use of the property for residential housing, elementary and secondary schools, childcare facilities, or a playground.

4.3.2 Remedy Implementation

LUCs restrictions have been implemented with the actions detailed in the Site 17 LUC RD (Navy, 2010c). The LUCs shall be maintained on all land within the boundaries of Site 17 until such time that additional actions are taken under CERCLA that allow for unlimited use and unrestricted exposure. To ensure continued implementation, a base Master Plan for NNSY accounts for land use restrictions across the facility and the LUC boundaries for Site 17 are annotated in the Navy's Geographical Information System.

4.4 Progress Since Last Five Year Review

During the 2011 Five Year Review the selected remedy for Site 17 was protective of human health and the environment. Exposure pathways that could result in unacceptable risk were being controlled through the enforcement of LUCs. As a result, no recommendations for future investigations or follow-up actions were required.

4.5 Five Year Review Process

Interviews were conducted with NNSY Facility Planning on August 3, 2016 as part of the Five-year Review process. The interview summary is provided in Appendix B. In general, no significant concerns with the environmental restoration program were expressed. Recommendation was made for the site LUC boundaries to be more readily accessible within the Navy's geo-spatial mapping program capable of projecting land features, boundaries, land restrictions, etc. Additionally, no long-term monitoring (LTM) data is collected because of the LUC only remedy.

4.5.1 Site Inspections

Annual inspections have been conducted by the Navy at Site 17 since August 2006. In addition, the Navy, USEPA, and VDEQ conducted a site inspection to support the Five-Year Review in February 2016. The site is within the CIA

of NNSY and the site use remains industrial. The ground surface is completely paved with asphalt and/or concrete and no soil is exposed.

Since the Navy in partnership with EPA and VDEQ agreed that human health risks associated with potable use of groundwater were not unacceptable, no action was required for groundwater. As a result, the NNSY partnering team agreed that the groundwater monitoring wells at Site 17 were no longer necessary and required abandonment. Seven monitoring wells at Site 17 were abandoned in accordance with the procedures outlined in Virginia Department of Environmental Quality Storage Tank Program Fact Sheet: Monitoring Well Abandonment and 12 VAC5-630-450 450. Well abandonment details were outlined in the Summary of Well Abandonment Activities at Norfolk Naval Shipyard (NNSY) Sites 10 & 17, Portsmouth, Virginia Technical Memorandum (CH2M, 2012). The Site 17 completed Site Inspection Checklist is included in **Appendix C**.

4.6 Technical Assessment

Question A: Is the remedy functioning as intended by the decision document?

- **Remedial Action Performance:** Based on the review of historic documents, applicable or relevant and appropriate requirements (ARARs), risk assumptions, and site inspection reports, the remedy at Site 17, consisting of LUCs is functioning as intended and is protective for human health and the environment. Exposure pathways that could result in an unacceptable risk are being controlled through LUCs (to prohibit development and use of the property for residential housing, elementary and secondary schools, child care facilities, or a playground).
- **Implementation of LUCs:** The Navy adheres to the requirements of the LUC RD for Site 17, which are to:
 - Conduct 5-year reviews of the Remedy and prepare a report that provides the results to EPA and the VDEQ.
 - Conduct annual inspections of the LUCs, in accordance with approved checklists, and provide a yearly report to EPA and VDEQ. Yearly reports identify all implementation actions that have been taken and need to be taken to maintain LUCs according to the ROD, including inconsistent land use activity at the site, any LUC failures, and the corrective action taken or proposed for each.
 - Indicate where LUCs have been imposed and annotate LUC objectives in the Navy Geographic Information System (GIS) database and real estate summary map(s) for the installation, and follow LUC-related procedures pertaining to ground-disturbing activity and changes in land use, as per *Commander, Navy Region, Mid-Atlantic Instruction 5090.2, Installation Restoration; Land Use Controls at Navy Region, Mid-Atlantic Installations; Establishment and Maintenance*, as amended.

Based on the above items, implementation of the Base-wide site approval and dig-permitting process prohibits unauthorized ground disturbance and protects the remedy.

- **LTM Activities:** The site remedy is LUCs only; therefore, LTM activities consist of maintaining LUCs including site inspections to verify land use and confirm that site conditions have not changed.
- **Opportunities for Optimization:** LUC implementation is effectively being implemented and requires no additional optimization.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

- **Changes in Exposure Pathways:** No changes in the site conditions that would affect exposure pathways have been identified during the Five-Year Review; however, the groundwater discharge to surface water pathway was not evaluated. No new contaminants, sources, or routes of exposure have been identified as part of this Five-Year Review. Vapor intrusion is not an exposure pathway because the contaminants present at Site 17 are not volatile.

- **Changes in Toxicity and Other Contaminant Characteristics:** Although there have been some changes in toxicity values, regulatory levels, and risk characteristics of some contaminants detected in Site 17 media, these changes do not affect the protectiveness of the selected remedy as they do not change the results of the risk assessment. The remedy is LUCs; LUCs restrict residential land use which may result in exposure to soil. Toxicity changes were noted but no additional use restrictions were required and the remedy remains protective of human health and the environment. With regard to 1,4-dioxane, although toxicity values were issued for 1,4-dioxane, 1,4-dioxane is a stabilizer that was commonly used in chlorinated solvents (i.e. plating solutions), primarily 1,1,1-TCA and less typically TCE. Per the Site 17 Phase II Remedial Investigation (Baker, 1999a), soil and groundwater samples were previously collected and analyzed for VOCs, SVOCs, pesticides, PCBs, and metals. No VOCs were detected in site surface or subsurface soil. In groundwater, neither 1,1,1-TCA nor TCE were detected. Based upon the lack of 1,1,1-TCA and TCE in groundwater and lack of evidence that a release of plating solutions occurred at the site, it is not expected that 1,4-dioxane would be present in site soil or groundwater. Therefore, no sampling for 1,4-dioxane at Site 17 is warranted.
- **Changes in Risk Assessment Methodologies:** Although there have been some procedural changes to how human health risk assessments are conducted, including how exposure point concentrations are calculated and the parameter values for the inputs to the dermal exposure estimates from groundwater, none of these changes affect the protectiveness of the remedy.

The ERA originally completed for Site 17 concluded there were no ecological receptors and/or ecological exposure pathways associated with this site based on its highly industrialized nature. These investigations also indicate that stormwater is managed onsite and there is no potential for the transport of chemicals to offsite locations. Land use activities and habitats on these sites have not changed over the past five years. It is therefore concluded there are still no complete terrestrial ecological exposure pathways for this site; however, the groundwater to surface water pathway will need to be evaluated for potential risk to aquatic ecological receptors.

Question C: Has any other information come to light that could question the protectiveness of the remedy?

- Since the completion of the 2011 Five-Year perfluorinated compounds (PFCs) have been identified as an emerging contaminant that is associated with certain types of plating processes. Based on site history, these constituents have the potential to be present in site groundwater.

4.7 Issues, Associated Recommendations, and Follow Up Actions

Tables 4-1 and 4-2 outline the issues identified during this FYR and presents recommendations and follow-up actions.

4.7.1 Issues

TABLE 4-1
Site 17 Issues Identified

Issue	Currently Affects Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
PFCs have been identified by the USEPA as an emerging contaminant. Based on site history, these constituents have the potential to be present in site groundwater.	N	TBD ¹
The potential impacts of groundwater discharge to surface water has not been evaluated for this site.	N	TBD ²

¹ In order to determine the future protectiveness, groundwater samples will be collected to determine the absence or presence of PFCs and assess any potential risks.

² In order to determine the future protectiveness, initially an evaluation of the groundwater discharge to surface water pathway through an assessment of available groundwater data and refinement of the CSM will be conducted. Following this evaluation, any follow-on activities will be jointly agreed upon by the Tier I Partnering Team if warranted.

4.7.2 Recommendations and Follow-Up Actions

TABLE 4-2

Site 17 Recommendations and Follow-up Actions

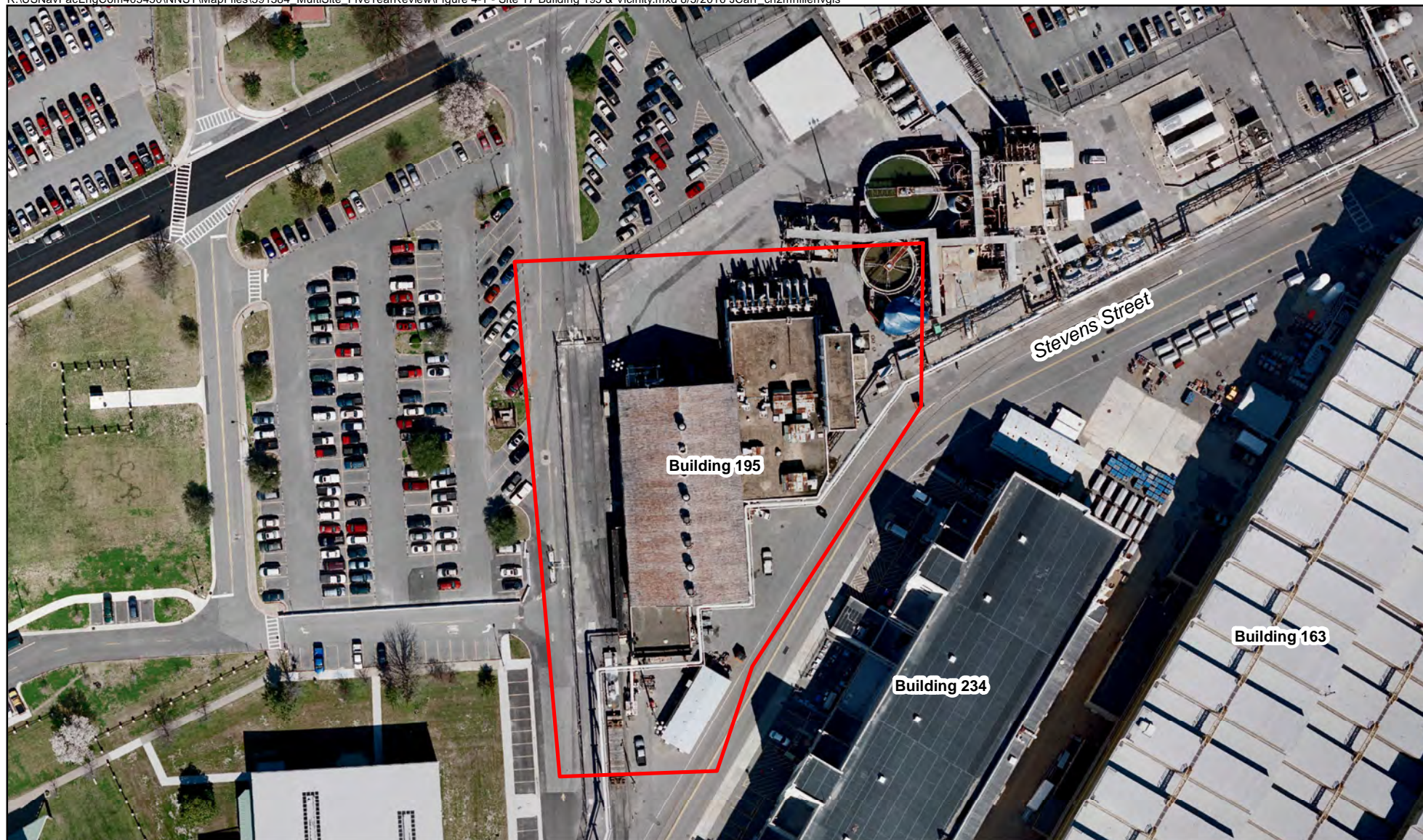
Issue	Recommendations/ Follow-Up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Y/N)	
					Current	Future
PFCs have been identified by the USEPA as an emerging contaminant. Based on site history, these constituents have the potential to be present in site soil and groundwater.	Though there is no direct exposure, determine the presence or absence of PFCs in site groundwater.	Navy, USEPA, and VDEQ	Navy	2019	N	TBD
The potential impacts of groundwater discharge to surface water has not been evaluated for this site.	The Navy, at the request of the EPA, will initiate an evaluation of the groundwater discharge to surface water pathway through an assessment of available groundwater data and refinement of the CSM.	Navy, USEPA, and VDEQ	Navy	2019	N	TBD

4.8 Protectiveness Summary

The remedy at Site 17, consisting of LUCs for soil is currently protective for human health and the environment. There are no current exposure pathways to groundwater and exposure pathways that could result in an unacceptable risk from exposure to soil are being controlled through LUCs (to prohibit development and use of the property for residential housing, elementary and secondary schools, child care facilities, or a playground), There are no current exposure pathways for groundwater as it is not currently used as a potable drinking water source. However, in order to ensure the continued protectiveness of the remedy, a groundwater evaluation should be completed to determine the presence/absence of PFCs in site groundwater. In addition, the Navy at the request of the EPA, will initiate an evaluation of the groundwater discharge to surface water pathway through an assessment of available groundwater data and refinement of the CSM.

4.9 Next Review

The next Five-Year Review for Site 17 will be in 2021.



Legend

 Site 17 LUC Boundary



0 50 100
Feet

Figure 4-1
Site 17 - Building 195 and Vicinity
Norfolk Naval Shipyard
Portsmouth, Virginia

Site 10—1927 Landfill

5.1 Site Chronology

Date	Event
1983	IAS (Water and Air Research, 1983)
1986	RFA (NUS Corporation, 1986)
1987	RFA-S (A. T. Kearney, 1987)
1994	EPIC Study (USEPA, 1994)
1999	NNSY on NPL
2000	SSA (Baker, 1999b)
2003	Site Screening Process (SSP) (CH2M HILL, 2003a)
2005	Supplemental Site Investigation (SSI) Activities
2006	RI/HHRA/FFS (CH2M HILL, 2006)
2006	Proposed Plan (PP) (Navy, 2006c)
2008	ROD (Navy, 2008)
2010	Remedial Design (RD) for Land Use Controls (LUC) (Navy, 2010c)
2011	Limited RACR (Navy, 2011c)

5.2 Site Background

5.2.1 Description

Site 10 (USEPA OU6), known as the 1927 Landfill in historical documents, is an industrial area located in the southern portion of the Main Shipyard. The physical setting of Site 10 consists of paved roads, parking lots, and Buildings 260, 297, and 510 (**Figure 4-1**). The areas to the north, west, and south of the site are industrial areas, while the east side of the site is adjacent to Slip 5 and Dry Dock 8 along the Southern Branch of the Elizabeth River.

The site was reportedly used from before 1927 until 1941. There is no specific design or information on materials used as fill. Basewide investigations and assessments have indicated that based on the activities at NNSY, salvage waste, sandblast grit, flyash, and asbestos may be found at the site and no release controls such as clay liners, leachate collection systems, or compacted cover material are in place. However, results from debris delineation activities completed in 2001 and a historical photograph review indicate that the site consists primarily of dredge fill material and a small amount of construction debris rather than waste consistent with an industrial landfill (CH2M HILL, 2006). Therefore, the Navy, in partnership the USEPA and VDEQ, agree that Site 10 is more likely to have been a “filling operation to reclaim land” than a “landfill.”

5.2.2 Geology and Hydrogeology

Site 10 was created by filling a tidal tributary (Back Creek) to the Southern Branch of the Elizabeth River, reportedly used from before 1927 to 1941. The ground surface to approximately 2 feet bgs is comprised of concrete and asphalt with gravel in some areas. Fill and debris material were present generally to 6 feet bgs, with some areas extending to 12 feet bgs (CH2M HILL, 2006). The debris does not appear to be restricted to specific areas and consists of concrete, wood, glass, ceramic fragments, brick, and slag. The fill material(s) (predominantly

sand and gravelly sands) are present to a depth of approximately 16 to 18 feet bgs, which comprises the unconfined Columbia aquifer. While site-specific hydraulic conductivity testing has not been performed at Site 10, hydraulic testing has been performed at nearby Site 17, where the hydraulic conductivity is 2.8 ft/day. Surface water runoff flows into catch basins that connect to the NNSY stormwater system.

5.2.3 Land and Resource Use

Site 10 is located in the controlled industrial area of NNSY and covers approximately 36 acres. The site consists of dredge fill material and small amounts of construction debris covered by buildings, asphalt roads, and concrete. The area is bordered by Dry Dock 8 and Slip 5 to the east and is currently used to support the industrial operations of the Shipyard, primarily the overhaul and repair of Navy ships.

LUCs are currently maintained at Site 10 to prohibit development and use of the property for residential housing, elementary and secondary schools, child care facilities, or a playground. There are no other foreseeable future land uses.

5.2.4 History of Contamination

The remedy for Site 10 is LUCs to prevent unrestricted exposure to contaminated soil.

Surface soil and subsurface soil samples were collected during the SSP (CH2M HILL, 2003a), and RI/HHRA/FFS (CH2M HILL, 2006) for analysis of VOCs, SVOCs, pesticides/PCBs, metals (groundwater was also analyzed for dissolved metals). Soil analytical results were screened against industrial RBCs.

Several SVOCs (benzo(a)pyrene, dibenz(a,h)anthracene, benzo(a)anthracene, and benzo(b)fluoranthene) and two metals (arsenic and lead) were detected in soil samples at Site 10 at concentrations that exceeded industrial RBCs and/or the background upper tolerance limits. These constituents were retained as relevant constituents in the RI/HHRA/FFS.

5.2.4.1 Initial Response

Site 10 was identified in the IAS (Water and Air Research, Inc., 1983). Subsequent investigations, including the RI/HHRA/FFS occurred from 1986 to 2006. Based on the recommendations in the FFS, a ROD was signed in 2008 (Navy, 2008) followed by the application of LUCs at the site.

5.2.4.2 Site Risks

A RI/HHRA/FFS was completed in June 2006 to evaluate the risks to human health from exposure to soil at Site 10 (CH2M HILL, 2006).

Human Health Risk

The HHRA was conducted to assess potential human health risks to the construction workers, future industrial workers, and future residents that may be impacted by a CERCLA release from Site 10. The results indicated that exposure to soil would not pose unacceptable risks to construction workers or industrial workers at the site. However, future residential use of the site would result in potential unacceptable risks because of exposure to lead in soil.

A potential risk from arsenic in groundwater (maximum detected concentration of 65.2 µg/L [total] and 52.9 µg/L [dissolved] compared to the MCL of 10 µg/L) was identified in the HHRA. A risk management determination was made recommending no action for groundwater based upon statistical analysis of the monitoring well data and the site-wide distribution of arsenic in soil versus arsenic in groundwater. A separate technical memorandum summarizing the potential groundwater risks associated with arsenic, and rationale for risk management, was completed for Site 10. The recommendation of the technical memorandum was no action for groundwater, which was summarized and documented in the ROD for Site 10.

Ecological Risk

For ecological risk, there are limited exposure routes because of the industrial nature of Site 10, and any minimal exposure would not pose unacceptable risk. The ERA concluded NFA is necessary to be protective of ecological receptors; however, the groundwater discharge to surface water pathway was not evaluated.

5.2.5 Basis for Remedial Action

The RI/HHRA/FFS concluded that the COC identified in Site 10 soil was lead. No unacceptable risks were identified for current industrial workers or future construction workers for exposure to soil. A potential risk to future residents is present at the site due to elevated lead concentrations in soil.

5.3 Remedial Actions

5.3.1 Remedy Selection

A ROD for Site 10 was signed in September 2008. This report summarized the risks to human health and ecological receptors, established Remedial Action Objectives (RAOs), and defined the selected remedy. The selected remedy for Site 10 was defined as LUCs to meet the following RAO:

- Prevent residential or childcare use until site conditions allow for unlimited use and unrestricted exposure to surface and subsurface soil without unacceptable levels.

The following LUC objective for Site 10 was selected in the ROD:

- Prohibit the development and use of the property for residential housing, elementary and secondary schools, child care facilities, or a playground.

5.3.2 Remedy Implementation

LUCs restrictions have been implemented with the actions detailed in the Site 10 LUC RD (Navy, 2010c). The LUCs shall be maintained on all land within the boundaries of Site 10 until additional actions are taken under CERCLA that allow for unlimited use and unrestricted exposure to surface and subsurface soil. To ensure continued implementation, a base Master Plan for NNSY accounts for land use restrictions across the facility and the LUC boundaries for Site 10 are annotated in the Navy's Geographical Information System.

5.4 Progress Since Last Five Year Review

During the 2011 Five Year Review the selected remedy for Site 10 was protective of human health and the environment. Exposure pathways that could result in unacceptable risk were being controlled through the enforcement of LUCs. As a result, no recommendations for future investigations or follow-up actions were required.

5.5 Five-Year Review Process

Interviews were conducted with NNSY Facility Planning on August 3, 2016 as part of the Five-year Review process. The interview summary is provided in **Appendix B**. In general, no significant concerns with the environmental restoration program were expressed. Recommendation was made for the site LUC boundaries to be more readily accessible within the Navy's geo-spatial mapping program capable of projecting land features, boundaries, land restrictions, etc. Additionally, no long-term monitoring data is collected because of the LUC only remedy.

5.5.1 Site Inspections

Annual inspections have been conducted by the Navy at Site 10 since August 2008. In addition, the Navy, USEPA, and VDEQ conducted a site inspection to support the Five-Year Review in February 2016. The site extends within and outside the CIA of NNSY and site use remains industrial. The ground surface is completely paved with asphalt and/or concrete except for one tree within the CIA portion of NNSY.

Since no potential unacceptable risk for groundwater at Site 10 was identified, no action was required for groundwater. As a result, the NNSY partnering team agreed that the groundwater monitoring wells at Site 10 were no longer necessary and required abandonment. Ten monitoring wells at Site 10 were abandoned in accordance with the procedures outlined in Virginia Department of Environmental Quality Storage Tank Program Fact Sheet: Monitoring Well Abandonment and 12 VAC5-630-450 450. Well abandonment details were outlined in the Summary of Well Abandonment Activities at Norfolk Naval Shipyard (NNSY) Sites 10 & 17, Portsmouth,

Virginia Technical Memorandum (CH2M, 2012). The Site 10 completed Site Inspection Checklist is included in **Appendix C**.

5.6 Technical Assessment

Question A: Is the remedy functioning as intended by the decision document?

- **Remedial Action Performance:** Based on the review of historic documents, ARARs, risk assumptions, and site inspection reports, the remedy at Site 10, consisting of LUCs is functioning as intended and is protective for human health and the environment. Exposure pathways that could result in unacceptable risk are being controlled through LUCs (to prohibit development and use of the property for residential housing, elementary and secondary schools, child care facilities, or a playground).
- **Implementation of LUCs:** The Navy adheres to the requirements of the LUC RD for Site 10, which are to:
 - Conduct 5-year reviews of the Remedy and prepare a report that provides the results to EPA and the VDEQ.
 - Conduct annual inspections of the LUCs, in accordance with approved checklists, and provide a yearly report to EPA and VDEQ. Yearly reports identify all implementation actions that have been taken and need to be taken to maintain LUCs according to the ROD, including inconsistent land use activity at the site, any LUC failures, and the corrective action taken or proposed for each.
 - Indicate where LUCs have been imposed and annotate LUC objectives in the Navy Geographic Information System (GIS) database and real estate summary map(s) for the installation, and follow LUC-related procedures pertaining to ground-disturbing activity and changes in land use, as per *Commander, Navy Region, Mid-Atlantic Instruction 5090.2, Installation Restoration; Land Use Controls at Navy Region, Mid-Atlantic Installations; Establishment and Maintenance*, as amended.

Based on the above items, implementation of the Base-wide site approval and dig-permitting process prohibits unauthorized ground disturbance and protects the remedy.

- **LTM Activities:** The site remedy is LUCs only; therefore, LTM activities consist of maintaining LUCs including site inspections to verify land use and confirm that site conditions have not changed.
- **Opportunities for Optimization:** LUC implementation is effectively being implemented and requires no additional optimization.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

- **Changes in Exposure Pathways:** No changes in the site conditions that would affect exposure pathways have been identified during this Five-Year Review; however, the groundwater discharge to surface water pathway was not evaluated. No new contaminants, sources, or routes of exposure have been identified as part of this Five-Year Review. Vapor intrusion is not an exposure pathway because the contaminants present at Site 10 are not volatile.
- **Changes in Toxicity and Other Contaminant Characteristics:** Although there have been some changes in toxicity values, regulatory levels, and risk characteristics of some contaminants detected in Site 10 media, these changes do not affect the protectiveness of the selected remedy as they do not substantially change the results of the risk assessment. The remedy is LUCs; LUCs restrict residential land use which may result in exposure to elevated concentrations of lead in soil. Toxicity changes were noted but no additional use restrictions were required and the remedy remains protective of human health and the environment.
- **Changes in Risk Assessment Methodologies:** Although there have been some procedural changes to how human health risk assessments are conducted, including how exposure point concentrations are calculated and the parameter values for the inputs to the dermal exposure estimates from groundwater, none of these changes affect the protectiveness of the remedy.

The ERA originally completed for Site 10 concluded there were no ecological receptors and/or ecological exposure pathways associated with Site 10 based on its highly industrialized nature. Land use activities and habitats on this site have not changed over the past 5 years. It is therefore concluded there are still no complete terrestrial ecological exposure pathways for this site; however, the groundwater to surface water pathway will need to be evaluated for potential risk to aquatic ecological receptors.

Question C: Has any other information come to light that could question the protectiveness of the remedy?

- Since the completion of the 2011 Five-Year review, toxicity values have been established dioxins/furans. Based on site history, these constituents have the potential to be present in site soil and groundwater due to the potential presence of flyash at the site. Because the site is covered in paved roads, parking lots, and Buildings 260, 297, and 510 there are currently no exposure pathways to soil. The current site conditions combined with LUCs restrictions prevent exposure which may result in exposure to elevated concentrations of contaminants in soil. Therefore, although toxicity changes were noted for dioxins/furans in soil no additional use restrictions were required and the remedy for soil remains protective of human health and the environment. Groundwater is not currently used at the facility; however, no LUCs are currently in place to restrict exposure to groundwater; therefore, the presence or absence of dioxins/furans in groundwater should be determined to assess future protectiveness of the remedy.

5.7 Issues and Associated Recommendations, and Follow Up Actions

Tables 5-1 and 5-2 outline the issues identified during this FYR and presents recommendations and follow-up actions.

5.7.1 Issues

TABLE 5-1
Site 17 Issues Identified

Issue	Currently Affects Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
Toxicity values were established for dioxins and furans. Based on site history, these constituents have the potential to be present in site groundwater.	N	TBD ¹
The potential impacts of groundwater discharge to surface water has not been evaluated for this site.	N	TBD ²

¹ In order to determine the future protectiveness, groundwater samples will be collected to determine the absence or presence of dioxins and furans and assess potential risks.

² In order to determine the future protectiveness, initially an evaluation of the groundwater discharge to surface water pathway through an assessment of available groundwater data and refinement of the CSM will be conducted. Following this evaluation, any follow-on activities will be jointly agreed upon by the Tier I Partnering Team if warranted.

5.7.2 Recommendations and Follow-Up Actions

TABLE 5-2

Site 17 Recommendations and Follow-up Actions

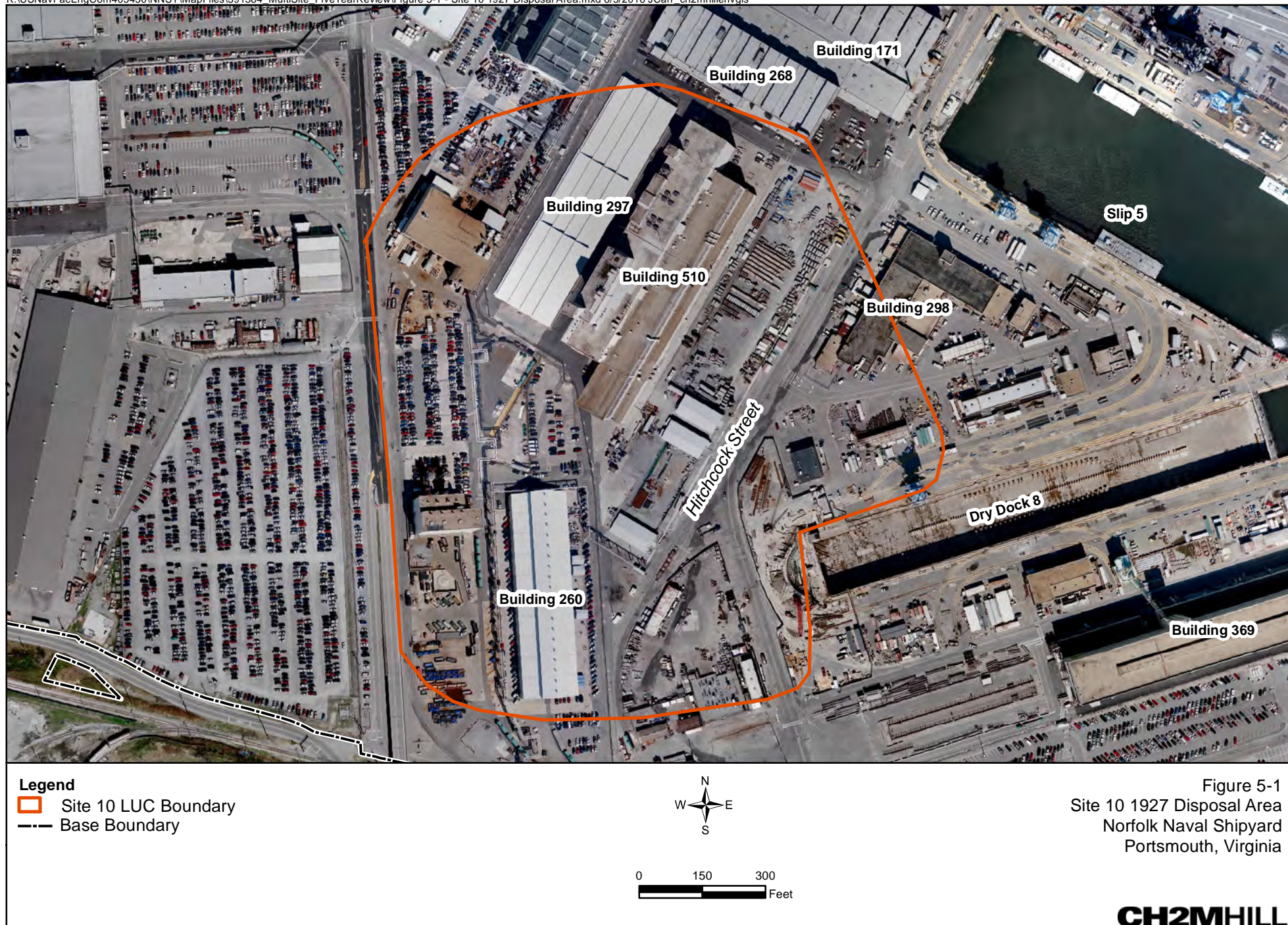
Issue	Recommendations/ Follow-Up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Y/N)	
					Current	Future
Toxicity values were established for dioxins and furans. Based on site history, these constituents have the potential to be present in site groundwater.	Though there is no direct exposure, determine if dioxins and furans are present in site groundwater at concentrations potentially posing risk to human health.	Navy, USEPA, and VDEQ	Navy	2018	N	TBD
The potential impacts of groundwater discharge to surface water has not been evaluated for this site.	The Navy, at the request of the EPA, will initiate an evaluation of the groundwater discharge to surface water pathway through an assessment of available groundwater data and refinement of the CSM.	Navy, USEPA, and VDEQ	Navy	2018	N	TBD

5.8 Protectiveness Summary

The remedy at Site 10, consisting of LUCs is currently protective for human health and the environment. There are no current exposure pathways to groundwater and exposure pathways that could result in an unacceptable risk from exposure to soil are being controlled through LUCs (to prohibit development and use of the property for residential housing, elementary and secondary schools, child care facilities, or a playground) and there are no current exposure pathways for groundwater as it is not currently used as a potable drinking water source. However, in order to ensure the continued protectiveness of the remedy, a soil and groundwater evaluation should be completed to determine if dioxins and furans are present in site soil and groundwater at concentrations potentially posing risk to human health. In addition, the Navy at the request of the EPA, will initiate an evaluation of the groundwater discharge to surface water pathway through an assessment of available groundwater data and refinement of the CSM.

5.9 Next Review

The next Five-Year Review for Site 10 will be in 2021.



Operable Unit 2 (Soils)—Paradise Creek Disposal Area

6.1 Site Chronology

Date	Investigation
1983	IAS (Water and Air Research, 1983)
1983	NNSY Landfill Management Plan (Talbot and Associates, 1983)
1986	RFA (NUS Corporation, 1986)
1989	IRI (IT Corp., 1989)
1989	Site 3 deemed closed
1994	EPIC Study (USEPA, 1994)
1995	RI/FS (FWEI, 1995)
1996	Site Characterization and Conceptual Design (OHM, 1997)
1999	NNSY on NPL
2002	Phase II RI (CH2M HILL, 2002b)
2004	Site 7 Engineering Evaluation/Cost Analysis (EE/CA) (CH2M HILL, 2004)
2005 – 2006	Site 7 NTCRA (FSSI, 2007)
2007	Construction Completion Report, Site 7 (Shaw, 2007)
2009	FFS (CH2M HILL, 2009)
2009	PP (Navy, 2009)
2010	ROD (Navy, 2010a)
2010	Post-Closure Monitoring Plan (Navy, 2010b)
2011	Construction Completion Report (Soil Cover) (Shaw, 2011)
2011	LUC RD (Navy, 2011a)
2011	RACR (Navy, 2011b)

6.2 Background

6.2.1 Site Descriptions

OU2 (USEPA OU2), Paradise Creek Disposal Area, encompasses approximately 91 acres and lies adjacent to Paradise Creek at the southern boundary of NNSY (**Figure 1-1**). OU2 is bounded to the northwest, across Victory Boulevard, by a refuse-derived fuel processing plant operated by the Southeastern Public Service Authority; to the east by Atlantic Wood Industries, Inc. (a former wood-treatment facility currently on the USEPA Region III NPL), the Portsmouth School Board vehicle maintenance and refueling yard, and the Vane Brothers Marine Terminal property formerly used for petroleum bulk-storage; and to the south and southwest by Paradise Creek, a tributary to the Southern Branch of the Elizabeth River. The land on the opposite bank of Paradise Creek (the south bank) is also industrial. Some of these properties that surround OU2 have had documented releases of contaminants to groundwater (e.g., Atlantic Wood to the east of OU2 has released the wood-preserving chemicals pentachlorophenol [PCP] and creosote to the groundwater).

OU2 consists of five individual sites (Sites 3, 4, 5, 6, and 7) as shown on **Figure 5-1**. Site 3 was used as a permitted landfill and for dredge spoil disposal and encompasses approximately 70 acres on the north bank of Paradise Creek. Sites 4, 5, 6 and 7, are located within the boundaries of Site 3. The individual sites are overlapping with no defined areas of contamination that can be attributed to one site rather than another. Additionally as a result of the NTCRA conducted at Site 7 from 2005 to 2006, which removed the waste and contaminated soils from the site, backfilled the area with clean soil, and created a tidal wetland (FSSI, 2007) adjacent to the site along the banks of Paradise Creek, no unacceptable human health or ecological risk remains at Site 7 that would prevent unlimited use and unrestricted exposure. The NFA determination was documented within the OU2 Soils ROD (Navy, 2010).

In 2009, the PMT agreed to address OU2 soil separately from groundwater, sediment, and surface water. The PP and ROD referenced in this Five-Year Review only pertain to soil at OU2. Groundwater, sediment, and surface water (USEPA OU7) continues to be under investigation and will be addressed in a future ROD.

Site 3

From 1954 through 1983, Site 3 reportedly served as a disposal area for dredge fill, abrasive blast material (ABM), paint residues, sanitary wastes, solvents, and other industrial residues. According to the IAS (Water and Air Research, 1983), the average rates of disposal of the primary wastes were estimated as follows:

- Salvage waste, including fluorescent tubes, mercury-contaminated rags, and construction/demolition debris: 1,200 tons per month
- Sandblasting grit: 1,500 tons per month
- Oil-fired power plant fly ash: 180 tons per month
- Coal-fired power plant fly ash: 1,800 tons per month
- Salvage waste, fuel-boiler-plant bottom ash: 1,700 tons per month up through 1977, 400 tons per month after 1977
- Asbestos waste: 320 cubic yards per month

Building 431, formerly located on the eastern side of the Western Area, was an incinerator used for burning liquid and solid waste until the late 1960s.

According to the NNSY Landfill Management Plan (Talbot and Associates, 1983), solid waste disposal operations continued until approximately 1983, when the landfill's permit expired. An application for a state permit to vertically expand both the Eastern and Western Landfills was denied. Between 1983 and 1985, an unspecified final cover material was applied to the Eastern Landfill. A letter from the Commonwealth of Virginia Department of Waste Management to the Environmental Programs Division of NNSY indicated the closure procedure for the facility had been accomplished and the site was deemed to be properly closed (Commonwealth of Virginia, 1989).

Site 4

Site 4, Liquid Waste Holding Ponds, was an area north of the Western Landfill that consisted of five former chemical waste holding ponds constructed between 1963 and 1972 on top of and within the fill material comprised of brick fragments, wood chips, crushed rock fragments, and construction debris, mixed with silts and sands (as noted by boring logs from the site). These ponds received liquid wastes between 1963 and 1980. According to the historical information provided in the Phase II RI (CH2M HILL, 2002b), four of the five ponds were lined with either a clay liner or asphalt. As documented by Navy records, the types of waste held in the ponds at Site 4 included cyanides, acids, degreasers, solvents, alkali, and other materials. When the ponds were full, the liquids were pumped into tanker trucks for offsite disposal. Prior to covering the pits with soil in 1981 (1 foot of clay and 6 inches of topsoil), remaining liquids were pumped out and disposed of offsite (NNSY, 1981). Site 4 was not operated within a regulatory program and, as such, the covering/closure of the holding ponds was not completed in accordance with any specific regulations.

Site 5

Site 5, Oil Reclamation Area (ORA), was an area north of the Site 3 Western Landfill used to store and consolidate used petroleum, oil, and lubricants (POL) from 1963 to the early 2000s before contract sale to Craney Island for reclamation. Two underground storage tanks (USTs) were used at the site for this purpose. The first tank was a 10,000-gallon tank in use from 1968 until the early 1980s. Because of suspected leaks, this tank was replaced in the 1980s by a new used-oil storage system. Navy record drawings indicate that the initial UST was abandoned in place by filling it with sand and capping the pipes. The new system consisted of a second 10,000-gallon UST, four bermed concrete pads used as staging areas for drums and tanker trucks, and an in-ground concrete oil-water separator (OWS) used to treat oily water collected in the four staging areas. An underground sewer pipe ran from floor drains in the four bermed staging areas to the OWS. A diversion box was installed on this line to manually divert oily water to the OWS and clean water to a 72-inch diameter storm sewer beneath the access road dividing the landfill areas. Treated water from the OWS was discharged through an underground pipe to the sanitary sewer. POL storage or handling has not been conducted at the site since 2005. A concrete area adjacent to the east side of Site 5 was reportedly used in the mid-1980s for storing containers of waste material (including oil, hydraulic fluid, and Freon) in 55-gallon drums (NUS Corporation, 1986). All former oil-handling structures (e.g., sumps, pipes) have been abandoned and taken out of service.

Site 6

Site 6, Former Liquid Waste Disposal Area, was an area north of the western portion of Site 3 where spent ABM was disposed of between the mid-1960s and 1977. Liquids such as acetone and alcohol were placed over top of the ABM and allowed to evaporate (White, 1998). Information about any completed closeout or cleanup activities that are specific to Site 6 is limited. The 1983 IAS indicated the exact location of the site could not be determined.

6.2.2 Geology and Hydrogeology

With the exception of the Site 7 area, a soil cover remedy was constructed over the historic ground surface of OU2 (Navy, 2010a and Navy 2011b). The soil cover was not constructed over Site 7 as the ROD concluded that no response action was necessary for Site 7. Currently, OU2 forms a local topographic high (approximately 20 feet above msl) and encompasses the entire area of Sites 3, 4, 5, and 6. The soil cover was extended over Site 4, 5, and 6 to provide for appropriate stormwater drainage for the site. Surface water runoff flows into catch basins that connect to the NNSY stormwater system or onsite ditches, which ultimately discharges into Paradise Creek.

OU2 is underlain by two aquifers: the Columbia aquifer and the Yorktown aquifer. The Yorktown confining unit separates the Columbia and the Yorktown. Hydraulic fill material has been identified in the upper portion of the surficial soils to depths ranging from five to 25 feet bgs (prior to placement of the soil cover). The fill makes up part of the upper portion of the Columbia aquifer. Prior to installation of the soil cover, groundwater flow was generally towards the 72-inch stormwater culvert (shallow groundwater) or southeast towards Paradise Creek and the Southern Branch of the Elizabeth River.

6.2.3 Land and Resource Use

Currently, access to OU2 is controlled with fencing and locked access gates. Since OU2 is a former disposal area managed under CERCL, the site is currently vacant as LUCs restrict its use. The future land use will continue to be vacant, through the implementation of LUCs to prevent unacceptable exposure of contaminants to the waste and soil beneath the soil cover. Access to the site is restricted except for inspection, monitoring, or necessary maintenance activities. The adjacent and surrounding land use is primarily industrial for both Navy and non-Navy entities and is anticipated to remain so for the foreseeable future.

6.2.4 History of Contamination

Prior to the placement of the OU2 soil cover remedy, the surface soil at OU2 was demonstrated to have elevated concentrations (i.e., above background levels) of metals (aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, silver, thallium, vanadium, and zinc) and of various polynuclear aromatic hydrocarbons (PAHs) and PCBs.

- Surface soil contamination was detected, particularly in the following locations:
 - Along the southern border of Site 4 (PAHs and phenols)
 - In drainage ditches that collect runoff from Site 4, Site 5, and the remainder of the Western Landfill (PAHs and phenols)
 - Along the northern part of the access road between Site 3 and the Atlantic Wood Industries, Inc. facility (PAHs, phenols, and arsenic), in the drainage ditch running along the southern side of the access road (pesticides), and in the eastern part of the Western Landfill on the embankment leading down to the access road (PAHs and phenols)
 - In the western and central parts of the Western Landfill (pesticides, PCBs, and metals)
 - In the northwest corner of the Eastern Landfill (metals)
 - Near the intersection of the service roads across the landfills and the access road (PAHs)
 - Where the access road meets Paradise Creek (PAHs)
 - At Site 5, PAHs, PCBs, and several metals were detected at concentrations above screening criteria.
- The fill material and subsurface soil contained VOCs, PAHs, PCBs, and metals. Maximum concentrations of most analytes in the subsurface soil were higher than in the surface soil. In general, the highest concentrations were detected in samples from depths greater than 2 to 3 feet bgs. No background data were collected for subsurface soil; concentrations of PAHs and several metals exceeded background results for surface soil. Exceedances of applicable screening criteria were detected in many locations on the site, particularly in the western part of the Site 3 Western Landfill (VOCs, PAHs, and PCBs), in and near Site 4 (VOCs, PAHs, phenols, PCBs, and metals), Site 7 (metals), the southeast corner of the Eastern Landfill (VOCs, PAHs, and metals) (removed in 2005-2006 NTCRA), and Site 6 (PAHs and metals). In Site 5 subsurface soil, total petroleum hydrocarbons (TPHs) and benzene, toluene, ethylbenzene, and xylenes (BTEX) were detected at elevated levels. Several PAHs, PCBs, and several metals were also detected above applicable screening levels in subsurface soil.

6.2.4.1 Initial Response

Preliminary environmental studies conducted at OU2 as part of base-wide efforts include the IAS and the RFA (NUS Corporation, 1986). Site-specific investigations conducted before NNSY was placed on the NPL in July 1999 consist of an IRI (IT Corp., 1989), an RI/FS (FWEI, 1995), and a Site Characterization and Conceptual Design (OHM, 1997).

Post-NPL investigation efforts include Phase II RI (CH2M HILL, 2002b), Draft OU2 FS (CH2M HILL, 2000), Waste Delineation Investigation (CH2M HILL, 2003c), EE/CA (CH2M HILL, 2004), NTCRA for Site 7 (FSSI, 2007), FFS (CH2M HILL, 2009). A ROD was signed in 2010 (Navy, 2010a) to select a soil cover and side slope stabilization as the remedy. OU 2 is a former disposal area managed under CERCLA, the site is currently vacant as LUCs restrict its use. The future land use will be limited to open space through the implementation of LUCs to prevent unacceptable exposure of contaminants in soil to receptors. Access to the site will continue to be controlled by fencing with locked access gates and is restricted except for inspection, monitoring, or maintenance activities.

6.2.4.2 Site Risks

Human Health Risk

The risks for Sites 3, 4, 6 were evaluated together during the Phase II RI (CH2M HILL, 2002b) while Site 5 was addressed separately in the Phase II RI (CH2M HILL, 2002b). Additionally, as a result of the NTCRA conducted at Site 7 from 2005 to 2006, which removed the waste and contaminated soils from the site, backfilled the area with clean soil, and created a tidal wetland (FSSI, 2007) adjacent to the site along the banks of Paradise Creek, no unacceptable human health or ecological risk remains at Site 7 that would prevent unlimited use and unrestricted exposure. The NFA determination for Site 7 was documented within the OU2 Soils ROD (Navy, 2010).

Sites 3, 4, and 6

Based on the HHRA completed in the Phase II RI (CH2M HILL, 2002b), there are no non-cancer hazards or cancer risks that exceed USEPA's acceptable levels for an industrial worker or future adult recreational user exposed to soil at Sites 3, 4, and 6 as evaluated as a combined data set in the Phase II RI.

Under a reasonable maximum exposure analysis, ingestion of and/or dermal contact with soil by a future adult or child resident, future construction worker, and future child recreational user would result in a non-cancer hazard and/or cancer risk above USEPA's acceptable levels.

Pre-NPL investigations at OU2 provided for separate risk evaluations for soil for Sites 3, 4, and 6. The 1995 RI data were superseded by the Phase II RI/HHRA (CH2M HILL, 2002b) in which the risk evaluation assessed Sites 3, 4, and 6 as a single, combined data set. Review of these data support the determination to assess sample results from each as a single site due to the similarity in detected constituents, concentrations and hazards and risks associated with Sites 3, 4, and 6 during previous investigations. Additionally, data from Sites 4 and 6 do not indicate that past liquid waste disposal activities have resulted in hazards or risks which are dissimilar to those posed by the former landfill activities in Site 3.

Site 5

Based on the HHRA, there are no non-cancer hazards or cancer risks that exceed USEPA's acceptable levels for an industrial worker, future construction worker, future resident, or future recreational user exposed to Site 5 soil. Although the reasonable maximum exposure cumulative non-cancer hazard for a future child resident (hazard index [HI] = 2.5) from exposure to soil exceeds USEPA's target threshold of 1, no individual compounds or target organs contribute a risk greater than 1. Therefore, there are no unacceptable risks or hazards for the future child resident from exposure to soil at Site 5.

Ecological Risk

An ERA (CH2M HILL, 2001) was completed to evaluate potential risks to ecological receptors in Paradise Creek and adjacent Navy landfills from chemicals potentially originating from three landfills associated with NNSY:

- Site 1 (USEPA OU5)—New Gosport Landfill
- Site 2 (USEPA OU1)—Scott Center Landfill
- OU2 (USEPA OU2)—Sites 3, 4, 5, 6, and 7

In addition to the evaluation of Paradise Creek, the ERA further evaluated ecological risks in adjacent upland areas (soil on the landfills) based on consideration of the presumptive remedies proposed for Site 2 (USEPA OU1)—Scott Center Landfill, OU2 (USEPA OU2)—Sites 3, 4, 5, 6, and 7, and removal actions completed during 2001 at the Site 1 (USEPA OU5)—New Gosport Landfill. The ERA concluded that the proposed soil cover over the OU2 landfill areas would eliminate the identified potential ecological risk from landfill soils.

6.2.5 Basis for Remedial Action

Based on the results of the HHRA and ERA, metals and PAHs are present in soil at levels resulting in unacceptable human health risks. Additionally, waste remains in place at the site and may also pose a hazard if exposed. Therefore, a response action was determined to be necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

6.3 Remedial Actions

6.3.1 Remedy Selection

A ROD for OU2 was signed in May 2010. The ROD summarized the risks to human health and ecological receptors, established RAOs, and defined the selected remedy. The selected remedy for OU2 was installation of a soil cover with side slope stabilization and LUCs to meet the following RAO:

- Prevent direct contact with contaminated soil posing unacceptable risk and reduce the potential for further erosion while being compatible with future actions that may be taken for groundwater at the site

The following LUC objectives for OU2 (soils) were selected in the ROD:

- Prevent exposure to contaminated soils and waste remaining in place
- Prohibit residential development or any other land use inconsistent with the RAO and selected soil remedy
- Prevent unauthorized access to the site with fencing, secured and locked gates, No-Trespassing signs, and limited site access
- Prevent activities that negatively affect the integrity of the soil cover and side slopes
- Comply with the Post-Closure Monitoring Plan, which includes gas monitoring, visual inspections, and maintenance activities.

The LUCs shall be maintained on all land within the OU2 LUC boundary (**Figure 5-1**) until the concentrations of hazardous substances in the soil have been reduced to levels that allow for unlimited use and unrestricted exposure.

6.3.2 Remedy Implementation

The selected remedy for contaminated soil at OU2 was a soil cover with side slope stabilization with LUCs and sediment excavation, backfill, and enhanced tidal wetland restoration. The installation of the soil cover with side slope stabilization in the *Final Completion Report, NTCRA – Phase 2 and Phase 3, OU2 –Paradise Creek Disposal Area, NNSY, Portsmouth, Virginia* (Shaw, 2011). Currently, access to OU2 is controlled with locked fencing. OU 2 is a former disposal area managed under CERCLA, the site is currently vacant as Land Use Controls (LUCs) restrict its use. The future land use will be limited to open space through the implementation of LUCs to prevent unacceptable exposure of contaminants in soil to receptors. The final LUC RD was finalized May 2011.

LUCs are implemented, maintained, monitored, inspected, enforced, and reported on as stated in the LUC RD (Navy, 2011a). To ensure continued implementation, a base Master Plan for NNSY accounts for land use restrictions across the facility and the LUC boundaries for OU2 are annotated in the Navy's Geographical Information System.

The Post Closure Monitoring Plan (Navy, 2010b) was created to define the objectives for landfill inspections and gas monitoring. The monitoring plan specified the final cover will be inspected for settling, subsidence, displacement, and erosion at least monthly for the first year following construction; additional visual inspections are conducted during and after major rain or storm events. The soil cover is inspected for the following:

- The final cover drainage system is inspected for ponding of water, erosion, and obstruction of culverts.
- Drainage structures, including ditches, swales, culverts, and channels, are inspected for sedimentation, blockage, obstructions, and erosion and to ensure proper drainage.
- Permanent survey benchmarks are protected and maintained.
- Signs are inspected for damage, fading, and obstructions to viewing.
- Roadways are inspected for erosion, rutting, physical damage, and obstructions.
- The Paradise Creek shoreline is inspected for instability, erosion, and raveling.
- The landfill gas venting system and landfill gas probes are inspected for damage and tampering.

Landfill gas monitoring was conducted quarterly at all landfill gas vents and probes for the first year following construction completion of the soil cover remedy. Based on the first year gas monitoring results, which indicated gases were not being generated at levels to pose any potential hazard, a determination was made that no further gas monitoring was required.

6.4 Progress Since Last Five Year Review

During the 2011 Five Year Review the selected remedy for OU 2 was protective of human health and the environment. Exposure pathways that could result in unacceptable risk were controlled through maintenance of

the soil cover (as warranted), enforcement of LUCs, and access restrictions (locked fence). As a result, no recommendations for future investigations of follow-up actions were required.

6.5 Five Year Review Process

Interviews were conducted with NNSY Facility Planning on August 3, 2016 as part of the Five-year Review process. The interview summary is provided in **Appendix B**. In general, no significant concerns with the environmental restoration program were expressed. Recommendation was made for the site LUC boundaries to be more readily accessible within the Navy's geo-spatial mapping program capable of projecting land features, boundaries, land restrictions, etc.

6.5.1 Site Inspections

Periodic inspections have been conducted by the Navy to inspect the integrity of the landfill soil cover since October 2010. Erosion and settlement issues have been identified throughout the soil cover following heavy rain events; the Navy quickly implemented temporary measures to minimize issues until a more permanent solution was identified (stone gabion baskets were installed in July 2011).

In addition, the Navy, USEPA, and VDEQ conducted a site inspection to support the second Five-Year Review in February 2016. The vegetation throughout the soil cover is established and in fair condition. A locked fence with restricted access signs are present, locked, and in good condition. Maintenance activities continue to be completed as necessary. The OU2 completed Site Inspection Checklist is included in **Appendix C**.

6.5.2 Performance Monitoring Data Summary

Periodic inspections indicated erosion and settlement issues have been identified in the soil cover following heavy rain events; the Navy quickly implemented temporary measures to minimize issues until a more permanent solution was identified. In July 2011, the Navy installed stone gabion baskets as a permanent solution to the washout areas identified in previous monthly inspections. The permanent fix was documented in the monthly report and will be monitored in future inspections.

6.6 Technical Assessment

Question A: Is the remedy functioning as intended by the decision document?

- **Remedial Action Performance:** Based on the review of historic documents, ARARs, risk assumptions, and site inspection reports, the OU2 Soils remedy is functioning as intended by the ROD.
- **Implementation of LUCs:** The Navy adheres to the requirements of the LUC RD for OU2, which are to:
 - Conduct 5-year reviews of the Remedy and prepare a report that provides the results to EPA and the VDEQ.
 - Conduct annual inspections of the LUCs, in accordance with approved checklists, and provide a yearly report to EPA and VDEQ. Yearly reports identify all implementation actions that have been taken and need to be taken to maintain LUCs according to the ROD, including inconsistent land use activity at the site, any LUC failures, and the corrective action taken or proposed for each.
 - Indicate where LUCs have been imposed and annotate LUC objectives in the Navy Geographic Information System (GIS) database and real estate summary map(s) for the installation, and follow LUC-related procedures pertaining to ground-disturbing activity and changes in land use, as per *Commander, Navy Region, Mid-Atlantic Instruction 5090.2, Installation Restoration; Land Use Controls at Navy Region, Mid-Atlantic Installations; Establishment and Maintenance*, as amended.
 - Post and maintain No-Trespassing signs.

Based on the above, implementation of the Base-wide site approval and dig-permitting process prohibits unauthorized ground disturbance and protects the remedy.

Implementation of LUCs and monthly soil cover inspections has ensured the facility land use remains consistent (former disposal area managed under CERCLA and access is restricted at the site).

- **LTM Activities:** The soil cover is inspected periodically for settling, subsidence, displacement, and erosion. Actions to address any issues identified by the site inspections are implemented by the Navy as soon as practicable. The objectives of the soil cover inspection are defined in Section 5.5.2

There are no sampling and analysis LTM activities for OU2 soil. Landfill gas monitoring was discontinued following a year of monitoring after construction of the soil cover remedy because data suggested landfill gas was not being generated that would pose a potential explosive hazard.

- **Opportunities for Optimization:**

Maintenance activities to the soil cover (erosion, localized settlement, bare vegetation areas, etc.) are conducted as necessary. No optimization opportunities are identified for the remedy.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

- **Changes in Exposure Pathways:** No changes in the site conditions that would affect soil exposure pathways have been identified during the Five-Year Review (groundwater, sediment, and surface water are currently being investigated as part of OU7). No new contaminants, sources, or routes of exposure have been identified as part of this Five-Year Review.
- **Changes in Toxicity and Other Contaminant Characteristics:** Although there have been some changes in toxicity values, regulatory levels, and risk characteristics of some contaminants detected in OU2 soil, these changes would not affect the protectiveness of the selected remedy as it would not substantially change the results of the risk assessment. The remedy is a soil cover with LUCs; the soil cover combined with LUCs restrict access, site activities, and land use which may result in exposure to elevated concentrations of contaminants in soil. Toxicity changes were noted but no additional use restrictions were required and the remedy remains protective of human health and the environment. Changes in toxicity values that may impact groundwater, sediment, or surface water will be addressed as part of the OU7 investigation.
- **Changes in Risk Assessment Methodologies:** Although there have been some procedural changes to how human health risk assessments are conducted, including how exposure point concentrations are calculated and the parameter values for the inputs to the dermal exposure estimates from groundwater, none of these changes affect the protectiveness of the remedy.

The ERA completed for this site indicated the potential for adverse effects to ecological receptors from the presence of organic and inorganic chemicals in the landfill surface soils/sediments. As part of the selected remedial alternative, a soil cover, side slope stabilization, and re-vegetation were completed for this site. These remedial actions created a physical barrier, eliminating ecological exposure pathways. Recent site inspections indicate the site remains vegetated and the soil cover and stabilized slopes remain intact, and there are no complete ecological exposure pathways to contaminants in soil.

Question C: Has any other information come to light that could question the protectiveness of the remedy?

- No new information has come to light that would question the current protectiveness of the remedy.

6.7 Issues, Associated Recommendations, and Follow Up Actions

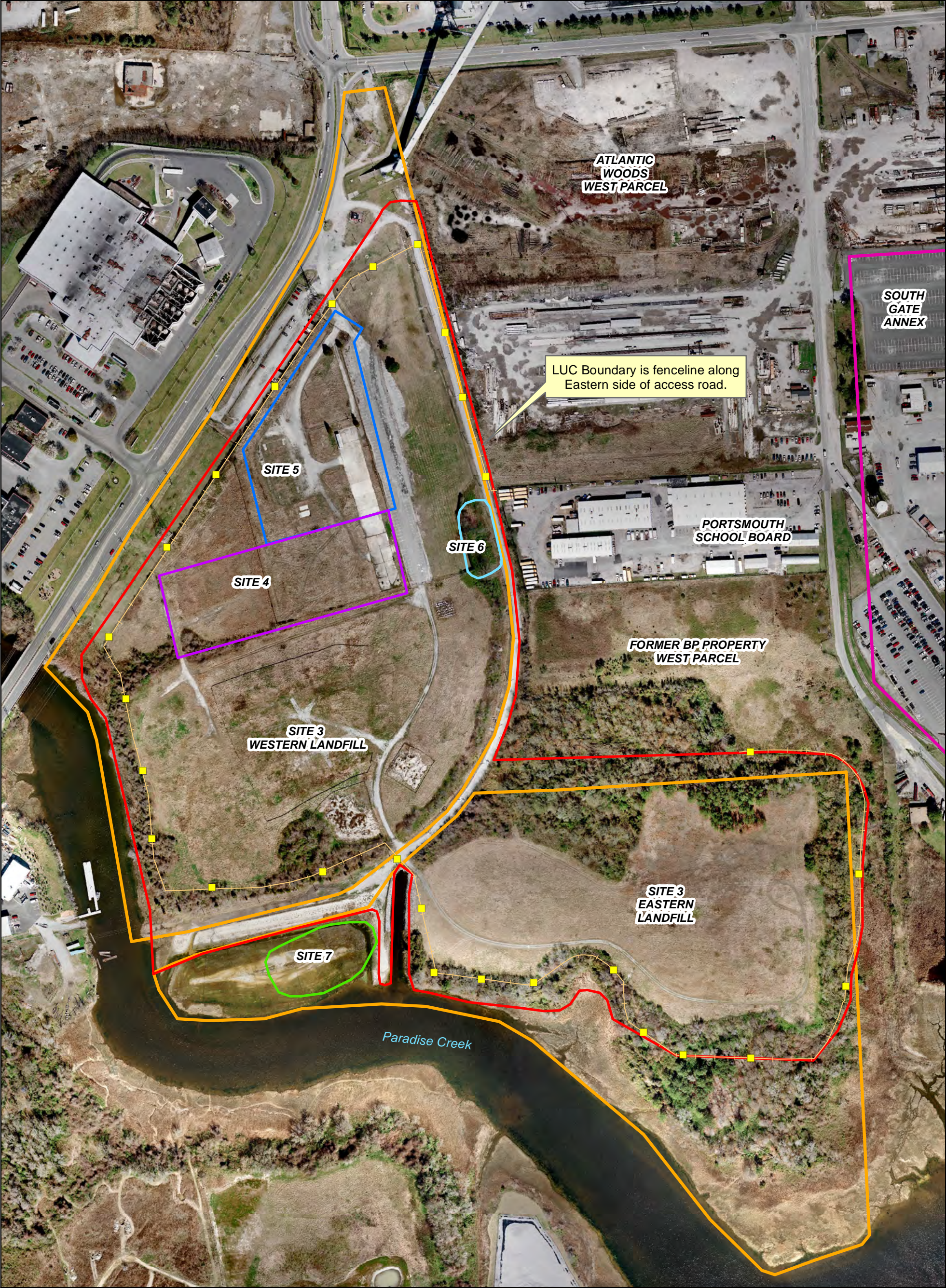
No issues, recommendations, or follow up actions were identified during this Five-Year Review for OU2 soils (groundwater, sediment, and surface water are currently being investigated as part of OU7). Minor areas of erosion and wash out are being addressed in a timely manner, while monthly site inspections are being conducted following completion of the soil cover.

6.8 Protectiveness Summary

The selected remedy for OU2 is protective of human health and the environment. Exposure pathways that could result in unacceptable risk are controlled through maintenance of the soil cover (as warranted), enforcement of LUCs, and access restrictions (locked fence). LUCs have been imposed to prevent residential land use at the site and the Navy adheres to LUC-related procedures pertaining to ground-disturbing activity and changes in land use. LUC objectives are annotated in the Navy GIS database and real estate summary map for the installation.

6.9 Next Review

The next Five-Year Review for OU2 will be in 2021.



- Legend**
- Sign Location
 - Fence Line
 - OU2 Soils LUC Boundary
 - Site 4 Boundary
 - Site 5 Boundary
 - Site 6 Boundary
 - Site 7 Boundary (No Further Action)
 - Navy Annexes
 - OU2 Boundary



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Feet

Figure 6-1
Operable Unit 2 - Paradise Creek Site Map
Operable Unit 2
Norfolk Naval Shipyard
Portsmouth, Virginia

SECTION 7

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Appendix A
Five Year Review Notifications



PUBLIC NOTICE
CERCLA Five-Year Review
Norfolk Naval Shipyard
Portsmouth, Virginia

The Department of the Navy and the US Environmental Protection Agency (EPA) Region 3, with concurrence from the Virginia Department of Environmental Quality (VDEQ), are beginning a Five-Year Review of the existing Record of Decision (ROD) documents and associated ongoing remedial (environmental cleanup) actions at Norfolk Naval Shipyard (NNSY), located in Portsmouth, Virginia. A ROD is a public document explaining the selected remedial action for implementation at a site. A Five-Year Review is required by Section 121 of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) for remedial actions that result in any hazardous substances, pollutants, or contaminants remaining at the site and is triggered by the initiation of the remedial action, which was selected in the ROD. The purpose of the review is to ensure that these environmental cleanup actions are adequately protecting human health and the environment. The Navy will submit draft findings of the Five-Year Review to EPA and the VDEQ by May 2016. The final report is anticipated to be made available to the public by September 2016.

RODs and Remedial Actions to be reviewed

Site 17 - Building 195 - Plating Shop: The ROD was signed in August 2006 to address contaminated soil from the Building 195 - Plating Shop that posed a potential risk to human health. While no specific contaminant was identified as a compound of concern (COC), the Navy along with EPA and VDEQ agreed to assume an unacceptable risk exists for residential receptors. Given the site was entirely covered by asphalt, concrete or buildings, the selected remedy to address this concern, as identified in the ROD, called for restricting exposure to soils through the implementation of Land Use Controls (LUCs). The LUC would prohibit unrestricted access to the site and to prohibit the development and use of the property. LUCs are maintained by the NNSY through routine inspections and by designating the LUC area through real estate maps and tracking through the Navy's Geographic Information System (GIS).

Site 10 - 1927 Landfill: The ROD was signed in September 2008 to address contaminants identified in soil. Lead concentration exceeded its acceptable risk level for future residential receptors. Given the site was entirely covered by asphalt, concrete or buildings, the selected remedy to address this concern, as identified in the ROD, called for restricting exposure to soils through the implementation of Land Use Controls (LUCs). The LUC would prohibit unrestricted access to the site and to prohibit the development and use of the property.

Operable Unit (OU) 2 - Paradise Creek Disposal Area: The ROD was signed in May 2010 to address contaminants identified in soil and disposal area content. Metals and PAHs present in the soils constitute an unacceptable risk to human health. Additionally, waste remains in place at the site and may also pose a hazard if exposed. The selected protective remedy outlined in the ROD included the installation of a soil cover with LUCs. The LUCs included the installation of a fence, signage, and routine inspections.

The Remedial Alternatives for each area were selected based on findings contained in documents that are part of the Administrative Record for NNSY. The Administrative Record provides background information on all of the sites included in the Five-Year Review, as well as remedial investigations conducted at each site. Copies of each ROD and all documents that formed the basis for selection of the remedial action are available in the Administrative Record file:

Public Affairs Office
Naval Facilities Engineering Command,
Atlantic Division
6506 Hampton Boulevard
Norfolk, VA 23508-1278
(757) 322-8005

The public is encouraged to participate in this review by submitting any questions, comments or concerns regarding the selection and/or effectiveness of removal actions or selected cleanup remedies for sites on NNSY to the NNSY Public Affairs Officer:

Terri Davis, Public Affairs Officer,
Norfolk Naval Shipyard
ATTN: Public Affairs Officer
Code 1160, Building 1500
Portsmouth, VA 23709-5000
Phone: (757) 396-9550
terri.k.davis@navy.mil

VP March 12 & 13 / 25009995

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Appendix B

Interview Records

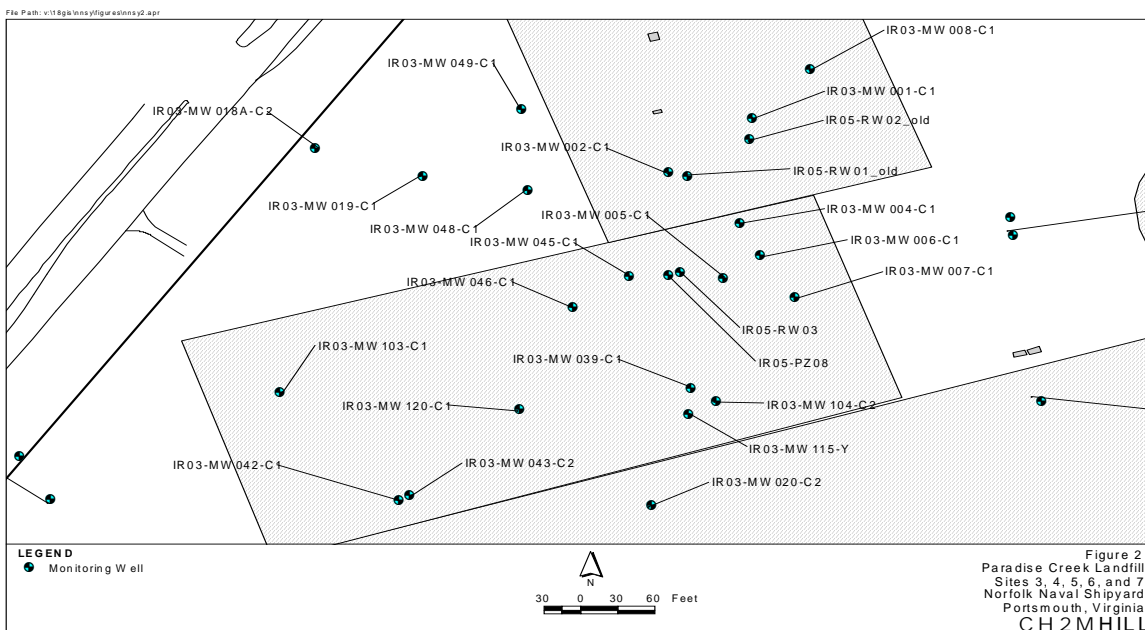
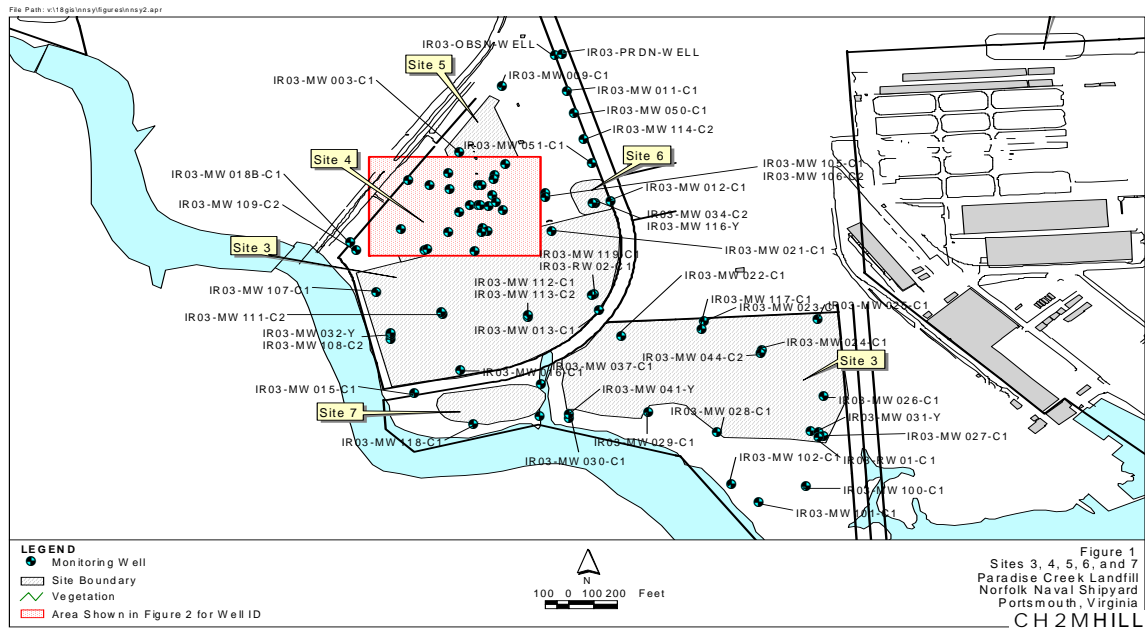
INTERVIEW RECORD			
Site Name: Norfolk Naval Shipyard		EPA ID No: VA1170024813	
Subject: Second Five Year Review		Time: 0800	Date: 3 Aug 2016
Type: 5 Year Review		Location:	NSS Norfolk NSY
Contact Made By:			
Name: Doug Huling	Title: Planning Director	Organization: PWD NSS Norfolk NSY	
Individuals Contacted:			
Name: Marjorie Winemiller	Title: Facility Planner	Organization: PWD Planning	
Telephone No:		Street Address:	
Email Address: 757-396-8077		City, State, Zip:	
Name: Monica Malley	Title: Facility Planner	Organization: PWD Planning	
Telephone No:		Street Address:	
Email Address: monica.mally.ctr@navy.mil		City, State, Zip:	
Summary Of Conversation			
<p>General</p> <p>Q1 - What is your overall impression of the program? Program is effective.</p> <p>Q2 - What impacts, if any, has the remedy had on the surrounding community? Are you aware of any community concerns?</p> <p>The community is well aware of the Paradise Creek restrictions as they have been in place for some time.</p> <p>Unaware of any new community concerns and none have been expressed.</p> <p>Q3. Does the program and/or site remedies affect day to day base operations? If so, how?</p> <p>The restrictions on the Installation are in place are well known by the Installation Planning Staff. No planning actions are affected by these restrictions at this time. Cost associated with minor surface disruption in these areas is included in project costs.</p> <p>Q5. Are LUCs and their objectives clear to appropriate base personnel? If not, what recommendations would you make to increase awareness?</p> <p>It would be helpful if maps with the restrictions indicated were included in the Geo Readiness maps for the Installation.</p> <p>Q6. Do you have any comments or recommendations regarding the program and/or site remedies?</p> <p>See response to Question 5 above.</p>			

Appendix C
2016 Completed Site Inspection Checklists

Sites 3, 4, 5, 6, and 7 (OU2 - Paradise Creek Disposal Area and Associated Sites)

Norfolk Naval Shipyard, Portsmouth, Virginia

Description: Site 3 is a 70 acre disposal area located to the north bank of Paradise Creek on the southern edge of NNSY. Sites 4, 5, and 6 are located to the north of the western portion of Site 3 and Site 7 is located to the south between Site 3 and Paradise Creek. Site 3 was used primarily for disposal of solid landfill waste. Sites 4, 6, and 7 were used as liquid waste holding sites. Site 5 was used as an oil reclamation area. Landfilling and storage at these sites began in the 1940s and continued until the 1980s. The sites are bounded to the south by Paradise Creek and to the landward side by various barriers, berms, fences and gates. Stormwater discharge and runoff is primarily to the south and east toward Paradise Creek. The Paradise Creek Disposal Area is currently in the Feasibility Study stage of the CERCLA process.



(Enter suggested improvements to this form)

Date _____

Yes	No
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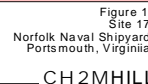
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Site Specific

5	Is the site fencing in good condition and are gates locked? If no, describe condition of fence and/or uncontrolled access points, mark location(s) on map, and notify activity coordinator of any deficiencies in fences. Note - fences are in place at these sites as deterrents for Shipyard security purposes.		
	Site 3		
	Site 4		
	Site 5		
	Site 6		
	Site 7		
6	Is the site signage in good condition? If no, describe condition of signage, mark deficient location(s) on map, and notify activity coordinator.		
	Site 3		
	Site 4		
	Site 5		
	Site 6		
	Site 7		
7	Are control measures for discharge and/or outfalls in place and in good condition? (Indicate specific control measures that exist at this site under this question) If no, describe condition of control measures		
	Site 3		
	Site 4		
	Site 5		
	Site 6		
	Site 7		
8	Are site monitoring wells, as depicted on the figure, in good condition and appear to be locked? (i.e. damaged protective posts and/or well head/casing) If no, describe condition of the deficient monitoring well(s), mark location of deficient monitoring well(s) (no site wells are currently [January 2003] part of long-term or ongoing groundwater monitoring).		
	Site 3		
	Site 4		
	Site 5		
	Site 6		
	Site 7		
9	Is the area free of any signs of disturbance (i.e. digging, settlement, cracking, holes, erosion) to the site cover/cap, as depicted on the figure? If no, describe condition of the deficient cover/cap, mark location of deficient cover/cap on map.		
	Site 3		
	Site 4		
	Site 5		
	Site 6		
	Site 7		

Norfolk Naval Shipyard, Portsmouth, Virginia

by a Feasibility Study (2003). The Bldg. 194 area is asphalt and concrete with runoff to NNSY storm sewer system.



Comments: (Provide related question number for each comment)

(Enter suggested improvements to this form)

Inspection performed by: (Print and sign)

Date _____

General

Yes	No

1 Is the area free of any indication of recent and/or current intrusive activities within the site boundary, as depicted on the figure, or in the immediate vicinity of the site? If no, mark location of intrusive activities on figure, note extent and purpose.

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2 Is the area free of storage of any investigative derived waste (IDW) on site? If no, mark location of IDW on figure, note its condition in the comment section below, and notify activity coordinator. Indicate if IDW is properly labeled, per example below.

Investigative Derived Waste
Purge water from *Site ID*
Date
Do not handle, analysis pending
Contact *Name* IR Coordinator, *Phone Number*

3 Is the area free of miscellaneous debris? If no, mark location of miscellaneous debris on figure, note its condition in the comment section below, and notify activity coordinator.

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4 Is the area free of stressed vegetation, scarred or stained asphalt/ground surface, or free of other identifiable concerns with regards to this site? If no, annotate these concerns in the comments section below, mark location of concern on map, and notify activity coordinator.

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Site Specific

Site signage and fences are in place for Shipyard security purposes and are not in place to restrict site access for reasons other than security.

5 Is the site fencing, as depicted on the figure, in good condition and are gates locked? If no, describe condition of fence and/or uncontrolled access points, mark deficient location(s) on map, and notify activity coordinator.

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6 Is the site signage, as depicted on the figure, in good condition? If no, describe condition of signage, mark deficient location(s) on map, and notify activity coordinator.

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7 Are control measures for discharge and/or outfalls, as depicted on the figure and described below, in place and in good condition? (Indicate specific control measures that exist at this site under this question) If no, describe condition of control meas

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8 Are site monitoring wells, as depicted on the figure, in good condition and appear to be locked? (i.e. damaged protective posts and/or well head/casing) If no, describe condition of the deficient monitoring well(s), mark location of deficient monitoring wells. Note - currently site monitoring wells are not part of long-term or ongoing groundwater monitoring programs.

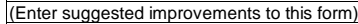
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9 Is the area free of any signs of disturbance (i.e. digging, settlement, cracking, holes, erosion) to the site cover/cap, as depicted on the figure? If no, describe condition of the deficient cover/cap, mark location of deficient cover/cap on map, and no

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Norfolk Naval Shipyard, Portsmouth, Virginia

Comments: (Provide related question number for each comment)



(Enter suggested improvements to this form)

Inspection performed by: (Print and sign)

Date

General

Yes No

The 1927 Landfill covers a large portion of the active, main Shipyard. Drum storage related to ongoing industrial activities and waste disposal areas are common within the site boundaries. The nature of any disturbances and/or storage should be noted and the department operating in that area should be identified by the inspector.

1 Is the area free of any indication of recent and/or current intrusive activities within the site boundary, as depicted on the figure, or in the immediate vicinity of the site? If no, mark location of intrusive activities on figure, note extent and purpose.

--	--

2 Is the area free of storage of any investigative derived waste (IDW) on site? If no, mark location of IDW on figure, note its condition in the comment section below, and notify activity coordinator. Indicate if IDW is properly labeled, per example below.

--	--

Investigative Derived Waste
Purge water from *Site ID*
Date
Do not handle, analysis pending
Contact *Name* IR Coordinator, *Phone Number*

3 Is the area free of miscellaneous debris? If no, mark location of miscellaneous debris on figure, note its condition in the comment section below, and notify activity coordinator.

--	--

4 Is the area free of stressed vegetation, scarred or stained asphalt/ground surface, or free of other identifiable concerns with regards to this site? If no, annotate these concerns in the comments section below, mark location of concern on map, and notify activity coordinator.

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Site Specific

5 Are control measures for discharge and/or outfalls, as depicted on the figure and described below, in place and in good condition? (Indicate specific control measures that exist at this site under this question) If no, describe condition of control measures

--	--

6 Are site monitoring wells, as depicted on the figure, in good condition and appear to be locked? (i.e. damaged protective posts and/or well head/casing) If no, describe condition of the deficient monitoring well(s), mark location of deficient monitoring

--	--

7 Is the area free of any signs of disturbance (i.e. digging, settlement, cracking, holes, erosion) to the site cover/cap, as depicted on the figure? If no, describe condition of the deficient cover/cap, mark location of deficient cover/cap on map, and no

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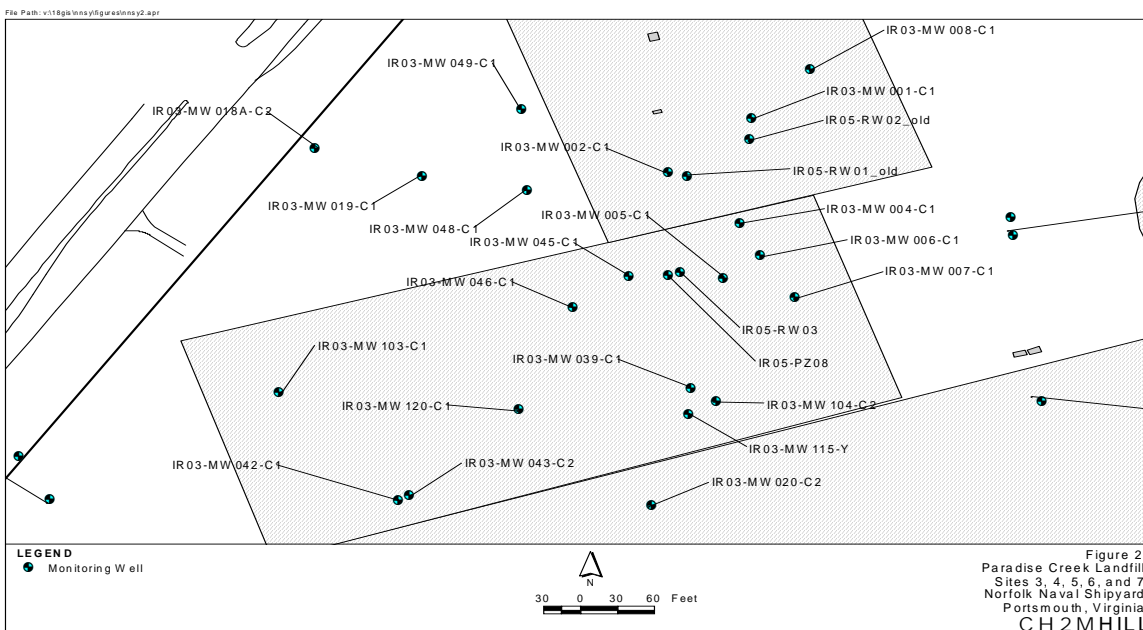
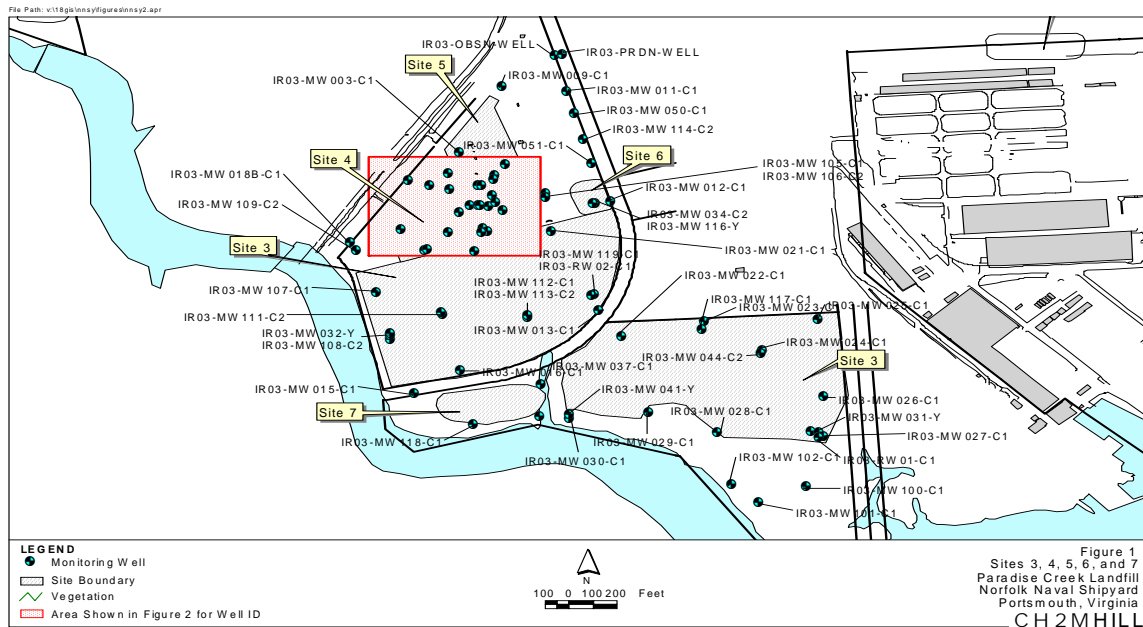
8 Is the area free of construction activity and are Buildings and or drydocks as depicted on the Figure? If no, describe construction milcon and demolition or construction of new buildings.

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Sites 3, 4, 5, 6, and 7 (OU2 - Paradise Creek Disposal Area and Associated Sites)

Norfolk Naval Shipyard, Portsmouth, Virginia

Description: Site 3 is a 70 acre disposal area located to the north bank of Paradise Creek on the southern edge of NNSY. Sites 4, 5, and 6 are located to the north of the western portion of Site 3 and Site 7 is located to the south between Site 3 and Paradise Creek. Site 3 was used primarily for disposal of solid landfill waste. Sites 4, 6, and 7 were used as liquid waste holding sites. Site 5 was used as an oil reclamation area. Landfilling and storage at these sites began in the 1940s and continued until the 1980s. The sites are bounded to the south by Paradise Creek and to the landward side by various barriers, berms, fences and gates. Stormwater discharge and runoff is primarily to the south and east toward Paradise Creek. The Paradise Creek Disposal Area is currently in the Feasibility Study stage of the CERCLA process.



Comments: (Provide related question number for each comment)

5) Fence panel in western corner tilted at a 45 degree angle
9) Some settling of the landfill cap observed throughout Site 3
(Enter suggested improvements to this form)

Inspection performed by: (Print and sign)

Date _____

General

Yes	No
-----	----

1 Is the area free of any indication of recent and/or current intrusive activities within the site boundary, as depicted on the figure, or in the immediate vicinity of the site? If no, mark location of intrusive activities on figure, note extent and purpose. Note - maintenance of the soil cover is ongoing.

X	
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Site 3

X	
---	--

Site 4

X	
---	--

Site 5

X	
---	--

Site 6

X	
---	--

Site 7

X	
---	--

2 Is the area free of storage of any investigative derived waste (IDW) on site? If no, mark location of IDW on figure, note its condition in the comment section below, and notify activity coordinator to assure their awareness and concurrence with the on-site storage. Indicate if IDW is properly labeled, per example below.

X	

Investigative Derived Waste
Purge water from Site ID
Date
Do not handle, analysis pending
Contact Name IR Coordinator, Phone Number

Site 3

X	
---	--

Site 4

X	
---	--

Site 5

X	
---	--

Site 6

X	
---	--

Site 7

X	
---	--

3 Is the area free of miscellaneous debris related to IR Site activities? If no, mark location of miscellaneous debris on figure, note its condition in the comment section below, and notify activity coordinator.

X	
---	--

Site 3

X	
---	--

Site 4

X	
---	--

Site 5

X	
---	--

Site 6

X	
---	--

Site 7

X	
---	--

4 Is the area free of IR Site related activities/conditions resulting in stressed vegetation, scarred or stained asphalt/ground surface, or free of other identifiable concerns with regards to this site? If no, annotate these concerns in the comments section below, mark location of concern on map, and notify activity coordinator.

X	

Site 3

X	
---	--

Site 4

X	
---	--

Site 5

X	
---	--

Site 6

X	
---	--

Site 7

X	
---	--

Site Specific

5	Is the site fencing in good condition and are gates locked? If no, describe condition of fence and/or uncontrolled access points, mark location(s) on map, and notify activity coordinator of any deficiencies in fences. Note - fences are in place at these sites as deterrents for Shipyard security purposes.		X
	Site 3		X
	Site 4	X	
	Site 5	X	
	Site 6	X	
	Site 7	X	

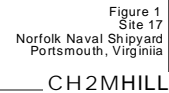
6	Is the site signage in good condition? If no, describe condition of signage, mark deficient location(s) on map, and notify activity coordinator.		
	Site 3	X	
	Site 4	X	
	Site 5	X	
	Site 6	X	
	Site 7	X	

7	Are control measures for discharge and/or outfalls in place and in good condition? (Indicate specific control measures that exist at this site under this question) If no, describe condition of control measures		
	Site 3	X	
	Site 4	X	
	Site 5	X	
	Site 6	X	
	Site 7	X	

8	Are site monitoring wells, as depicted on the figure, in good condition and appear to be locked? (i.e. damaged protective posts and/or well head/casing) If no, describe condition of the deficient monitoring well(s), mark location of deficient monitoring well(s) (no site wells are currently [January 2003] part of long-term or ongoing groundwater monitoring).		
	Site 3	X	
	Site 4	X	
	Site 5	X	
	Site 6	X	
	Site 7	X	

9	Is the area free of any signs of disturbance (i.e. digging, settlement, cracking, holes, erosion) to the site cover/cap, as depicted on the figure? If no, describe condition of the deficient cover/cap, mark location of deficient cover/cap on map.		X
	Site 3		X
	Site 4	X	
	Site 5	X	
	Site 6	X	
	Site 7	X	

Description: Site 17 is located within NNSY security access area and within the security of the Controlled Industrial Area (CIA) in the north-central portion of the Facility, and consists of Building 195 which is the main plating shop for the Facility and the surrounding vicinity formerly used as part of a coal storage facility for the old power plant. The plating shop is active in Building 195 and is regulated by the Virginia DEQ under RCRA. Historical activities for this Site being addressed by a Feasibility Study (2003). The Bldg. 194 area is asphalt and concrete with runoff to NNSY storm sewer system.



Comments: (Provide related question number for each comment)

(Enter suggested improvements to this form)

Inspection performed by: (Print and sign)

Date _____

General

Yes	No
X	

1 Is the area free of any indication of recent and/or current intrusive activities within the site boundary, as depicted on the figure, or in the immediate vicinity of the site? If no, mark location of intrusive activities on figure, note extent and purpose.

2 Is the area free of storage of any investigative derived waste (IDW) on site? If no, mark location of IDW on figure, note its condition in the comment section below, and notify activity coordinator. Indicate if IDW is properly labeled, per example below.

X	
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Investigative Derived Waste
Purge water from *Site ID*
Date
Do not handle, analysis pending
Contact *Name* IR Coordinator, *Phone Number*

3 Is the area free of miscellaneous debris? If no, mark location of miscellaneous debris on figure, note its condition in the comment section below, and notify activity coordinator.

X	
---	--

4 Is the area free of stressed vegetation, scarred or stained asphalt/ground surface, or free of other identifiable concerns with regards to this site? If no, annotate these concerns in the comments section below, mark location of concern on map, and notify activity coordinator.

X	
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Site Specific

Site signage and fences are in place for Shipyard security purposes and are not in place to restrict site access for reasons other than security.

5 Is the site fencing, as depicted on the figure, in good condition and are gates locked? If no, describe condition of fence and/or uncontrolled access points, mark deficient location(s) on map, and notify activity coordinator.

X	
---	--

6 Is the site signage, as depicted on the figure, in good condition? If no, describe condition of signage, mark deficient location(s) on map, and notify activity coordinator.

X	
---	--

7 Are control measures for discharge and/or outfalls, as depicted on the figure and described below, in place and in good condition? (Indicate specific control measures that exist at this site under this question) If no, describe condition of control meas

X	
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8 Are site monitoring wells, as depicted on the figure, in good condition and appear to be locked? (i.e. damaged protective posts and/or well head/casing) If no, describe condition of the deficient monitoring well(s), mark location of deficient monitoring wells. Note - currently site monitoring wells are not part of long-term or ongoing groundwater monitoring programs.

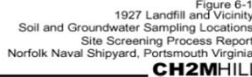
X	
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9 Is the area free of any signs of disturbance (i.e. digging, settlement, cracking, holes, erosion) to the site cover/cap, as depicted on the figure? If no, describe condition of the deficient cover/cap, mark location of deficient cover/cap on map, and no

X	
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Norfolk Naval Shipyard, Portsmouth, Virginia

Comments: (Provide related question number for each comment)



(Enter suggested improvements to this form)

Inspection performed by: (Print and sign)

Date _____

General

Yes No

The 1927 Landfill covers a large portion of the active, main Shipyard. Drum storage related to ongoing industrial activities and waste disposal areas are common within the site boundaries. The nature of any disturbances and/or storage should be noted and the department operating in that area should be identified by the inspector.

- 1 Is the area free of any indication of recent and/or current intrusive activities within the site boundary, as depicted on the figure, or in the immediate vicinity of the site? If no, mark location of intrusive activities on figure, note extent and purpose.
- 2 Is the area free of storage of any investigative derived waste (IDW) on site? If no, mark location of IDW on figure, note its condition in the comment section below, and notify activity coordinator. Indicate if IDW is properly labeled, per example below.

X	
---	--

X	
---	--

Investigative Derived Waste
Purge water from Site ID
Date
Do not handle, analysis pending
Contact Name IR Coordinator, Phone Number

- 3 Is the area free of miscellaneous debris? If no, mark location of miscellaneous debris on figure, note its condition in the comment section below, and notify activity coordinator.
- 4 Is the area free of stressed vegetation, scarred or stained asphalt/ground surface, or free of other identifiable concerns with regards to this site? If no, annotate these concerns in the comments section below, mark location of concern on map, and notify activity coordinator.

X	
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X	
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Site Specific

- 5 Are control measures for discharge and/or outfalls, as depicted on the figure and described below, in place and in good condition? (Indicate specific control measures that exist at this site under this question) If no, describe condition of control measures
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- 7 Is the area free of any signs of disturbance (i.e. digging, settlement, cracking, holes, erosion) to the site cover/cap, as depicted on the figure? If no, describe condition of the deficient cover/cap, mark location of deficient cover/cap on map, and no
- 8 Is the area free of construction activity and are Buildings and or drydocks as depicted on the Figure? If no, describe construction milcon and demolition or construction of new buildings.

X	
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X	
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X	
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X	
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Regulatory Acceptance



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

AUG 10 2016

Captain Scott M. Brown
US Navy
Commander
Norfolk Naval Shipyard
Portsmouth, Virginia 23709-5000

Dear Captain Brown,

Thank you for submitting the report, *Second Five-Year Review, Norfolk Naval Shipyard, Portsmouth, Virginia*, dated August 8, 2016 to the U.S. Environmental Protection Agency (EPA) for review and concurrence. The report was prepared to fulfill the requirements of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Section 121 (c) to review at least every five years Remedial Actions where hazardous substances remain to assure that human health and the environment are being protected. EPA has reviewed this five-year review report and compared it to EPA's June 2001 guidance document, *Comprehensive Five-Year Review Guidance* (OSWER No. 9355.7-03B-P, EPA 540-R-01-007).

In June of 2016, the Norfolk Naval Shipyard (NNSY) formally submitted a draft report entitled, *Draft Five-Year Review, Norfolk Naval Shipyard, Portsmouth, Virginia* to EPA. EPA conducted a technical review of the draft document and provided comments. NNSY submitted a signed final August 2016 version of the Five-Year Review.

EPA has reviewed the August 2016 final version of the Five-Year Review and concurs with the Navy's determination. The remedy at Operating Unit (OU) - 2 (Sites 3, 4, 5, & 6) – Paradise Creek Disposal Area, is protective of human health and the environment because all exposure pathways have been addressed, the remedy in place functions as designed, no new information was identified that would question the protectiveness of the remedy, and there are institutional controls in place to prevent human exposure to the contamination remaining at this OU.

The remedies at OU-4 (Site 17) - Building 195 Plating Shop and OU-6 (Site 10) - 1927 Landfill, are protective to human health and the environment in the short term because all current exposure pathways have been address and there are institutional controls in place to prevent human exposure to contamination remaining at these OUs. However, in order for these remedies to remain protective in the long term, the Navy needs to complete the following actions for these OUs:

- OU-4 (Site 17) - Building 195 Plating Shop

Issue #1: Perfluorinated compounds (PFCs) have been identified as an emerging contaminant. Based on the site history, these contaminants have a potential to be present in groundwater.

Recommendation: Determine the presence or absence of PFCs in site groundwater and assess any potential risk.

Issue #2: The potential groundwater discharge to surface water pathway has not been evaluated at this site.

Recommendations: Evaluate the groundwater to surface water pathway through an assessment of available groundwater data and refinement of the conceptual site model. Assess any potential risks based on the results of this evaluation.

- OU-6 (Site 10) - 1927 Landfill

Issue #1: Dioxins and furans have a potential to be present in groundwater at this site.

Recommendation: Determine the presence of dioxins and furans in site groundwater above established screening levels and assess any potential risk.

Issue #2: The potential groundwater discharge to surface water pathway has not been evaluated at this site.

Recommendations: Evaluate the groundwater to surface water pathway through an assessment of available groundwater data and refinement of the conceptual site model. Assess any potential risks based on the results of this evaluation.

Furthermore, EPA has evaluated the Government Performance and Results Act (GPRA) measures for the above-listed sites and has determined their status is as follows:

Environmental Indicators

1. Human Health: Current Human Exposure Controlled
2. Groundwater Migration: Insufficient Data


Sitewide Ready for Anticipated Use

The Site has not been determined to be Site-Wide Ready for Anticipated Use.

The requirement for this five-year review at Norfolk Naval Shipyard was triggered by the signature of the OU-4 (Site 17) Record of Decision in August 2006 by the Navy and EPA. The next five-year review will be due for signature by the Navy no later than August 10, 2021.

If you have any questions, please contact Ms. Deborah Goldblum, Acting Chief of the NPL/BRAC Federal Facilities Branch, at (215) 814-3432 or Andrea Barbieri at (215) 814-3374.

Sincerely,

A handwritten signature in black ink, appearing to read "Dominique Lueckenhoff".A large, stylized handwritten flourish or signature in black ink, positioned to the left of the typed name.

Dominique Lueckenhoff, Acting Director
Hazardous Site Cleanup Division
US EPA, Region 3

cc: Cecilia Landin – NNSY
James Cutler – VADEQ



COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

Street address: 629 East Main Street, Richmond, Virginia 23219

Mailing address: P.O. Box 1105, Richmond, Virginia 23218

www.deq.virginia.gov

Molly Joseph Ward
Secretary of Natural Resources

David K. Paylor
Director

August 22, 2016

(804) 698-4000
1-800-592-5482

Ms. Cecilia Landin
NAVFAC MIDLANT, CODE OPHE3
9324 VIRGINIA AVENUE
Building N-26, Room 3300
Norfolk, VA 23511-3095

RE: Five-Year Review Report
Norfolk Naval Shipyard – Portsmouth, VA

Dear Ms. Landin:

Thank you for providing the Virginia Department of Environmental Quality, Office of Remediation Programs (ORP), the opportunity to review and comment upon the Five-Year Review Report for Norfolk Naval Shipyard. This Five Year Review Report documents the review of remedial activities for Site 17 – Building 195 Plating Shop, Site 10 – 1927 Landfill and OU2 (Soils) – Paradise Creek Disposal Area.

Subsequent to our internal review in accordance with the *EPA Comprehensive Five-Year Review Guidance* (OSWER No. 9355.7-03B-P), CERCLA §121 (c), and the NCP 40 CFR §300.430(f)(4)(ii), this office supports the conclusions stated in the Five-Year Review Report. These conclusions include several issues which require resolution in order to achieve the long term protectiveness determination. Future groundwater sampling for perfluorinated compounds (PFCs) is needed at Site 17 and for dioxins and furans at Site 10. Investigation of the potential groundwater discharge to surface water pathway will also be needed for the above compounds.

This office concurs with both the Navy and EPA Region 3, that the final remedy for OU2 is functioning as intended and is protective of both human health and the environment; and that the final remedies for Sites 17 and 10 are generally functioning as intended and are protective of both human health and the environment in the short term. It is noted that once the issues have been resolved for Sites 17 and 10 the remedies will likely also achieve the goal of being long term protective.

Should you have any questions or comments, please contact Mr. James Cutler at (804) 698-4498 or by email at james.cutler@deq.virginia.gov.

Very truly yours,

Karen M. Doran
CERCLA Program Manager

cc: Andrea Barbieri ; USEPA Region 3
Janet Weyland; VDEQ-TRO
NNSY Correspondence File