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Five-Year Site Management Plan
Fiscal Year 2000

Naval Amphibious Base Little Creek
Virginia Beach, Virginia

CTO 098
May 2000

Prepared for

Department of the Navy
Atlantic Division
Naval Facilities Engineering Command

Under the

LANTDIV CLEAN II Program
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Prepared by

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SIGNATURE PAGE

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Contract Task Order 098

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Acronyms and Abbreviations

AOC	Area of Concern
Baker	Baker Environmental, Incorporated
BGS	Below Ground Surface
BMPs	Best Management Practices
BNA	Base-Neutral and Acid Extractable Organic Compound
BRA	Baseline Risk Assessment
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CLEAN	Comprehensive Long-Term Environmental Action
CMP	Corrective Measures Plan
CTO	Contract Task Order
Cy	Cubic Yards
1,1-DCA	1,1-Dichloroethane
1,2-DCE	1,2-Dichloroethene
DD	Decision Document
Ebasco	Ebasco Environmental Consultants
EE/CA	Engineering Evaluation/Cost Analysis
EPA	United States Environmental Protection Agency
FFA	Federal Facilities Agreement
FS	Feasibility Study
FWES	Foster Wheeler Environmental Services
FY	Fiscal Year
HRS	Hazard Ranking System
HRSD	Hampton Roads Sanitation District
IAS	Initial Assessment Study
IP/FP	Implementation Plan and Fee Proposal
IR	Installation Restoration
IRI	Interim Remedial Investigation
MCL	Maximum Concentration Limit
mg/kg	milligrams per kilogram
NAB	Naval Amphibious Base
NACIP	Navy Assessment and Control of Installation Pollutants
NEX	Naval Exchange
NFRAP	No Further Response Action Planned
NPL	National Priorities List
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls

Acronyms and Abbreviations (Continued)

PCE	Tetrachloroethene
PCP	Pentachlorophenol
PRAP	Proposed Remedial Action Plan
PSI	Preliminary Site Inspection/Site Investigation
PWC	Public Works Center
RA	Remedial Action
RBCs	Risk Based Concentrations
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RGH	Rodgers, Golden, and Halpern
RI	Remedial Investigation
RRRS	Relative Risk Ranking System
RVS	Round 1 Verification Step
SARA	Superfund Amendments and Reauthorization Act
SEA	Supplemental Ecological Assessment
SI	Site Inspection/ Site Investigation
SMP	Site Management Plan
SRI	Supplemental Remedial Investigation
SVOC	Semivolatile Organic Compound
SWMU	Solid Waste Management Unit
TAL	Target Analyte List
TCE	Trichloroethene
TCL	Target Compound List
TOC	Total Organic Carbon
TOX	Total Organic Halogens
TPH	Total Petroleum Hydrocarbons
UST	Underground Storage Tank
VDEQ	Virginia Department of Environmental Quality
VOC	Volatile Organic Compound
µg/l	Micrograms per Liter

1.0 Introduction

This document presents the Site Management Plan (SMP) for Naval Amphibious Base (NAB) Little Creek for the fiscal years 2000 through 2004. The SMP meets the requirements of the Federal Facilities Agreement (FFA) that the Atlantic Division of the Navy (LANTDIV) has entered into with Region III of the Environmental Protection Agency (EPA Region III) under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) to address environmental contamination at applicable sites at NAB Little Creek. The SMP is being submitted for use by the Little Creek Installation Restoration (IR) Partnering Team and their respective organizations (LANTDIV, NAB Little Creek, EPA Region III, and the Virginia Department of Environmental Quality (VDEQ)).

Figure 1-1 provides the location of NAB Little Creek.

1.1 Purpose

The purpose of the SMP is to provide a management tool for LANTDIV, NAB Little Creek, VDEQ and EPA personnel and consultants to be used in planning, scheduling, and setting priorities for environmental remedial response activities to be conducted at NAB Little Creek under the CERCLA FFA. The SMP establishes schedules and conceptual approaches and scopes of work that EPA, VDEQ and the Navy have agreed to. The schedules and work descriptions consist of:

- Detailed schedules, near-term milestones, and descriptions of proposed activities for the current fiscal year (FY).
- Conceptual schedules and general work approaches for activities planned for FY+1 through FY +4

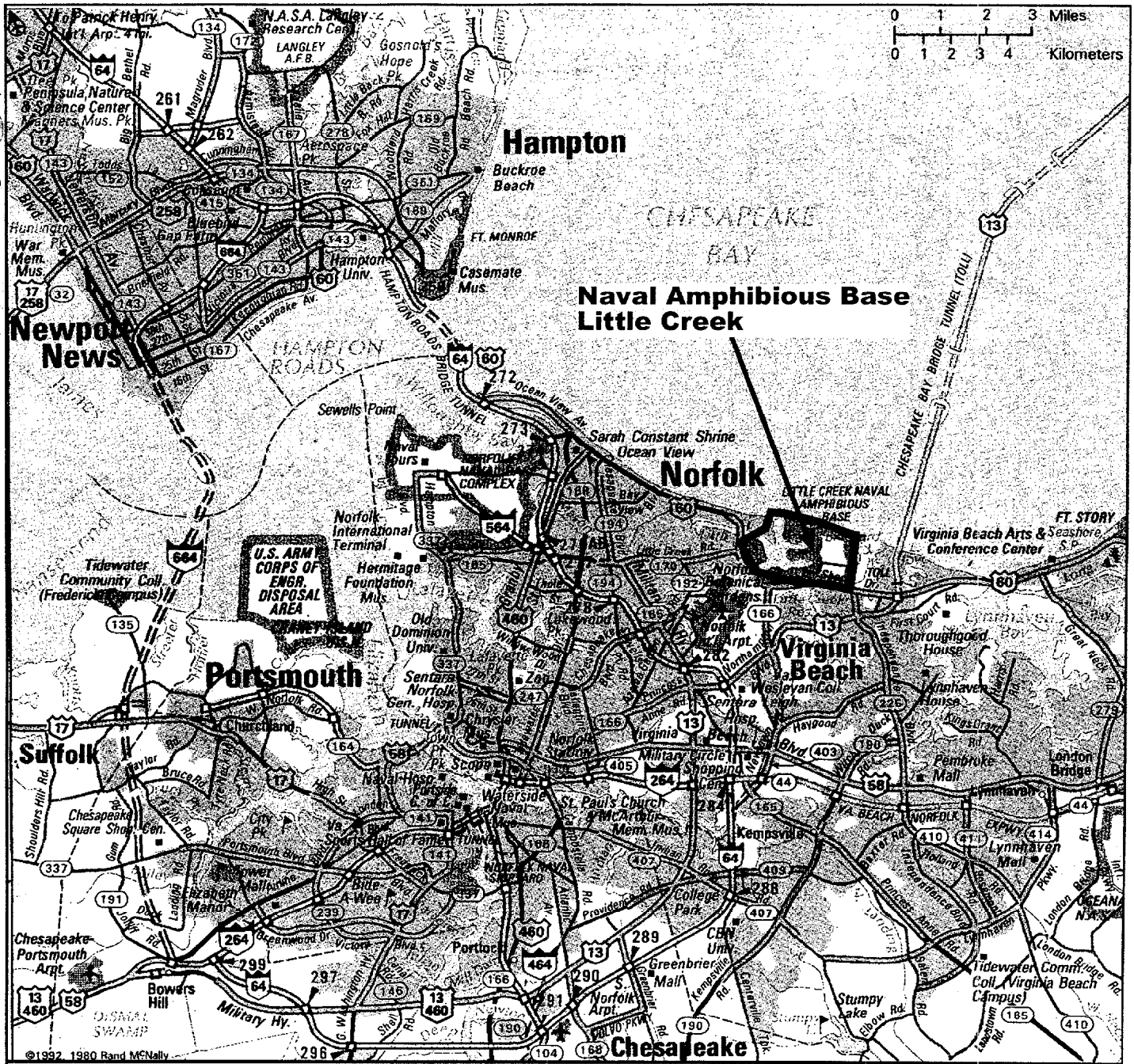
The prioritization of activities and the proposed schedules were developed by the NAB Little Creek Partnering Team and are based on several factors:

- The Partnering Team's relative ranking of the sites with regard to the potential risks that they may pose to human health and the environment (i.e.: address high sites first)
- LANTDIV's internal funding goal of having remedies in place at all "high" priority sites by FY 2005.
- Goals set by the Partnering Team to meet requirements of EPA, VDEQ, LANTDIV, and the public.

The SMP is a working document that is updated yearly to maintain an up-to-date documentation and summary of environmental actions at NAB Little Creek. This SMP updates and supercedes the 1999 SMP prepared by CH2M HILL.

1.2 SMP Report Organization

This SMP consists of six sections. This section establishes the purpose of the SMP. Section 2.0 presents a brief history of environmental activities at the base and describes each of the sites at NAB Little Creek that are currently included, or are being considered for inclusion, in the FFA. Section 3.0 presents the proposed scope of work at each site for FY 2000. Section 4.0 presents 5-year schedules for environmental investigation and remediation activities at those sites where activities are currently planned. Section 5.0 specifically addresses previous and potential remedial and removal actions. Section 6.0 presents references.



Source: Rand McNally

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Figure 1-1
REGIONAL LOCATION MAP
NAB Little Creek
Virginia Beach, Virginia

2.0 Site Background

NAB Little Creek, located in Virginia Beach, Virginia, provides logistic facilities and support services for local commands, organizations, home-ported ships, and other units to meet the amphibious warfare training requirements of the Armed Forces of the United States. The base is in the northwest corner of Virginia Beach and its western border abuts the city of Norfolk, Virginia. The area surrounding this 2,147-acre base is low lying and relatively flat with several fresh water lakes (Chubb Lake, Lake Bradford, Little Creek Reservoir/Lake Smith, and Lake Whitehurst) located on or adjacent to the base.

NAB Little Creek is primarily an industrial facility that centers around four saltwater bodies: Little Creek Harbor, Little Creek Cove, Desert Cove, and Little Creek Channel that connects the coves and harbour with the Chesapeake Bay. In addition to industrial land-use, NAB Little Creek is also used for recreational, commercial, and residential purposes. Specifically, the southeast corner of the base has been developed for residential use. Land development surrounding the base is residential, commercial, and industrial. Little Creek Reservoir/Lake Smith, located upgradient of the base, serves as a secondary drinking water supply for parts of the city of Norfolk.

NAB Little Creek was commissioned on July 30, 1945, by combining four contiguous activities. The Navy began purchasing land in the area from private estates and the Pennsylvania Railroad just prior to World War II. The first activity to be commissioned was the Amphibious Training Base in the southwestern corner of the present base near Little Creek Harbor. The base's mission was the training of landing craft personnel for operational assignments. Over the last 50 years, NAB Little Creek has expanded in both area and the complexity of its mission.

2.1 Environmental History

Comprehensive environmental restoration activities at NAB Little Creek essentially started in 1984 under the Navy's Navy Assessment and Control of Installation Pollutants (NACIP) and Installation Restoration (IR) Programs. The purpose of the Navy's NACIP and IR Program was to identify, assess, characterize, and clean up 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. The Department of Defense, as well as general industry, have 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 in compliance with all federal, state, and U.S. Navy regulations to ensure safe operation and disposal.

In 1981 the Department of the Navy initiated the Navy Assessment and Control of Installation Pollutants (NACIP) Program. The NACIP Program used a three-phased approach to study and clean up sites. NAB Little Creek initiated its environmental restoration, study and investigation efforts under the NACIP Program by conducting an initial assessment study (IAS) in 1984. The NACIP program was changed in 1986 to reflect the requirements of CERCLA as

amended by the Superfund Amendments and Reauthorization Act (SARA). This revised program is referred to as the IR Program

On July 28, 1998, the EPA proposed that NAB Little Creek be added to the National Priorities List (NPL). EPA scores all industrial sites using the Hazard Ranking System (HRS) and those facilities with scores exceeding 28.5 are proposed for the NPL. The HRS score of 50, assigned by the EPA to NAB Little Creek, is mainly attributed to the surface water component at Site 7 (Amphibious Base Landfill). The proposed listing was followed by a minimum 60-day review and comment period prior to the inclusion of NAB Little Creek on the NPL. On May 10, 1999, NAB Little Creek was placed on the NPL.

In the past, the Virginia Department of Environmental Quality (VDEQ) has primarily provided regulatory oversight at NAB Little Creek. Now that NAB Little Creek has been placed on the NPL, the EPA has taken a more active role in providing regulatory and technical oversight to support the IR/CERCLA activities. In addition, a Federal Facilities Agreement (FFA) has been negotiated between the Navy, the EPA, and the VDEQ. As part of the FFA negotiation process, all past and future work at IR sites and SWMUs will be reviewed and a course of action for future work requirements at each site will be developed. The FFA includes specific requirements for the preparation and contents of the SMP.

The following sections provide an overview of the CERCLA process and a summary of the major multi-site studies completed to date at NAB Little Creek. Individual site-specific investigations and studies are discussed in Section 2.2. Table 2-1 lists each of the studies conducted and identifies the various sites that the studies addressed.

2.1.1 CERCLA Process

The CERCLA remedial investigation/feasibility study (RI/FS) process refers to the process of site investigation and remedial action that is used for CERCLA sites. The CERCLA RI/FS process will be followed where noted for the sites addressed by this SMP

The objectives of the CERCLA process are to evaluate the nature and extent of contamination at a site, and to identify, develop, and implement appropriate remedial actions in order to protect human health and the environment. The major elements of the CERCLA process are:

- Remedial Investigation (RI)
- Feasibility Study (FS)
- Proposed Plan and Record of Decision (ROD)
- Remedial Design and Remedial Action (RD/RA)
- Post-Remedial Action Monitoring and Reporting

The documents prepared for the program are maintained in information repositories for review by the public. A formal public comment period and a public meeting (if required) generally occurs at the remedy selection step (Proposed Plan and ROD). Public comments received are addressed as part of the responsiveness summary in the ROD. Subsequent to the public comment period, RD/RA activities are initiated.

At times some sites warrant preliminary or interim investigations, studies, or removal/remedial actions. If it is unclear as to whether a site should be included in the CERCLA process, a Site Investigation is sometimes conducted to make a general determination if activities at the site have impacted environmental media.

Removal actions are implemented to clean up or remove hazardous substances from the environment at a specific site in order to mitigate the spread of contamination. Removal actions may be implemented at any time during the CERCLA process.

Removal actions are classified as either time-critical or non-time-critical. Actions taken immediately to mitigate an imminent threat to human health or the environment, such as the removal of corroded or leaking drums, are classified as time-critical removal actions. Removal actions that may be delayed for 6 months or more without significant additional harm to human health or the environment are classified as non-time-critical removal actions.

For non-time-critical removal actions, an EE/CA is prepared rather than the more extensive FS. An EE/CA focuses only on the substances to be removed rather than on all contaminated substances at the site. It is possible for a removal action to become the final remedial action if the risk assessment results indicate that no further remedial action is required in order to protect human health and the environment.

Interim remedial actions are implemented to provide temporary mitigation of human health risks or to mitigate the spread of contamination in the environment. Similar to removal actions, they may be implemented at any time during the process. Examples of interim remedial actions include installing a pump-and-treat system for product recovery from the groundwater or installing a fence to prevent direct contact with hazardous materials.

For interim remedial actions, a focused FS is prepared rather than the more extensive FS. As with the removal action, an interim remedial action may become the final remedial action if the results of the risk assessment indicate that no further remedial action is required in order to protect human health and the environment.

Treatability studies are performed to assist in the evaluation of a potentially promising remedial technology. The primary objectives of treatability testing are:

- To provide sufficient data to allow treatment alternatives to be fully developed and evaluated during the FS
- To support the remedial design of a selected alternative

Treatability studies may be conducted at any time during the process. The need for a treatability study generally is identified during the FS.

Treatability studies may be classified as either bench-scale (laboratory study) or pilot-scale (field studies). For technologies that are well-developed and tested, bench-scale studies are often sufficient to evaluate performance. For innovative technologies, pilot tests may be required to obtain the desired information. Pilot tests simulate the physical and chemical parameters of the full-scale process, and are designed to bridge the gap between bench-scale and full-scale operations.

2.1.2 Initial Assessment Study (IAS)

The IAS at NAB Little Creek was completed in December 1984 by Rogers, Golden, and Halpern, of Philadelphia, Pennsylvania. Its purpose was to identify and assess sites posing a potential threat to human health or the environment due to contamination resulting from prior hazardous waste management activities. The study entailed the collection and evaluation of archival and activity records relating to waste generation, handling and

disposal; characterization of physical conditions at the site such as soil hydrogeology, and identification of migration pathways and potential receptors. The results of these data evaluation efforts were used to develop recommendations concerning the need for a confirmation study at a given site, the goal of which was to verify the presence of contamination and determine the need for further characterization and/or remediation.

The IAS examined 17 sites at NAB Little Creek (IR Sites 1-17). Six sites were recommended for confirmation studies: Sites 7, 9, 10, 11, 12, and 13. Of the remaining 11 sites, mitigation measures were recommended for 4 of the sites (Sites 4, 5, 15, and 16), and no further action was recommended for 6 of the sites (Sites 1, 2, 6, 8, 14, and 17). Site 3, the West Annex Fuel Spill, was addressed under a separate action to recover free-floating oil from the water table. Site 17, the Building 1256 Motor Oil Disposal Area, was later added to the preliminary site inspection (PSI) by the Navy.

The IAS recommendations to conduct confirmation studies were based largely on the finding that contaminants from disposal areas may migrate toward surface water bodies with little attenuation, owing to a lack of clays and organic material in the subsurface soil, and in a relatively short time because of high hydraulic conductivities in the water table aquifer. The potentially affected surface waters include Little Creek Cove, Lake Bradford, and Lake Smith. Lake Bradford and Lake Smith are used for recreational purposes, and Lake Smith serves as the secondary municipal water supply for the Norfolk-Virginia Beach area. Delineation of an actual threat or risk was not possible due to the lack of site-specific hydrogeologic and groundwater quality data.

The IAS presented a number of detailed recommendations concerning the installation and sampling of monitoring wells, the sampling of surface soil, surface water and sediment, and the types of laboratory analyses to be completed. The recommendations also addressed well completion depths and water level monitoring requirements. Many of the recommendations were aimed at resolving the data gaps identified in the IAS. These recommendations became the scope of work for the round 1 verification step (RVS).

2.1.3 Round 1 Verification Step (RVS)

The RVS at NAB Little Creek, the first step in the confirmation study process, was completed in October 1986. The purpose of the study was to verify the presence and/or absence of contamination at the six sites recommended in the IAS for a confirmation study (Sites 7, 9, 10, 11, 12, and 13). The scope of work of the RVS activities at each site was established by the recommendations presented in the IAS, with notable deviations concerning the number of monitoring wells completed and samples collected.

As part of the work conducted for the RVS, 31 monitoring wells were installed to facilitate the collection of groundwater samples and hydraulic head data to determine groundwater flow directions. Surface water and sediment samples were collected to investigate impacts on nearby surface water bodies and determine whether contaminated run-off was migrating from the IR Sites. Subsurface soil samples also were collected to delineate the vertical extent of contamination in probable source areas.

As stated in the RVS, the results of the round 1 sampling and analysis activities indicated that little or no contamination was leaving any of the three landfill sites addressed in the RVS (Sites 7, 9, and 10). Contamination was detected in one or more environmental media at the

other three sites. These results indicated that contamination was being released from these three sites, but the magnitude and distribution of this contamination could not be determined on the basis of the RVS findings alone. The results of the sampling and analysis activities were used to develop recommendations for additional investigations at all six sites. These recommendations were generally limited to continued or expanded sampling conducted during the interim RI (IRI) to confirm the RVS results (IRI, 1991).

2.1.4 Interim Remedial Investigation (IRI)

The IRI was conducted in 1991 to determine whether or not further characterization activities or remedial actions (RAs) were warranted at Sites 7, 9, 10, 11, 12, or 13. The objectives of this investigation, as identified by Naval Facilities Engineering Command, were to conduct a second round of sampling at the six sites sampled for the RVS, and to integrate the historical and newly acquired data along with site-specific recommendations for further action into a single document. The data were used to develop recommended response action, a human health assessment, and site specific recommendations concerning additional characterization.

2.1.5 Preliminary Site Inspection (PSI)

A PSI was prepared in 1991 to assess the threat to human health and the environment from five sites at NAB Little Creek (Sites 4, 5, 15, 16, and 17). Chemical constituents of concern were detected in the groundwater at Site 5 and further sampling was recommended. At Site 16, elevated levels of PCBs were detected in soil and additional sampling was recommended to delineate contamination. Remediation was also recommended for Site 16. No further action was proposed for Sites 4, 15, and 17.

2.1.6 Remedial Investigation/ Feasibility Study (RI/FS) and Site Inspection (SI)

From 1993 through 1994, Foster Wheeler Environmental Services (FWES) conducted a RI/FS of Sites 7, 9, 10, 11, 12, and 13. The RI/FS included a Phase 1 Baseline Risk Assessment (BRA). At this same time, FWES conducted a SI at Sites 5 and 16. The investigations included soil, groundwater, sediment, surface water, and soil-gas sampling. Additional groundwater monitoring wells were also installed. The FS recommended long-term groundwater monitoring for Sites 9 and 10, a source removal action and post-removal monitoring for Site 11, and additional evaluations at Sites 7, 12, and 13. The SI recommended semiannual groundwater monitoring at Site 5 and a soil removal action at Site 16.

2.1.7 RCRA Facility Assessment (RFA) Report

A Resource Conservation and Recovery Act (RCRA) facility assessment (RFA) was conducted at NAB Little Creek in 1989 by A.T. Kearny as a contractor to EPA Region III. The RFA is the first step in the RCRA corrective action process, an investigation and remediation process that facilities with RCRA Part B permits must go through in order to renew their permits. The RFA, which involves a records search and a SI, but no sampling and analyses, identified 147 Solid Waste Management Units (SWMUs) and several areas of concern (AOCs). SWMUs and AOCs are areas where wastes have been stored and/or where contaminants may have been released to the environment. Twenty-two of these SWMUs and two AOCs are associated with the 17 IR sites that were previously identified (e.g., SWMUs 123-126 are located within the bounds of IR Site 7)

Prior to conducting a RCRA facility investigation (RFI), the next step in the corrective action process, NAB Little Creek decided not to renew their Part B permit. As a result, the base dropped out of the corrective action program. NAB Little Creek decided, however, to investigate 17 of the SWMUs by including them in the Navy's relative risk ranking system (RRRS) sampling program. The 17 SWMUs investigated were chosen because EPA had identified them as the sites of highest concern.

2.1.8 Relative Risk Ranking System (RRRS) Report

A RRRS and a revised RRRS analysis were completed by Baker Environmental, Inc. (Baker) in 1996. The purpose of the analysis was to gather contaminant, pathway, and receptor information for 17 SWMUs. The SWMUs addressed were originally identified in the RFA as being potential sites affected by contamination. Data were collected for each of the 17 SWMUs through a field investigation in October 1995. The field investigation was aimed at identification of contaminants in surface soil, subsurface soil, and groundwater. The results of the investigation were used to identify the relative risk posed by each SWMU according to the contaminants present, the migration pathway, and the potential receptors for each media at the SWMU. Both human health and ecological receptors were considered.

Based on the RRRS, three of the SWMUs were identified as posing a high risk, and six SWMUs were identified as presenting medium risk.

The nine high- and medium-risk SWMUs are listed below. The SWMUs were consolidated and renumbered as indicated.

High-risk SWMUs:

- SWMU 84—Demolition Debris Landfill (also referred to as IR Site 8)
- SWMU 105—Steam Plant Flyash Silo (redesignated as "new" SWMU 2)
- SWMU 111—Pier 10 Sandblast Yard (redesignated as "new" SWMU 3)

Medium-risk SWMUs:

- SWMU 17—Small Transformer Storage Area (redesignated as "new" SWMU 1 and also referred to as IR Site 14)
- SWMU 117—Special Boat Squadron 2 Battery Storage Area (redesignated as "new" SWMU 4 and also referred to as IR Site 4)
- SWMU 130—Building 3896 Boat Painting Area (redesignated as "new" SWMU 5)
- SWMU 131-133—SeaBee Area (consolidated and redesignated as "new" SWMU 6)

2.1.9 Background Groundwater Quality Study

A background groundwater quality study was conducted during three rounds of groundwater sampling completed on November 31, 1991, September 15, 1992, and June 30, 1993, at NAB Little Creek. The Background Groundwater Quality Study report was finalized in December 1992. Results of the third round of background groundwater quality sampling were reported in the RI/FS. The purpose of this study was to collect, organize, and present data on background groundwater quality and conditions. The groundwater quality information was obtained from a network of eight monitoring wells installed for this study.

Since the objective was to obtain representative samples from all portions of the base, the wells were located throughout the base, and areas of known or suspected contamination were avoided. Information on the hydraulic characteristics of the water-table aquifer was obtained by conducting pump tests at three locations.

Subsurface soil samples were collected from each well boring and analyzed for target analyte list (TAL) metals and moisture content. The wells were sampled and analyzed for target compound list (TCL) volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs), several TAL metals (not the complete list), total petroleum hydrocarbons (TPH), pesticides, polychlorinated biphenyls (PCBs), total organic carbon (TOC), total organic halogens (TOX), ethylene dibromide, cyanide, hexavalent chromium, and anions.

The analyses performed on the groundwater samples used relatively high detection limits and did not include all TAL metals in either the total of filtered analyses. No surface soil nor shallow subsurface soil samples were collected. The subsurface soil samples collected were from below the water table adjacent to the screened interval of the wells. None of the data was validated. Because of this, the data is of limited use in evaluating background concentrations for risk analysis.

Water-level measurements were taken in the background monitoring wells and plotted to determine groundwater flow patterns. The data was not collected at the same time, however, and groundwater may be subject to tidal fluctuations. The general direction of groundwater flow for most of the eastern portion of the site is to the north, towards the Chesapeake Bay and Little Creek Harbor Cove.

2.2 Descriptions of Sites

2.2.1 Descriptions of Sites in the CERCLA RI/FS Process

The following sites have been identified in the FFA as requiring RI/FSs under CERCLA. The ultimate closure of each of these sites will require a Record of Decision. Locations of each site are shown in Figure 2-1.

2.2.1.1 Site 5—Buildings 9 - 11, Motor Oil Disposal Area

Site 5 consists of Buildings 9, 10, and 11 and the area between the buildings. The site is also referred to as SWMU 118 in the RFA. This area measures approximately 100 feet by 150 feet. There is very little topographic relief in this area and drainage from rainfall appears to be to the west-southwest past Building 10. A small, concrete-bermed drum storage area, approximately 10 feet by 10 feet, and an oil/water separator were located on the northern side of Site 5 along Building 9. A drain in the middle of the concrete storage area was connected to the oil/water separator. The area between the buildings was previously covered by Marsden matting. Marsden matting consists of a layer of steel grating over top of solid steel plates. The spaces within the steel grating, and between the grating and the steel plate, would typically get filled with soil. A site visit conducted as part of the 1984 IAS noted that the soil within the Marsden matting was heavily stained with motor oil. However the construction of the matting (i.e., the presence of the underlying steel plates) would have prevented the infiltration of the oil into the subsurface soil. Observations during a January 1992 site visit by FWES noted that the matting had been removed.

Buildings 9 and 11 had been used continuously since 1943 by Special Warfare Group 2.

Building 9 was used for motor pool maintenance, including trucks, trailers, and general purpose military vehicles. Used motor crankcase oil from this maintenance shop was reportedly disposed of on the ground in the area covered by the Marsden matting between Buildings 9 and 11 (RGH, 1984). However, given the construction of the matting, this seems unlikely. The IAS estimated that 1,230 gallons of oil and antifreeze were generated and disposed of each year. It is presumed that similar quantities were used in the past, since the level of activity has remained fairly constant. The potential quantity generated at Site 5 could be as high as 50,000 gallons of oil and antifreeze. There is no visible evidence at the site, based on observations made in December 1990 and April 1991 that would suggest disposal activities of this magnitude had occurred on or near the Marsden matting. Sampling and analyses conducted during 1991 and 1993 lend support to these visual observations. Building 9 was demolished in 1996 and a new building, Building 116, was constructed in roughly the same location.

Building 11 was originally built as a cable tank building. The ten cable tanks were concrete-lined inground tanks measuring 20 by 28 by 8 feet deep. They may have been used to store or perform maintenance on the mooring cables for mines. Seven of the tanks were backfilled with select fill and capped with a concrete cover in 1969. Three of the tanks, located near the center of the floor, were covered with steel plates. According to the IAS, from 1969 until 1981 used motor oil, solvents, and antifreeze from boat engines maintained in Building 11 were reportedly stored in these three tanks. The IAS also reported that 2,285 gallons of oil were generated annually from activities in Building 11. If similar quantities are projected back to 1969, as much as 43,000 gallons may have been generated at Site 5 and placed in the cable tanks (PSI, 1991). In 1991, Building 11 was demolished to make way for new facilities, and only the concrete slab foundation and the three remaining subsurface cable tanks were kept in place. The liquid in the cable tanks was sampled and analyzed in 1993. Sampling results found low concentrations of total petroleum hydrocarbons (TPH). In May 1995, the remaining three of the original ten cable tanks were cleaned and drained. These three cable tanks were drained and cleaned again prior to being filled with sand and capped with concrete in June 1996. The tanks were completely removed in 1999 and a new building is currently being constructed at this location.

Site 5 was the subject of a PSI performed by Ebasco Environmental Consultants (Ebasco) in 1991 and a SI performed by FWES in 1993. No constituents of concern were detected in surface soils sampled within the limits of the study area during the SI. Elevated levels of 1,1-dichloroethane (1,1-DCA) had been consistently detected in one monitoring well, GW-2. The level had increased from 23.2 µg/l in 1991 to 76 µg/l in May 1993. 1,1-DCA was not detected in any of the three other wells at the site during either of the sampling events. 1,1-DCA also was not detected in any soil samples. All four monitoring wells contained low levels of lead.

Soil samples obtained during the PSI contained only low levels of TPH suggesting that the reported dumping of waste oil between Buildings 9 and 11 was grossly overestimated or overstated. Further soil sampling was not required during the SI.

Results of soil and groundwater sampling at Site 5 obtained during the PSI and SI indicate that no risk is posed by contaminants in soil and groundwater. Verification groundwater monitoring on a semiannual basis, for a duration of 1 year, was proposed to verify the no-risk

determination. The first round of verification sampling was conducted in May 1996 by FWES. The second round was conducted in December 1996 by CH2M HILL. The results of the two rounds of verification groundwater sampling confirm the results of previous groundwater sampling at Site 5. Two chlorinated VOCs (1,1-DCA and chloroethane) continued to be detected at one well at the site (LC5-GW2) at relatively constant concentrations. Neither compound has a maximum concentration limit (MCL), however, the concentrations of chloroethane exceeds the current EPA Region III RBC for tap water.

Additional groundwater sampling was requested by the EPA in 1998 to confirm groundwater conditions downgradient of the site at various depths in the aquifer. These results again identified similar concentrations of VOCs and no significant metals.

A discussion of FY 2000 activities associated with Site 5 is provided in Section 3.2.1 of this SMP.

2.2.1.2 Site 7—Amphibious Base Landfill

The Amphibious Base Landfill is located in the south-central portion of the installation. The area is bounded on the north by the southeast shoreline of Little Creek Cove, on the east by Helicopter Road, on the south by Amphibious Drive and the Hampton Roads Sanitation District (HRSD) sewage treatment plant, and on the west by an undeveloped area and an ordnance magazine. The site is also referred to in the RFA as SWMUs 123-126. The Amphibious Base Landfill was originally thought to comprise 50 acres; however, the 1994 RI/FS investigation determined through a review of historical aerial photographs and the HRSD treatment plant construction boring logs (which show no indication of waste, debris, or contamination south of Amphibious Drive) that the areal extent of the landfill is approximately 38 acres. The area was originally an arm of Little Creek Cove which was filled with dredge spoils prior to its use as a landfill. A chain link fence borders the landfill to the east and south and Little Creek Cove borders the northern side of the site. Two entrances with locked gates and a gravel access road control access to the site. Restricted access signs are in place around the perimeter of the site.

The current appearance of the landfill ranges from small stands of mature trees on the western portion of the site to tall, thick grasses in the central and eastern portions of the site. The area bordering Little Creek Cove also is well vegetated, with numerous trees, dense brush, and tall grasses. All of the visible debris has been removed from the landfill surface and additional cover soil and topsoil were added to the site's open areas in May 1998. The landfill was constructed so that the central portion is comprised of a broad flat area bounded by gentle slopes on all sides. Erosion-prone areas of the site have been reinforced on each side of the canal crossing the west side of the site.

According to the IAS, the landfill operated from 1962 to 1979, spanning the period during which land waste disposal of many chemicals and other materials was changed from an acceptable to an unacceptable technology. Before its use as a landfill, the site was used for the disposal of spoils from the dredging of Little Creek Cove. Some of the original dikes built to contain the dredging spoils are still visible in the northeast corner of the landfill area.

The Amphibious Base Landfill was initially operated as a trench-type landfill with open burning of refuse in the trenches. The trenches were excavated to the depth at which groundwater filled the trench as fast as it could be excavated. Standing water in the trenches

was common. Cover was applied as necessary to maintain traction for the vehicles involved in the operations. For a landfill operated in this manner, it is difficult to establish the degree of combustion or the fate of any particular item disposed. Remaining evidence of the trenches is easily seen along the southern edge of the area. The ground surface has settled as the wastes in the trenches have become more compacted than the adjacent soils. The landfill was later operated as an area landfill, with refuse spread over the ground surface and covered on a regular basis. This aspect of the operation has brought the surface elevation up to its present level.

The IAS estimated the volume of waste (excluding dredge spoils) in the landfill to be approximately 500,000 cubic yards (cy). However, based on the expected areal extent and depth of actual waste material, it is more likely that the volume disposed is less than half of this estimate. Most of the waste is presumed to be composed of nonhazardous solid waste from base housing and other residential and commercial activities at the installation. Specific records documenting the types and quantities of waste placed in the Amphibious Base Landfill are not available. Because the landfill received all wastes generated by NAB Little Creek during its operation, it most likely received potentially hazardous materials.

Waste oils and metals segregated from the wastes were placed in the landfill starting in 1970. A hazardous waste management plan was not implemented until 1979, the year in which the landfill closed. Up until 1979, the landfill was operated under a Virginia solid waste permit (No. 276). The permit was terminated in 1982 and the landfill was considered closed by the state. After closure, the landfill area continued to be used as a metal collection and transfer site, temporary storage for wastes, and burn area for scrap wood and trees. Currently, there is no collection transfer activity or temporary storage of construction debris and miscellaneous rubble occurring on site. Open burning was halted in 1984 and waste storage activities were moved in 1994. In 1994, the landfill was reportedly covered with approximately 24 inches of compacted soil and 2 to 3 inches of topsoil cover. A vegetative cover was also established to mitigate dermal contact with surface soils in 1994. The thickness of the soil cover was largely confirmed by soil borings collected by CH2M HILL in preparation for the soil cover constructed in 1998.

The 1984 IAS concluded that Site 7, in addition to several other sites, posed sufficient potential threats to human health or the environment to warrant further evaluation in a confirmation study. A confirmation study subsequently was performed at Site 7 and several other sites that were recommended for further investigation in the IAS. The confirmation study was conducted in two rounds consisting of the RVS, conducted by CH2M HILL, dated October 1986, and the IRI, conducted by Ebasco, dated November 1991. The study verified the presence or absence of potential contamination at the IR sites identified in the IAS. Nine groundwater samples, five surface-water samples, and five sediment samples were collected at Site 7 during this phase of the investigation. Groundwater and surface water samples were analyzed for VOCs, base neutral and acid extractable organic compounds (BNAs), pesticides, PCBs, and metals.

The RVS report concluded that little or no contamination was leaving the landfill at that time. However, the source of the low-level concentrations of some contaminants in surrounding surface water could not be adequately assessed, based on available data. The RVS, in turn, recommended that a second round of samples be collected from the previously sampled monitoring wells and surface water and sediment locations.

The IRI was conducted to determine whether further characterization activities or RA were warranted at Site 7. Additional sampling was performed, as recommended in the RVS. The results tended to confirm the findings of the RVS.

On the basis of the combined results of the RVS and IRI, the IRI report concluded that the landfill was not releasing contaminants to the groundwater. The IRI recommended that the status of the landfill, according to Virginia regulations, be determined.

The RI/FS was conducted at six sites, including Site 7, by FWES in November 1994. Eight surface soil, five subsurface soil, nine groundwater, six surface water, and six sediment samples were collected at Site 7.

A Final FS was completed for Site 7 by FWES in October 1997. The FS identified remedial alternatives to reduce potential human health and environmental risks associated with the various contaminants of concern identified at Site 7. The preferred alternative was identified on the basis of the evaluation provided in the FS and was finalized after a public comment period. The Final Proposed Remedial Action Plan (PRAP) was completed in October 1997. Alternative 2 of the FS, institutional controls, was recommended as the preferred alternative. The alternative consists of removing visible debris from the landfill surface and placing topsoil in selected areas of the landfill where the existing cover is insufficient, construction of a new perimeter fence, and semiannual monitoring.

The Navy signed the final Decision Document in January 1998. The design for the alternative was completed and the alternative was implemented in the spring of 1998.

In June 1998, remedial actions were completed at Site 7. The remedy included the removal of 610 cy of debris along the landfill shoreline. Approximately 8,640 cy of clean fill and 11,260 cy of topsoil were placed on the landfill during the RA. A 12 to 18 inch thick fill layer was placed over some areas of the landfill where cover was inadequate and a 6 to 8 inch topsoil cover was placed over the entire landfill area. The landfill waste is currently located an average of 30 inches below the ground surface.

A long-term monitoring plan for groundwater, surface water, and sediment was proposed, and the first of the proposed ten rounds of semiannual long-term monitoring was conducted in June 1998. The fourth and most recent round was completed in January 2000. A long-term monitoring letter report is submitted to the Navy, EPA, and VDEQ after each round. The first four rounds of long-term monitoring results at Site 7 were similar to results reported in the RI/FS.

FY 2000 activities associated with Site 7 are discussed in Sections 3.2.2 of this SMP.

2.2.1.3 Site 8—Demolition Debris Landfill

Site 8, the Demolition Debris Landfill, was formerly classified as SWMU 84 in the RFA. The landfill is located at the northeast corner of the intersection of Amphibious Drive and Helicopter Road. It was operated from 1971 to 1979 as a disposal area for inert materials. Approximately 4,840 cy of waste are contained in the landfill. The Amphibious Base Landfill (Site 7) was in operation during the same time as the Demolition Debris Landfill and is located directly across Helicopter Road from the Demolition Debris Landfill. The Demolition Debris Landfill waste was disposed of to a depth of approximately 3 feet and covered an approximate 2-acre area. The landfill was constructed in a pit where the Public Works Center

(PWC)-Transportation Division excavated material to surface parking lots. The landfill area did not include the wooded areas between the tributary of Little Creek Cove and Amphibious Drive. Wastes contained within the landfill included debris from buildings destroyed by fire, concrete piping, debris removed from the bar screen in the base sewage pump stations, and mercury-contaminated carpeting from the demolition of a dental clinic. An old loading ramp which may have been used in the borrow pit operations, is visible along with sections of old concrete pipe at the landfill. There is no evidence of past hazardous waste disposal at the site. No release controls were in place at the site and no waste inventory is available.

Site 8 is situated adjacent to wetlands fed by a drainage canal from Lake Bradford, runoff from surrounding on-site and off-site areas, tidal inflow from Little Creek Cove, and possibly by discharge from the surficial aquifer. The wetlands drain into Little Creek Cove and experience tidal fluctuations. A wildlife observation station is located at the east end of the site. Access to the area is unrestricted, although its designation as a wildlife area is believed to minimize access by base personnel.

The Demolition Debris Landfill was included in the Navy's RRRS. The high risk ranking evaluated by the RRRS was primarily due to the presence of metals in the soil and groundwater. The analytes found to drive the relative risk in soil and groundwater include manganese, arsenic, beryllium, aluminum, vanadium, antimony, chromium, lead, and zinc. Also detected in soils at Site 8 were several SVOCS, mostly PAHS, PCBs, and a few VOCs. In addition to the metals in the groundwater at Site 8, two VOCs, four SVOCs, and four pesticides were detected.

The landfill was the subject of an SI in 1998. The SI included installing five monitoring wells, groundwater monitoring, the collection of surface and subsurface soil samples at eight locations and the collection of sediment samples at four locations. The final SI report, dated December 1999, also included a qualitative human health risk assessment.

FY 2000 activities associated with Site 8 are discussed in Section 3.2.3.

2.2.1.4 Site 9—Driving Range Landfill

The Driving Range Landfill is located in the northeast portion of the installation, northwest of the golf course, directly east of the Sewage Treatment Plant Landfill (Site 10) and Hewitt Drive, and approximately 500 feet south of the Chesapeake Bay shoreline. The northern perimeter of the landfill is bounded by a network of sand dunes that parallels the Bay shoreline. The landfill, which is also referred to in the RFA as SWMU 24, comprises approximately 6 acres. Although precise boundaries for the fill area have not been delineated, the boundary of the landfill generally coincides with that of the currently operating driving range. The existing surface features include a relatively level and vegetated (grass turf) soil cover.

The Driving Range Landfill operated from 1952 through 1956, and was not closed by a regulatory authority at any time. Prior to landfilling operations, the area was apparently a marsh or other lowland environment adjoining the easternmost arm of Little Creek Cove. Landfilling methods reportedly entailed the excavation of trenches with a dragline or other heavy equipment. The trenches were filled with waste and backfilled. The depth of excavation probably varied but was likely limited by the depth to the water table, typically within 5 feet of the ground surface.

An incinerator, located on Hewitt Drive opposite the western perimeter of the Driving Range Landfill, was active during much of this time, and apparently burned combustible materials generated by NAB Little Creek. The resulting ash was disposed of in the Driving Range Landfill, as were any noncombustible items that bypassed the incinerator. After the incinerator was decommissioned, solid waste from the base was disposed of directly in the landfill. According to the IRI, some of this material may have been burned after being placed in the trench.

The IAS estimated that the landfill contains approximately 40,000 cy of waste. Historical data concerning the types and quantities of wastes in the landfill were not available, but it was reported in the IAS that the landfill contents include various hazardous wastes such as PCBs and pesticides as well as potentially large quantities of used motor oil. Given the sizable population of the base and resulting significant quantities of nonhazardous solid wastes that would be generated, it is likely that the overall quantity of hazardous waste is small compared to the total volume of solid waste placed in the landfill.

After landfill operations at the site were terminated, the installation converted the area into a driving range. The depth of the cover on the surface of the driving range is not known. A berm was constructed, using clean fill, along the east side of Hewitt Drive and sewage sludge was brought in along the southern site boundary to enhance growth of the grass (IRI, 1991).

Site 9 was the subject of an RI/FS performed by FWES in 1993. The findings were summarized in the RI/FS report dated November 1994. Results of RI/FS sampling and a baseline human health risk assessment indicate that no current risk is posed by contaminants in soil and groundwater.

A PRAP and a decision document for both Sites 9 and 10 were prepared by Baker in January 1997. The documents called for long-term groundwater monitoring due to the contents of the landfill and its proximity to the Chesapeake Bay and other surface water bodies. It is important to note that the RI/FS, risk assessment, PRAP, and decision document were conducted under the IR program before NAB Little Creek was placed on the NPL and have not been reviewed or accepted by EPA or VDEQ.

A long-term monitoring program was prepared by FWES in 1996. Groundwater monitoring was proposed to be conducted semiannually for a period of 5 years (10 rounds of sampling). The first round of monitoring was conducted in May 1996 by FWES. Since May 1996, seven additional rounds of groundwater monitoring have been conducted semiannually by CH2M HILL. Groundwater monitoring results are presented in periodic letter reports submitted to the Navy, EPA, and VDEQ following each round of sampling. A 3-year summary report was completed and submitted in July 1999.

FY 2000 activities associated with Site 9 are discussed in Section 3.2.4 of this SMP.

2.2.1.5 Site 10—Sewage Treatment Plant Landfill

The Sewage Treatment Plant Landfill is located in the northeast portion of NAB Little Creek, approximately 500 feet south of the Chesapeake Bay shoreline and due west of the Site 9 Driving Range Landfill. The landfill is bounded on the north and the west by sand dunes, on the south by 11th Street and recreational facilities that extend onto the landfill area, and on the east by Hewitt Drive. The landfill, which is also referred to as SWMUs 25 and 26 in the RFA, is approximately 18 acres, and its boundary is generally defined by the dunes and roads.

However, precise delineation of the fill area has not been performed. Existing surface features include a well-vegetated soil cover that has been partially reclaimed for use as baseball diamonds and vegetated sand dunes.

The Sewage Treatment Plant Landfill began operation in 1941 and was the first landfill to be used at NAB Little Creek. Landfilling operations began in the southern portion of the area, which included an extension of Desert Cove and associated lowlands. Disposal in this area was reportedly directly into the water and resulted in the filling of approximately 5 acres of the cove. Disposal activities then moved northward into an area of marshy lowlands, and eventually encompassed an area of approximately 18 acres. According to the IAS, the average depth of fill in both areas is 6 feet, which results in an estimated combined total volume of waste of 46,500 cy.

The types of waste placed in the Sewage Treatment Plant Landfill were predominantly solids until 1952. Subsequently, most of the waste was diverted to the incinerator and the ash was disposed in the Site 9 Driving Range Landfill. Disposal of sewage sludge from the on-site sewage treatment plant, formerly located in the southeast portion of the fill area, continued until 1968, the year in which the treatment plant closed. The bulk of the sewage sludge was disposed of along the northwest perimeter of the landfill, near the base of the sand dunes that border the landfill.

According to the IAS, between 1941 and 1952, this landfill was the only operational landfill on the base, and received all of the household and industrial wastes generated on the base, including a variety of potentially hazardous constituents. A large quantity of demolition debris also was disposed of in the landfill. Historical data concerning the actual types and quantities of waste placed in the Sewage Treatment Plant Landfill are not available. It is likely that the volume of hazardous waste disposed of in the landfill is small relative to the volume of nonhazardous waste. The Navy does not currently intend to build on this site, thereby eliminating potential exposure to the subsurface soils by intrusive activities. If construction at the site is desired in the future, further evaluation of the subsurface conditions, including delineation of extent and magnitude of subsurface soil contamination, would be required.

Site 10 was the subject of an RI/FS performed by FWES in 1993. The findings were summarized in the RI/FS report dated November 1994. Results of RI/FS sampling and the baseline human health risk assessment indicate that no current risk is posed by contaminants in soil and groundwater.

A PRAP and a decision document for both Sites 9 and 10 were prepared by Baker in January 1997. The PRAP called for long-term groundwater monitoring due to the contents of the landfill and its proximity to the Chesapeake Bay and other surface water bodies. It is important to note that the RI/FS, the risk assessment, the PRAP, and the decision document were conducted unilaterally by the Navy under the IR program before NAB Little Creek was placed on the NPL and were not formally reviewed or accepted by the EPA or VDEQ.

A long-term monitoring program was prepared by FWES in 1996. Groundwater monitoring was proposed to be conducted semiannually for a period of 5 years (10 rounds of sampling). The first round of monitoring was conducted in May 1996 by FWES. Seven additional rounds of groundwater monitoring have been conducted semiannually by CH2M HILL. Groundwater monitoring results are presented in periodic letter reports submitted to the

Navy, EPA, and VDEQ following each round of sampling. A 3-year summary report was completed and submitted in July 1999.

FY 2000 activities associated with Site 10 are discussed in Section 3.2.5 of this SMP.

2.2.1.6 Site 11—School of Music Plating Shop

The School of Music Plating Shop was located in Building 3651. This building is located in the eastern portion of the base, near the intersection of 7th and E Streets. The School of Music, located in Building 3602, is southwest of the former plating shop. The site consisted of the plating shop building and an in-ground concrete tank used to neutralize plating solutions, its associated piping, and potentially contaminated soil surrounding the tank and piping. This site is also referred to as SWMU 27 (plating shop) and SWMU 28 (neutralization tank) in the RFA.

The tank was approximately 10 feet east of the south corner of Building 3651. Surrounding areas, apart from buildings and paved areas, are covered with grass and are generally level between man-made drainage ditches.

The neutralization tank for the plating shop had a diameter of 5 feet and a depth of 11 feet. Approximately 2.5 cy of crushed limestone were placed in the pit to neutralize the acidic plating bath wastes. Wastewater entered the tank via an acid-resistant drainpipe that originated in a sink in Building 3651. According to the IRI, neutralized wastewater was discharged from the unit into the storm sewer via an outlet and drain from the northwest side of the tank. Flow through the unit was controlled by the standpipe and drain elevations, so that all wastewater had to pass through the limestone before it could enter the discharge pipe connecting with the storm sewer.

The IAS reported that plating wastes were discharged into the neutralization tank during a ten-year period beginning in 1964. In 1974, the plating operations were transferred to a separate facility and discharges into the neutralization tank were discontinued. During its period of operation, the plating shop reportedly used silver cyanide, copper cyanide, chromic acid (brite dip), nickel plating baths, and various acids. In addition, lacquer strippers and lacquer were also used. Small quantities of these plating baths, acids, and lacquer strippers were disposed of down the sink in the plating shop which drains into the neutralization tank and eventually into the storm sewer system. The IAS reported that approximately 10 gallons of each plating chemical and lacquer stripper were disposed of in the shop sinks each year.

Site 11 was the subject of a RI/FS performed by FWES in 1993. The findings were summarized in the RI/FS report dated November 1994. The surface soil, the neutralization tank and its contents, and groundwater at Site 11 were determined to be affected by contamination.

Arsenic, beryllium, and manganese were detected above screening criteria in the surface soil and trichloroethene (TCE) and 1,1-dichloroethene (1,1-DCE) were detected in the groundwater above MCL drinking water standards in one of the three wells at the site. The maximum concentrations of TCE and 1,1-DCE detected in three rounds of groundwater sampling were 340 ppb and 34 ppb, respectively.

A decision document was issued by the Navy in November 1994, proposing the removal of the neutralization tank, associated piping, and neighboring surface and subsurface soil. The

neutralization tank, piping, and surrounding soil were excavated in November 1995. An interim removal action final closeout report was issued in May 1996.

A short-term post-removal groundwater monitoring program was proposed (FWES, 1996) to verify the effectiveness of the source and contaminated-soil removal action. Sampling results for Site 11 were scheduled to be assessed and the program reevaluated after one year (two rounds) of sampling. The first round of post-removal monitoring was conducted in May 1996 by FWES. The second round of monitoring was completed by CH2M HILL in December 1996. The results of the groundwater monitoring program are reported in the *Final Groundwater Monitoring Report for Sites 5 and 11 by CH2M Hill* dated February 1998.

During the post-removal groundwater monitoring, no metals were detected above MCLs or RBCs, indicating the removal action removed the source of metal contamination and the metal contamination. Historically, chlorinated hydrocarbons had only been detected in one well, LC11-GW01S, at Site 11. During the last round of the post-removal groundwater monitoring program, however; low levels of TCE were detected in LC11-GW03S at concentrations below the MCL for TCE. A decrease in the concentration of all chlorinated hydrocarbon groundwater contaminants was observed during the post-removal groundwater monitoring in well LC11-GW01S. Significant fluctuations in concentrations of contaminants have been observed in the past in this well. Therefore, additional groundwater sampling was recommended to define the extent of the contamination in the groundwater and to evaluate if the contamination in LC11-GW01S is on a permanent and irreversible downward trend.

Supplemental remedial investigation field activities at Site 11 were initiated in June 1998. As part of the SRI, additional groundwater samples were collected with a Geoprobe® to define the source area and extent of contamination at Site 11. Concentrations of chlorinated VOCs collected from 8 to 12 feet bgs in the shallow portion of the surficial aquifer did not exceed MCLs. Concentrations of 1,1-DCE, cis-1,2-DCE, and TCE exceeded MCLs in groundwater samples collected from the deep portion of the surficial aquifer; generally from 17 to 21 feet bgs. Total chlorinated VOCs in the lower portion of the aquifer were found at greater concentrations and were more extensive than in the upper portion of the aquifer at Site 11.

As a result of the Geoprobe® groundwater sampling, 15 additional monitoring wells and two piezometers were installed. These monitoring wells serve to monitor the source area and extent of the plume. All the new and existing monitoring wells were sampled in September 1998 and again in July 1999.

FY 2000 activities associated with Site 11 are discussed in Section 3.2.6 of this SMP.

2.2.1.7 Site 12—Exchange Laundry Waste Disposal Area

The Exchange Laundry/Dry Cleaning Facility was located in Building 3323, near the intersection of 3rd and B Streets, in the eastern portion of NAB Little Creek. This site is also referred to as SWMU 77 in the RFA. Building 3323 was torn down in 1987 for the construction of the existing commissary (Building 3445). A catch basin and a major portion of a storm sewer line were removed during construction of the new building in 1992. The storm sewer line received dry cleaning wastes from the former Naval Exchange (NEX) laundry and drained to a canal that flows between Lake Bradford and Little Creek Cove.

As reported in the IAS, wastes were dumped into the storm sewer and thought to flow into the drainage canal via an outfall located immediately west of the former laundry building.

However, review of the storm sewer configuration, conducted by Little Creek personnel in the summer of 1991, revealed that drainage from the catch basin reportedly used for the dumping actually flows north along B Street and then west along the north side of Building 3329, before flowing into the canal. Based on this information, the outfall for wastes dumped into the catch basin was approximately 350 feet north of the outfall sampled during the IRI investigation and the 1986 Round 1 Verification Step. Drainage into the outfall pipe sampled during the IRI comes from a relatively small area of the parking lot around Building 3432.

Based on recommendations made in the Site Characterization Report for the commissary construction project, the storm sewer was removed and the area regraded.

The ground surface at the site was mostly an asphalt-paved parking area associated with the car wash and former Buildings 3432, 3433, 3434, and 3435 (replaced by Building 3445). The current commissary building was commissioned at the site in early 1993. The former Building 3323 lot was graded for the parking area for the new commissary. The outfall immediately west of the car wash consists of a 12-inch galvanized iron pipe located approximately 3 feet below grade. This outfall is referred to as the "southern" outfall or discharge pipe. The outfall located north of Building 3445, the "northern" outfall, which is connected to the catch basin used for disposal, was not inspected during the IRI field program, but probably had a configuration similar to the southern outfall. The catch basin used for disposal, located southwest of the intersection of 4th and B Streets, has since been removed.

The drainage canal is approximately 20 feet wide and 9 feet deep from the top of the bank. The sides of the canal are steep and covered with a relatively thick growth of vegetation. At the time of the April 1991 IRI site visit, the canal contained approximately 2 to 3 feet of water, i.e., the water level was 6 to 7 feet below the top of the bank. The canal is bordered by a 20- to 30-foot-wide strip of vegetation on either side containing abundant trees, bushes, and weeds. The flow direction in the canal is to the south and is controlled by a weir at Little Creek Cove that prevents the tides in the cove from backing up into Lake Bradford. Miscellaneous trash and refuse were observed in many places along the banks of the canal and the wooded areas (IRI, 1991).

The IAS reported that wastes dumped into the storm sewer included tetrachloroethene (PCE) sludges, soap, sizing, and dyes. The period of operation and disposal lasted from 1973 until 1978, during which an estimated 1,320 gallons of waste were dumped into the storm sewer drain. Of this total, approximately 200 gallons were PCE sludges. In addition to the dumping, smaller quantities of PCE and other wastes may have entered the storm sewer through run-off from spills or overflow of waste containers (IRI, 1991).

Site 12 also was a subject of the RI/FS performed by FWES in 1993. The findings were summarized in the RI/FS report dated November 1994. A Geoprobe® investigation was conducted and four monitoring wells were installed. In addition, groundwater, surface water, and sediment samples were collected and analyzed during this investigation.

Groundwater samples were collected from the four monitoring wells and were analyzed for VOCs. 1,2-Dichloroethene (total), TCE, and PCE were among the VOCs detected in groundwater samples. The highest total VOCs was 18,200 ppb.

Four surface water samples and four sediment samples were collected from the canal adjacent to Site 12. These samples were analyzed for VOCs and TAL metals. No chlorinated solvents were detected in the canal surface water or sediment.

A Phase I Supplemental Remedial Investigation (SRI), which included soil sampling in the area of the former Exchange Laundry, installation of five additional monitoring wells, pumping tests, and collection of surface water and sediment samples from the adjacent canal, was conducted by FWES from August 1995 through September 1995.

The SRI was continued by CH2M HILL in a second phase initiated in October 1997 and continued through 1998. From June through September 1998, eight monitoring wells and nine multi-level samplers and two piezometers were installed at Site 12. Groundwater flow in the Columbia Aquifer is influenced by the infiltration of groundwater into sanitary sewers on the western portion of Site 12. Three of the monitoring wells were installed in the Yorktown aquifer below the Yorktown confining unit to monitor the presence of contamination in the Yorktown aquifer.

Groundwater sampling for natural attenuation parameters as well as for chlorinated VOCs was conducted in July and September of 1998. Biodegradation is occurring at the site, based on the reduction in concentrations of chlorinated VOCs over time and the presence of PCE breakdown products (TCE and cis-1,2-DCE) in the groundwater collected from selected wells. The purpose of this sampling was to determine the extent of contamination and if biodegradation is occurring at a rate that would make it a viable remedial alternative.

The draft Supplemental Remedial Investigation Report was submitted in January 2000. FY 2000 activities associated with Site 12 are discussed in Section 3.2.7 of this SMP.

2.2.1.8 Site 13—Public Works PCP Dip Tank and Wash Rack

The pentachlorophenol (PCP) Dip Tank and Wash Rack is located near the intersection of 7th and F Streets in the eastern portion of NAB Little Creek, approximately one block west of Site 11. The site consisted of the dip tank formerly used to treat wood with a mixture of PCP, diesel, and kerosene, an adjacent area that contained drying racks for the PCP-treated wood, an open area formerly used by the PWC for storage of supplies and equipment, and a concrete wash rack at the southwestern end of that area. This site is also referred to in the RFA as SWMUs 14 (wash rack) and 15 (dip tank).

The PCP dip tank was located in the southwest corner of the fenced compound behind (west of) Building 3165E. According to a former Public Works Supervisor, the tank was constructed of metal, was 20 feet in length, and 5 feet in diameter. The top third of the tank was cut off and replaced with a metal lid. The bottom half of the tank was buried in the ground. A tank of this size and specifications would hold approximately 1,500 gallons.

The contents of the tank were a mixture of one part PCP to ten parts diesel and kerosene. Wood was dipped into the tank and either set on racks for drying or placed directly on trucks for delivery to where it was to be used on base. The drying racks were located immediately east of the dip tank between the tank and Building 3165E. A pump was located at the south end of the tank, outside the fenced compound. This pump was used to keep the contents of the tank mixed and to empty the contents of the tank into 55-gallon drums when it became spent. According to the former PWC supervisor, there had only been one PCP tank throughout the history of this area and it was always in this location. The dip tank was cleaned out approximately every 6 months, at which time the approximately 55 gallons of PCP sludge generated are believed to have been disposed of in the Amphibious Base Landfill (IAS, 1984). All remaining PCP solution and associated sludges were removed from the tank

in 1975. The tank itself was dismantled in 1982. The area formerly containing the PCP dip tank and drying racks has since been paved with asphalt and converted to a PWC storage area.

The wash rack and associated storage area, both of which were immediately south of the dip tank and west of Building 3165D, continue to be used by the PWC. The wash rack, located at the southwestern corner of the storage area, is a concrete pad with bermed sides and centrally-located deck drain. The rack is used by the PWC to clean vehicles, equipment, and miscellaneous objects with steam and biodegradable chemical cleaners. Wash water and other run-off from the rack drains through the central deck drain into an oil/water separator located under the paved driveway between the wash rack and Building 3165. The oil/water separator was accessible via a rectangular steel manhole located in the driveway. The contents of the separator, as observed in April 1991, included both oily sludge and oil.

The unpaved storage area immediately north of the wash rack, between the wash rack and the former location of the PCP dip tank, was used for the storage of various materials and equipment. The IAS reported readily observable solvents, paint, fuel, and tar staining the surface in this area. During the IRI, the gravel area was free of surface staining, indicating that although the area continued to be used as a storage yard by Public Works, the occurrence of spillage and other releases has been significantly reduced (IRI, 1991).

Site 13 was the subject of an RI/FS performed by FWES in 1993. The findings were summarized in the RI/FS report dated November 1994. Three additional monitoring wells were installed as part of the RI effort (five wells had previously been installed during the RVS). In addition, groundwater and surface and subsurface soil samples were collected and analyzed during this investigation.

The highest total VOCs detected in surface soil was 19 ppb and the total SVOCs detected ranged from 1,210 ppb to 95,800 ppb.

VOC concentration in the subsurface soil were as high as 250 ppb while SVOCs, primarily PCP, were detected in subsurface soil at concentrations ranging from 11,000 ppb to 890,000 ppb.

Groundwater samples were collected from 6 of the 8 monitoring wells at Site 13. These samples were analyzed for VOCs and SVOCs. The maximum total VOCs concentration detected was 262 ppb. Vinyl chloride was detected at 200 ppb. SVOCs were detected at four of the six groundwater sampling locations. PCP was detected at three of the six groundwater sampling locations; the highest concentration detected was 1,700 ppb near the former dip tank.

Additional site data were obtained during the Phase I SRI through Geoprobe® groundwater sampling west and southwest of the site, the installation of five additional monitoring wells, groundwater sampling of monitoring wells, slug testing, and collection of soil samples from the dip tank and drying rack area. Surface and subsurface soil sampling during the Phase I SRI focused on delineating the areas of soil contamination found during the RI.

VOCs were detected in ten of the twelve groundwater samples collected from monitoring wells at the site. The highest concentration of a VOC was PCE at 1,200 ppb. Several SVOCs were detected in groundwater samples. PCP was detected at the greatest concentrations; with a maximum concentration of 2,300 ppb observed near the former dip tank.

Additional soil and groundwater sampling was conducted, as part of a Phase II SRI, to fully delineate the contamination in these media. Soil samples were collected in May 1998 around the former PCP dip tank to define the surficial and subsurface contamination in the PCP source area. Results of this portion of the Phase II SRI are reported in the *Engineering Evaluation/Cost Analysis (EE/CA) for Soil at Site 13: Public Works PCP Dip Tank and Wash Rack* by CH2M HILL dated September 1998. The EE/CA was prepared to address the PCP soil contamination in the area of the former dip tank. The EE/CA recommended excavation of approximately 150 cy of soil. A PCP soil removal action was conducted in May 1999.

In June and July 1998, additional groundwater samples were collected using Geoprobe® to define the source and extent of contamination at Site 13. Ten additional wells were installed in September 1998 to monitor the extent of contamination and concentrations in the source area of the plume. All new and existing monitoring wells were sampled in September 1998.

FY 2000 activities for Site 13 are discussed in Section 3.2.8 of this SMP.

2.2.1.9 New SWMU 3 (SWMU 111) —Pier 10 Sandblast Yard

"New" SWMU 3 (formerly classified as SWMU 111) is the Pier 10 Sandblast Yard. This area was used for sandblasting boats from 1962 to 1984. After 1984, anchors and anchor chains were sandblasted at the site. Up until 1995, sandblasting took place on a concrete pad located on the west side of Building 1263. The sandblast material was periodically removed from the site for disposal following EPA toxicity testing indicating the residue was not hazardous. Paint chips and grit covered the unpaved ground south of the pad to the water's edge and the nearshore bottom of Little Creek Channel. In 1982, a fence was installed around the sandblasting area to limit access to the site. The fence also prevented windblown sandblast materials from migrating outside the fenced area. This fence is generally closed and locked outside working hours. Also, in 1993, photos indicated that the area had been covered with asphalt, except for a small area to the west of the sandblasting pad. Little or no vegetation covers this unpaved area. In approximately 1995, a new sandblasting area was constructed in the northwest corner of the compound. This new area consisted of a concrete pad surrounded by a 4 to 5 foot concrete wall; the old area was no longer used after 1995. All sandblasting operations at SWMU 3 ceased in 1996 when the new indoor sandblasting facility, CB125, was completed.

Within the sandblasting area, surface water drainage flows toward a catch basin. Some runoff from other areas of the site may flow into Little Creek Channel, located on the east side of SWMU 3. Little Creek Channel is not used for recreational purposes, but NAB Little Creek boat traffic and maneuvers are practiced in the area. A picnic area located in the southwest portion of SWMU 3 is used by personnel from Building 1265. The picnic area was covered by 3 inches of soil and sod in April 1999 to prevent soil contact.

SWMU 3 was originally identified in the RFA as being a potential site affected by contamination and was one of the SWMUs included in the Navy's RRRS. The soils at SWMU 3 were found to result in a high relative risk ranking as defined by the Navy's RRRS. Arsenic, barium, beryllium, cadmium, chromium, lead, manganese, mercury, nickel, and zinc were detected in soils. Relatively high concentrations of metals have been observed in the groundwater; however, these results were for total (unfiltered) metals from temporary wells, which typically yield high levels of metals.

In September, as part of the SI, four monitoring wells were installed at SWMU 3. Groundwater sampling of the four newly installed wells and one existing upgradient well, the collection of surface and subsurface soil samples at 10 locations and the collection of sediment samples at four locations also occurred in September 1998. The final SI report, dated December 1999, also included a qualitative human health risk assessment.

Proposed FY 2000 activities associated with SWMU 3 are discussed in Section 3.2.10 of this SMP.

2.2.2 Descriptions of Sites Requiring Screening (FFA Appendix A)

The sites described in this section have been identified by the FFA as requiring screening for possible inclusion in the CERCLA RI/FS process (Appendix A sites). The location of each site is shown in Figure 2-1.

2.2.2.1 Site 6 —Special Boat Unit 2 Battery Storage Yard

Site 6 is the Special Boat Unit (SBU) 2 Battery Storage Yard. It is also referred to as SWMU 117 in the RFA and renumbered as "New" SWMU 4 in several subsequent Navy correspondence. Since 1943, the battery storage area has been in various locations in the vicinity of Buildings 103 and 104.

Prior to off-site disposal spent lead-acid batteries containing electrolyte were stored at this site. From 1943 until 1980, an area of about 300 - 400 square feet, located west of Schofield Avenue and about 100 feet south of Pier 2, was used to store batteries. Batteries were stored on wooden pallets placed on bare soil. Painting wastes, oily wastes, and scrap metal were also stored at the site on wooden pallets over soil. Pier 2 refers to flotilla piers present in the SBU compound prior to the permanent piers 60 and 61 being built. Therefore, the location of this former storage area is now approximately 100 feet south of Pier 61. There were no release controls present in the area. Between 1980 and approximately 1993, spent batteries were stored outside Building 103 (southeast corner of the building) on wooden pallets over soil. At the time of the 1988 Visual Site Inspection (VSI), no batteries were in storage. Batteries are now stored inside Building 103.

The 1984 IAS and the 1988 VSI state that oil stains have been noted on the ground in the area. There are also reports of batteries rupturing during the winter, and their contents being released onto the ground. These observations pertain to the 1980-1993 storage area.

The site currently is paved with concrete and asphalt, with the exception of grass areas along the fence and around the buildings. Human contact with contaminated soil is possible in areas with exposed soil. Access to the site area is limited as the area is fenced with a controlled security gate.

The underlying soils consist of silty sand with occasional thin clay lenses. The soils would retard, but not prevent, vertical migration of constituents to the surficial aquifer. The surficial aquifer at NAB Little Creek is not used as a potable water source. No wells are located in the area. Human contact with groundwater is therefore not anticipated. Little Creek Channel/ Cove is located north of the site and may receive some surface water discharge.

On October 19, 1995, utility excavation activities east of the new Building 115 (within the assumed limits of the 1943-1980 storage area, uncovered oil contaminated soil. Two soil and

one groundwater sample were collected and analyzed for VOCs, SVOCs, TAL Metals, and Pest/PCBs. The apparent release was reported to the DEQ. The results were compared to TCLP and RBC limits and the soil and groundwater were found not to be hazardous. The soil excavated for the utility line was placed back into the excavation. No soil was removed from the site.

Between October 25 and 31, two additional surface soil samples and one groundwater sample were collected from the vicinity of Building 103 (the 1980-1993 storage area) and analyzed for SVOCs and metals in October 1995, in support of the RRRS report. No SVOCs were detected in surface soil or groundwater above detection limits. Metals were detected in both surface soil and (unfiltered) groundwater samples at concentrations that indicated possible site-related contamination. Both surface soil samples collected had comparable levels of metals.

The RRRS considered this site to constitute a medium risk due to metals in the surface soil and groundwater.

The Revised RFA suggested that surface and shallow subsurface soil sampling be conducted to determine if releases have occurred. The Draft RCRA Permit states that soil samples should be taken and analyzed for pH and lead.

2.2.2.2 SWMU 5—Building 3896 – Port Ops Boat Painting Area

"New" SWMU 5, the Building 3896 Boat Painting Area, was initially referred to as SWMU 130 in the RFA. Activities at this site included grinding of boat hulls in preparation of painting, and painting of boats. Grinding and painting took place outside over bare ground as the boats were stored on raised on stands. Metal grindings and paint over-spray were allowed to fall onto the ground. No release controls were present. In addition, bilge water, metal grindings, paints, and thinners were released to the soil.

The site was paved with concrete and/or asphalt in 1994 after boat maintenance activities were initiated at the site. There is, however, an area north of the current boat maintenance area and along the compound fence that is currently unpaved and has little vegetative cover. The entire site is scheduled for demolition in FY 2000, and the Port Ops facilities (including boat painting) will be relocated to the West Annex.

Access to the site is and will remain restricted. The service area is fenced off and kept locked during non-working hours.

The underlying soils are believed to be comparable to soils over much of the base, consisting of silty sand, a thin clay layer, and cobbles. The concrete and/or asphalt cover reduces but will not eliminate the volume of water infiltrating through the soil to the surficial aquifer. No wells are located in the area. Little Creek Channel/Cove is located south of the site and would receive surface water and groundwater discharge from the site.

Surface soil and groundwater samples were collected and analyzed for VOCs, SVOCs and metals in October 1995, in support of the RRRS report. No VOCs were detected in surface soil above detection limits. SVOCs were detected above detection limits in the surface soil sample collected immediately east of Building 3896. The groundwater sample contained metals at concentrations that indicated possible site-related contamination.

The RRRS concluded that SWMU 5 presents a medium relative risk due to SVOCs in the surface soil and metals in the groundwater.

2.2.2.3 SWMU 6—SeaBee Area – CB 124

"New" SWMU 6 (formerly identified in the RFA as SWMUs 131, 132, and 133) is the SeaBee area. The area consists of three separate waste management areas. Former SWMU 131, Satellite Accumulation Point for Paint Wastes, included a 55-gallon drum and several smaller cans stored on a wooden pallet over bare soil. Wastes stored included paints and thinners. No release controls were present and soil staining was evident.

Former SWMU 132, Inoperative Wire Degreaser, was an elevated trough 20 feet long and 12 inches deep that had been filled with JP-5 aircraft fuel to degrease wires. The degreaser has been taken out of service. No release controls were present and there was evidence that JP-5 apparently leaked from a valve and stained the soil below the unit.

Former SWMU 133, Excess Material Storage Area, is a gravel yard that was used to store excess paints and cables. The paints were stored on wooden pallets and were covered with canvas tarps. Stains were observed in this area.

An asphalt road exists around the perimeter of the site. Concrete slabs indicate the locations of former structures. The remainder of the site is soil with little to no vegetative cover. The site is completely open, with unrestricted access.

Six surface soil and four groundwater samples were collected and analyzed for VOCs, SVOCs, and metals in October 1995, in support of the RRRS report. Acetone was detected in all but one of the surface soil samples. No SVOCs were detected in surface soil above detection limits. Metals concentrations in surface soil were generally comparable to background conditions. No VOCs or SVOCs were detected in groundwater above detection limits. Lead, zinc, and several other metals were detected in one groundwater sample (LC14-W1) at concentrations that indicated possible site-related contamination.

The RRRS concluded that this SWMU poses a medium relative risk due to metals concentrations in the groundwater.

2.2.2.4 SWMU 7 – Small Boats Sandblast Yard

"New" SWMU 7, the Small Boats Sandblast Yard, is located along piers 44 through 55 at Desert Cove and includes an area surrounding the northern portions of CB-125. This SWMU is also referred to as SWMU 137 in the RFA and has also previously been identified as part of IR Site 2 during the IAS. The area of SWMU 7 was used to sandblast and paint ships prior to 1996, when sand blasting activities were moved to an indoor facility. The small boats sandblast yard was used to store spent abrasive blast material (ABM) while awaiting characterization (EP toxicity) test results. Approximately 4,000 cubic yards of ABM from sandblasting generated from 1960 to 1982 were stored in the yard.

No release controls have been identified for this unit. Based on visual site inspections (VSI) conducted by Earth Technology Corp. in 1988, releases of spent grit and oily substances to soil and Desert Cove have occurred in the small boats sandblast yard. According to the Navy's responses to the RFA, oil stained soil in the area has been removed. ABM is currently present in the compound near CB125 and near CB317 and CB318. A small amount of ABM was also found west of Building 3869.

The southwestern portion of the area indicated as SWMU 7 is the site of the new paint blast facility, CB125. Prior to construction of the building, LANTDIV contracted with ATEC

Environmental to conduct a soil and groundwater investigation. Five soil locations were sampled. The samples were analyzed for total metals and EP Tox metals. ATEC noted in their summary report that the only metal detected above the method detection limit (MDL) in the EP Tox analysis was zinc at 3.4 mg/L. This is below the hazardous waste criteria. In January 1993, three soil and three groundwater samples were collected from wells installed at the site. Soil samples were analyzed for TCLP metals and groundwater was analyzed for total metals. These samples were taken in the immediate area of the new sand blasting facility CB125. The soil was found to be non-hazardous. No other soil or groundwater investigations have been conducted in the area of SWMU 7, however, in 1999, a site reconnaissance was conducted for the visual presence of ABM. The presence of ABM was noted in the area of CB125 and trace amounts were observed in the area along small boat piers 51 through 44.

FY 2000 activities proposed for SWMU 7 are discussed in section 3.2.11.

2.2.2.5 SWMU 8 – West Annex Sandblast Area

"New" SWMU 8, the West Annex Sandblast Area, is also referred to as SWMU 144 in the RFA, and has also previously been identified as part of IR Site 2 in the IAS. SWMU 8 consists of three discontinuous parcels of land near the northwest corner of the base. An area at the northeast corner of the intersection of Guadalcanal Road and Amphibious Drive was previously used for sandblasting activities to remove paint from boats. As boats were hauled into the area for sandblasting, residue accumulated on the ground. Between 1949 and 1954, spent sandblasting residue was stored in areas north of Midway Road, south of Guadalcanal Road, and east of Amphibious Drive. An estimated 5,125 cubic yards of residue was generated and stored in the area between 1949 and 1954, and an additional 3,525 cubic yards were generated between 1954 and 1971. A reconnaissance of the area in 1999 noted ABM in the area surrounding Water Tower 1553 from the surface to a depth of 5 inches. No other investigations have been conducted at SWMU 8.

FY 2000 activities proposed for SWMU 8 are discussed in section 3.2.12.

2.2.2.6 SWMU 13 - Former Pesticide Shop

According to the Revised RFA, the former pesticide shop was located in Building 3360-3, near Building 3166 and the intersection of 6th and F Streets. However, according to PWC personnel, the shop was actually in Building 3170, which is in the vicinity of Building 3360-3. The shop managed and applied pesticides at the base. Since the change from the Navy to contractor pest control at NAB Little Creek in 1980, there has been no storage or mixing of pesticides by PWC (MWR still handles pesticides for the golf course, see AOC H). The pesticide materials that remained at the time of the changeover were transferred to the pesticide shop at Naval Air Station, Oceana. The pesticide shop operated from 1973 to 1980, after which the building was razed. The site is now a paved parking lot.

Hand-held sprayers were reportedly rinsed daily after use and between mixtures of different pesticides if they occurred on the same day. Empty pesticide containers were triple-rinsed at this unit and disposed of with the other general solid waste in base landfills (SWMUs 24, 25, 26, 123). Metal containers were triple rinsed and then punctured or crushed to prevent reuse before disposal. Pesticide application was done by tank sprayers and hand-held sprayers. The mixed pesticides were usually completely used at the job site. Residue in tank sprayers

was either left in the tank until the next job or diluted with rinse water and left in the tank to mix with the next application.

Types of pesticides previously used in the shop include: Abate (insect), Anticoagulant (rodent), Baygon (insect), Diazinon (insect), Dursban (insect), Mineral Oils (insect), Naled (insect), Other Carbamate (insect), Pyrethrum (insect), and Silica Aerogel (insect).

No evidence of releases were observed during the 1988 VSI. However, no formal closure or follow-up sampling was conducted at the time the unit was razed.

As part of the IR Program, groundwater sampling has been conducted in the area and low concentrations (one order of magnitude below the EPA Region III Tap Water RBC) of DDD and chlordane were detected.

2.2.3 Descriptions of Sites Requiring Desk-top Audits (FFA Appendix B)

The sites described in this section have been identified by the FFA as requiring desk-top audits to determine if they should be included in the FFA. Locations of these sites are shown in Figure 2-1.

2.2.3.1 Site 4 – Reserve Center Motor Oil Disposal Area

This site is an outdoor amphibious vehicle maintenance pad just north of Building 1 on the Naval Marine Reserve Center. The soil along the edges of the pad and beneath the pavement were reportedly saturated with crankcase oil. Waste oils and antifreeze were believed to have been disposed into the storm sewer from 1967 to 1981. The storm sewer was equipped with an oil/water separator. These wastes may also have been disposed directly on the soil. About 2,000 gallons per year are estimated to have been disposed of in this fashion, for a total of 30,000 gallons. Groundwater flow at this site is anticipated to be to the northeast toward Little Creek Channel near Piers 9 and 10, about 300 feet to the northeast. In 1981, the Public Works Department began collecting spent crankcase oil in a UST and in 1984 a new oil/water separator system was installed.

This site was evaluated qualitatively under the IR Program in the 1984 IAS and samples were collected during a Preliminary Site Inspection Report, dated July 1991. A total of 16 surface soil samples were collected from this area and screened in the field with a photo ionization detector (PID). Ten samples were sent off for analysis of TCL VOCs, TPH, and lead. Three of the ten samples contained TPH at concentrations greater than 100 ppm (concentrations in the three samples were 498, 652, and 6,070 ppm). No VOCs and low levels of lead were detected.

Excavation and removal of the waste oil storage tank sometime after 1991 included removal of the TPH-contaminated soils immediately surrounding the tank lid. This is the area from which the sample containing 6,070 ppm of TPH was collected. The other two detections of TPH were reported next to the storage area asphalt parking lot and adjacent to a small tar pile apparently left over from an earlier sealing of the storage area parking lot. This soil has not been removed.

It should be noted that this site is not part of NAB Little Creek. And, while the navy currently owns this property, it did not own the land during the disposal activities. The Naval Marine Reserve Center was the owner at that time.

2.2.3.2 Site 14—Public Works Compound Transformer Storage Area

Site 14 consists of the Old Pole Yard (SWMU 16 in the RFA) and the Small Transformer Storage Area (SWMU 17 in the RFA and "new" SWMU 1 under other Navy correspondence). The old pole yard (across 7th Street from the Public Works compound) is surrounded by a chain linked fence and has been used to store large, PCB- and non-PCB-containing transformers, vehicles, and equipment. A section of the old pole yard, approximately 150 feet by 15 feet, was used to store the transformers. Since 1975, these transformers have been phased out of use on the base. During the 1988 VSI, at least 12 labeled PCB transformers stored in the old pole yard were awaiting pickup by the PWC and disposal through the DPDO. Eleven rusted 55-gallon drums were also present at the site. The drums were stored on a rack and were on their side. The transformers and drums are stored on asphalt. Some of the asphalt was cracked during the VSI. No curbing or diking was present. Oil stains were observed on the grass edges of the asphalt surface during the VSI.

The old pole yard has been used to store large PCB transformers since at least 1953, and according to the Navy's comments on the Draft RFA, was closed in October 1988.

Soil samples were collected in the transformer storage area in 1983 by the Public Works Department at NAB Little Creek to evaluate if there had been any releases. No detectable concentration of PCB was found in any of the soil samples collected.

According to the Navy's comments on the Draft RFA, PCB, PCB-containing transformers, and those undergoing analysis were moved to Building 110 - the PCB storage building in the PWC Hazardous Waste Area (SWMU 110). All non-PCB transformers have been moved to a fenced, secured, asphalt area adjacent to Building 3175 (SWMU 17). Drums of unused oil were also moved to SWMU 17. All stains were removed from the asphalt in the Old Pole Yard. The drum rack was also removed.

In October 1995, this site was sampled for Relative Risk Ranking using DOD's model. Three surface soil and one groundwater sample were collected and analyzed for SVOCs, pesticides, and PCBs. Low levels of pesticides (less than 1 ppb), PCBs (15 ppb), and semivolatiles were detected in soil samples.

The Small Transformer Storage Area (SWMU 17/1) is located in the vicinity of Buildings 3175, 3292, and 3293, south of 7th Street. The paved yard was used beginning in 1975 for storage of small, non-PCB-containing transformers. However, according to the 1984 IAS the site may have been used in the past for repair of PCB-containing transformers. The release history or contaminants that may have been released are unknown. The yard is covered with asphalt that is cracked in some places. No drains or berms are included in the yard. Surface soil is exposed between Buildings 3292 and 3293. The site is located within a fenced service area which limits access.

Two surface soil samples were collected and analyzed for SVOCs and pesticides/PCBs during the October 1995 RRRS. Aroclor-1260 was detected at 0.7 ppm in a soil sample collected from between Buildings 3292 and 3293. Alpha- and gamma-chlordane, 4,4'-DDE, 4,4'-DDD, 4,4'-DDT, and SVOCs also were detected at low concentrations.

The RRRS concluded that this area posed a medium risk due to PCBs in the surface soil.

2.2.3.3 Site 15 – PCB Capacitor Spill – Fire Station No. 1

In the early 1980s, lightning struck an electric utility pole on E Street immediately south of Fire Station 1. One of the capacitors was damaged, resulting in a leak of about 5 gallons of dielectric fluid onto the ground beneath the capacitor pole. The damaged capacitor was replaced after the accident and analysis of soil samples taken in this area revealed PCB concentrations of 170 ppm and 601 ppm.

Soil in the vicinity of the spill was excavated to a depth of 7 inches and taken away from the site. The final disposal of the PCB contaminated soil is not known. The area was backfilled with clean soil.

As part of the Preliminary Site Inspection (July, 1991), five soil samples were collected and analyzed for PCBs. The analytical results indicated only low levels of PCBs (less than 10 ppm) are present in the soil. Two samples contained concentrations greater than 1 ppm. Site 15 is referred to as Area of Concern (AOC) A in the RFA.

2.2.3.4 Site 16—PCB Capacitor Spill, Pole No. 425

The area of the PCB capacitor spill around Pole No. 425 is located approximately 300 feet east of the intersection of Amphibious Drive and Helicopter Road on the south side of Amphibious Drive, approximately 12 feet from the road. During heavy rainstorms, water ponds in the grassy area where the pole is located between Amphibious Drive and the wooded area to the south until it reaches the level of the road and then drains to the north. An above-ground steam line parallels Amphibious Drive in this area and is located between Pole No. 425 and the woods, approximately 25 feet south of Amphibious Drive (PSI, 1991).

Less than 5 gallons of dielectric fluid were found missing from the capacitor, formerly attached to Pole No. 425, after a lightning strike in the early 1980s (IAS, 1984). The capacitor was removed from the pole. There was no visible evidence at the site that would indicate a spill of dielectric fluid.

A campground is located in the wooded area south of Amphibious Drive. Access to the camping area is gained by two driveways located 50 feet east and 50 feet west of Pole No. 425. An electrical hookup from Pole No. 425 to the campground was installed after the PCB spill. During installation a ditch was excavated from Pole No. 425, passing southward through the woods, approximately 40 feet, to the area that had been cleared for the campground. The depth of the ditch is estimated to have been between 2 and 3 feet. After completion of the electrical hookup, the area was regraded and revegetated.

Site 16 was the subject of a PSI performed by Ebasco in 1991 and an SI performed by FWES in 1993. PCBs had been detected at concentrations above the RCRA cleanup level since the 1981 capacitor spill. A concentration of 1,000 mg/kg was reported in 1981. The PSI reported PCB concentrations up to 750 mg/kg. Analysis conducted during the SI indicated concentrations as high as 2,100 mg/kg for aroclor-1248. A soil removal action was recommended for the site. A corrective measures plan (CMP) was prepared in September 1994 to identify removal action alternatives and costs. In addition, soil samples were collected for field screening to determine PCB levels, if any, across the road from Pole No. 425.

A removal action consisting of excavation and disposal of PCB-contaminated soil, vegetation, and the utility pole was completed in 1995. Four composite soil samples were collected to confirm the concentrations remaining in the soil. Three samples contained concentrations

between 1 and 10 mg/kg. The fourth sample contained less than 1 mg/kg. This site is referred to as AOC B in the RFA.

2.2.3.5 Site 17 – Motor Oil Disposal Area, Building 1256

Site 17, the Motor Oil Disposal Area at Building 1256, is also referred to as SWMU 113 in the RFA. Waste motor oil from a vehicle maintenance facility (the SIMA Transportation Shop) was formerly disposed by pouring it onto the soil in a corner of the scrap yard adjacent to Building 1256. It is estimated that the vehicle maintenance facility disposed of approximately 100 gallons of waste oil per year from 1949 to 1984. Runoff from a nearby lube oil and hydraulic fluid storage shed may also have contributed to soil contamination in the area. The area is close to the West Annex Fuel Leak (SWMU 102).

According to facility personnel, oil stained soil was removed in 1986.

This site was sampled during a preliminary site inspection in 1991. A total of eight surface soil samples were collected from this area. They were screened in the field with a photo ionization detector (PID). Those samples registering organic vapors higher than background were sent off for analysis. Four samples were sent off for analysis of TCL VOCs, TPH, and lead. TPH was detected at one location at 2,750 mg/kg. All other samples were below 100 mg/kg. No VOCs and only low levels of lead were detected.

The PSI concluded that contamination in soil was limited to one small area of oil stained soil (less than 4 feet square).

2.2.3.6 SWMU 2 – Steam Plant Flyash Silo

"New" SWMU 2, the Steam Plant Flyash Silo, was initially referred to in the RFA as SWMU 105. It is located in Building 757 between Murray Rd and Amphibious Drive. The steam plant has provided steam to NAB since 1956. From 1956 to 1969, the steam plant burned approximately 40,000 to 45,000 tons of coal per year. In 1969, the plant switched to burning No. 6 diesel oil, but switched back to coal in 1983.

Flyash is produced from the burning of coal. Baghouses are used to remove flyash from the steam plant exhaust. The collected flyash is stored in a silo until it is removed for disposal. Flyash is sprayed with water as a dust control measure before being transferred from the silo to railroad cars or disposal trucks. Flyash is removed through a duct in the bottom of the flyash silo. The trucks or rail cars being filled sit on a concrete slab. The slab is equipped with a trench drain that collects runoff. The ash is then taken off-site for recycling. Bottom and flyash production averages about 2,500 tons per year from a total of 35,000 tons of coal burned. The steam plant will be phased over to natural gas within the next 5 years.

As noted above, a trench drain located beneath the flyash silo collects the water sprayed on the flyash and transports the water to the Coal Pile Treatment Lagoons. Water in these permitted lagoons is tested and undergoes treatment before going to the sanitary sewer system. Some flyash may still, however, be released during transfer to the rail cars or trucks due to wind. Releases from the conveyor used to transfer flyash from the baghouses to the silo are considered unlikely because a vacuum (suction) pump is used for conveyance of the flyash.

The site is partially covered with concrete under and around the flyash silo, with a paved asphalt road to the north. Vegetation covers the remaining areas around the silo. Access to

the site is unrestricted. Contact with contaminants would be most likely from airborne particulates generated during the offloading of flyash from the silo. There is also evidence of soot/flyash on the ground and building wall next to the silo. Infiltration of flyash constituents into the aquifer could occur in the unpaved areas around the silo.

The underlying soils consist of silty sand with occasional thin clay lenses. The soils would retard, but not prevent, vertical migration of constituents to the surficial aquifer. The surficial aquifer at NAB Little Creek is not used as a potable water source. No water supply wells are located in the area of the site. No surface water features are present in this area. Human contact with groundwater is therefore not anticipated.

SWMU 2 was originally identified in the RFA (as SWMU 105) as being a potential site affected by contamination, and was one of the SWMUs included in the Navy's RRRS. As part of the RRRS, three surface soils and one groundwater sample were collected in 1995 for analysis of target analyte list (TAL) metals. Arsenic in soil and groundwater exceeds EPA Region III residential risk based concentration for soil and tap water concentration for groundwater.

This SWMU was concluded to present a relative high risk due to metals in the fly ash and soil. Discussions of FY 2000 activities associated with SWMU 2 are presented in Section 3.2.9.

2.2.3.7 SWMU 18 - PWC Trans. Garage Spent Battery Shop, Collection Area , Bldg 3661

All PWC transportation maintenance is conducted at Building 3661. Batteries are in both the battery shop and on a wooden platform outside the shop. The transportation garage (Building 3661) was constructed in 1974. Spent batteries were placed outside the shop on a wooden pallet that rests on the edge of the asphalt parking lot. Staining from the spent battery collection area on the grassy area adjacent to the storage area was observed during the IAS and the VSI. According to the Navy's comments on the Draft RFA, the stained soil at this site has since been removed.

Batteries are currently (since before 1993) stored inside a berm to contain potential releases. No stains were visible in 1993 at this bermed area.

2.2.3.8 SWMU 30 - Leaking Above Ground Diesel Tank, Building 3400

Building 3400 is a lift station for the Little Creek sanitary sewer system. It is located in the southwest corner of the commissary parking lot. Adjacent to the building is an above ground diesel tank that has leaked. The tank holds about 150 gallons and rests about 2 feet above ground by four steel legs. The tank is currently active, and its age is unknown.

The tank rested on a stand above an asphalt surface. The RFA states that the asphalt appeared to be in good condition although certain portions appeared to have been recently repaired. Sand had been placed immediately below the tank in what appeared to be an attempt to adsorb some of the leaked product. In 1988, the asphalt area immediately below the tank and the grass surrounding the tank was stained with oily liquids.

The tank has since been reconfigured and a concrete slab and berm has been placed under and around the tank. The tank and bermed area are in good condition. It is likely that at least 6 inches of soil had been removed from below the tank to construct the new slab and berm.

2.2.3.9 SWMU 81 - MWR Auto Hobby Shop Stain in Parking Lot Area, Building 3530

The auto hobby shop is presently located in Building 3530, between 5th and 3rd Streets. Prior to this shop the building was used for heavy duty equipment maintenance. The shop is accessible to base personnel to work on their motor vehicles. Oil changes, lubrication work, body work, and painting are common activities. During the 1988 VSI, oily stains were observed next to the parking lot at several locations. These stains likely emanate from oily liquids from dumpsters, vehicles, and equipment stored around the site.

The building was constructed in 1954 and served as the heavy duty maintenance shop from then until 1974. The building became the auto hobby shop in 1974 when the transportation department relocated to its new building. The building was demolished in the mid-1990s.

Oily stains and stressed vegetation were observed at several locations on the parking lot edge during the VSI.

2.2.3.10 SWMU 96 - CB301 Seabee Vehicle Maintenance Facility Scrap Storage Area

The Seabees operate two vehicle maintenance shops in Building CB301; a "light shop" and a "heavy shop." The light shop is used for automotive maintenance. The heavy shop is used for construction equipment maintenance. SWMU 96 is located in back of Building CB301. Scrap metal is stored here on bare earth. This area started operation after 1984. The 1988 VSI stated that the yard is visibly stained with oil.

However, according to the Navy's comments on the Draft RFA, the oil-stained soil has been removed but no confirmation samples had been collected.

The Seabee compounds have drastically changed over the last ten years due to demolition and construction activities and the location of the former scrap metal storage area is not readily apparent. Several site visits in 1999 have led to the conclusion that the site was on the east side of the southeast corner of the fence, north of CB210 and CB301.

2.2.3.11 SWMU 97—CB301 Seabee Vehicle Maintenance Facility Storm Drain

SWMU 97, a storm drain inlet, is located near CB301 in the same compound as SWMU 96. Surface water runoff from SWMU 96 would enter this storm drain and ultimately discharge to Desert Cove. At the time of the 1988 VSI, oil from a forklift parked near the drain was flowing into the drain.

As with SWMU 96, this storm drain inlet is assumed to have begun receiving runoff from the compound in 1984. According to the Navy's comments on the Draft RFA, the oil-stained soil has been removed and oil is prevented from entering the storm drain.

In general, storm drains or pipes are not cleaned unless a blockage creates backup. There was no precedent to clean up soil near a storm drain or oil/water separator if staining was found. The outfalls in the Seabee areas are not specifically sampled as part of the VPDES permit because no industrial activities are conducted in the area.

The Seabee compounds have drastically changed over the last 10 years due to demolition and construction activities. The VSI photo is a close-up shot of a storm drain. Due to the vague narrative description of this SWMU in the Revised RFA and the poor perspective provided in the VSI photo, it is not presently possible to positively identify the storm sewer inlet referred

to as SWMU 97, however, based on a May 1999 site visit, the location of the SWMU is assumed to be the storm drain directly west of the north west corner of CB301.

2.2.3.12 SWMU 98 - CB210 Elevated Causeways Mechanic Shop Material Dispensing Area

SWMU 98 is located near Building CB210, a supply building. The elevated causeway (ELCS) material dispensing area consists of three 55-gallon drums of lubricants on wooden pallets over gravel. The area also contained an aboveground waste oil storage tank (~100 gallons) which has been referred to in the RFA as SWMU 67.

As the drums were opened, they were fitted with dispensing pumps which helped to prevent spills. The gravel area beneath the drums was stained during the 1988 VSI. It appeared to have occurred from routine dripage.

The Seabee compounds have drastically changed over the last ten years due to demolition and construction activities. This SWMU no longer exists and it is difficult to determine the exact former location of the drums and stained soil. On March 10, 1999, EPA, VDEQ, and the Navy visited this SWMU and a best estimate of the former location of the site was made.

2.2.3.13 SWMU 114 - ACU-2 Drum Rack and Tank Area, Building 1522

The ACU-2 drum rack and tank area consists of a 100 square foot concrete area surrounded by a concrete berm. A two-tier metal drum rack holds 55-gallon drums of liquids on their sides. Materials are dispensed from the drums. Empty drums are also stored on the rack. A 200-gallon above ground steel tank is also present within the bermed area. There is a drain in the slab. No means of closing the drain was identified during the 1988 VSI. The unit stored virgin and used petroleum products. The RFA stated that oily substances have been released to the soil from the bermed area.

Currently, the concrete berm is pumped by a waste oil vac truck on an "as needed" basis. This SWMU is included in the SPCC Plan. NAB Little Creek plans to address this area as part of the SPCC upgrades. The berm will be demolished and removed. All stained soil will be excavated. Confirmatory sampling will be completed to confirm sufficient cleanup. Results will be submitted to TRO-DEQ as part of the SPCC Program. The timing for this proposed work is not known.

2.2.3.14 SWMU 115 - ACU-2 Fuel Dispensing Area, Building 1522

The ACU-2 fuel dispensing area is adjacent to the ACU-2 drum rack (SWMU 114). The ACU-2 fuel dispensing area consists of two above-ground metal tanks, each with an approximate capacity of 200 gallons. The tanks are situated inside a bermed concrete slab. The tanks contain gasoline and diesel fuel. No start-up date is available for this unit.

During the 1988 VSI, staining was apparent near the top of the berm. ACU-2 personnel stated that the staining on the edge of the concrete berm was due to slow leakage from a fueling hose. The previous fueling hose was too long which permitted it to rub against the edge of the concrete berm. When the leak was discovered the hose was replaced. Any releases caused by the friction on the hose were minor. The berm is surrounded by an asphalt lot.

This area will be addressed as part of the SPCC upgrades. The existing tanks will be replaced with convaults. The berm will be partially demolished, and the rest filled in to form a raised

platform for the new tanks. Results will be submitted to TRO-DEQ as part of the SPCC Program.

2.2.3.15 SWMU 116 - MWR Recreation Boat Maintenance Facility, Building 3021

The MWR Boat Maintenance Facility is located in Building 3021. The facility is currently used to store recreational boats. In the past, gasoline was poured along the fence in back of Building 3021 for weed control. SWMU 116 refers to the area along the fence. Operation of the MWR Boat Maintenance Facility began in 1943, and the site is still active, although the weed control method discussed above is no longer practiced. Facility personnel estimate approximately 5 gallons of gasoline per year were used from approximately 1969-1979.

In October 1995, this site was sampled for Relative Risk Ranking using DOD's model. Three shallow subsurface (12"-18") soil and one groundwater sample were collected along the fence and analyzed for VOCs and TAL Metals. No VOCs were detected above 5 ppb in soil or groundwater, and no significant metal concentrations were detected.

2.2.3.16 SWMU 119 - Former Special Warfare Group 2 Electronics Shop, Building W112

The former Special Warfare Group (SWG)2 electronics shop was located in Building W112. File information indicates that, in the past, the building was served by a septic system which received waste solvents and dilute phosphoric acid generated by the shop. The septic system apparently consisted of a tile field on the south side of the building. The current status of the septic system is not available.

The SWG2 electronics shop began operations in Building W112 in 1943. The shop vacated Building W112 after 1984 and the building was demolished in 1998.

In October 1995, this site was sampled for Relative Risk Ranking using DOD's model. Two subsurface soil and one groundwater sample were collected and analyzed for VOCs, SVOCs, and TAL Metals. No organic contamination was detected in the soil above 11 µg/kg and in the groundwater above 3 µg/L. High iron concentrations were detected in one soil sample.

Several base personnel were consulted about this site. The building was never hooked up to the sanitary sewer system. A sink was present inside the building. The pipes exited the building on the southeast corner. Placement of the samples collected in 1995 was due to the location the pipes entered the ground from the building, and assuming a tile field extended to the south. During building demo in 1998, no evidence of a tile field or septic tank was found. It is possible that the pipes from the sink emptied directly into the ground below the building, or emptied into a dry well.

Although monitoring wells are present upgradient of the site, groundwater gradient could not be determined because the water levels from the wells were inconclusive, possibly due to influences from the sanitary sewer system.

2.2.3.17 SWMU 122 - Gymnasium Emergency Generator, Building 3147

SWMU 122 is an emergency generator located adjacent to the front entrance to Building 3147, the gymnasium. The generator sits on a concrete slab at grade. The pad was visibly stained with oil. During the 1988 VSI, a milky white substance was observed leaking from the generator, off the concrete pad and onto the adjoining soil and grass. White stains were also visible on the pad. According to PWC personnel, the milky white substance leaking from the

generator was most likely acid from the batteries inside the generator. Currently, the emergency generator for this building is stored in a paved compound near Building 3165. Only when it is needed, it is hooked up to the connections for the building.

The startup date of this generator is not known. According to the Navy's comments on the Draft RFA, the generator was removed October 1988.

A site visit on October 4, 1993, stated that there was no evidence of a release from a former generator. Site was visited again on May 6, 1999. The former location of the generator was identified. No staining or evidence of release was present.

2.2.3.18 SWMU 128 - Port Ops Lube Oil Dispensing Area Storm Water Drain, Building 3896

Port Ops, Building 3896, houses the engine overhaul shop for a boat maintenance area. Boat bilges are emptied of residual bilge water, hulls are ground by hand and painted, and engine maintenance is performed in this area. SWMU 128 is a storm drain that collects runoff from a lube oil dispensing area and conveys it to Little Creek Cove. Start-up information for this SWMU is not available; however, lube oil is no longer managed in this area.

During the October 1995 RRR Sampling event, this SWMU was investigated. The Work Plan included two samples to be collected from the sludge in the bottom of the storm drain. However, upon investigation of the drain, no sludge was present. Therefore, no samples could be collected. This SWMU is also regulated under the VPDES Program/Permit. Appropriate Best Management Practices have been taken to preclude wastes from entering the storm drain.

2.2.3.19 SWMU 129 - Port Ops Satellite Accumulation Area , Building 3896

Port Ops, Building 3896, houses the engine overhaul shop for a boat maintenance area. Boat bilges are emptied of residual bilge water, hulls are ground by hand and painted, and engine maintenance is performed in this area. SWMU 129, the Satellite Accumulation Area, is used to consolidate paint wastes in drums. The startup date of this area is not known. The unit is being closed in 2000. Storm water runoff (and spills) from this area would flow to the storm sewer inlet identified as SWMU 128. Drummed paint wastes rest on a concrete slab of good integrity. The 1988 VSI noted paint stains on the concrete.

This SWMU was investigated during the October 1995 RRR sampling event. The Work Plan included two samples to be collected from the sludge in the bottom of the storm drain near the unit. However, upon investigation of the drain, no sludge was present. Therefore, no samples could be collected.

As noted under the section for SWMU 128, the storm water drain is regulated under the VPDES Program. Appropriate Best Management Practices have been taken to preclude wastes from entering the storm drain. Additionally, the paint stains observed during the VSI were on concrete. There is no evidence that paint wastes have reached the storm drain.

2.2.3.20 SWMU 138 - SEAL Team 4 Satellite Accumulation Area, Building 3806

The SEAL Team 4 compound is used to maintain and store boats, weapons, and other material used by SEAL Team 4. SWMU 138, the satellite accumulation area, was located outside of Building 3806. The accumulation area consisted of multiple 55-gallon drums on a concrete slab inside a locked fence. The satellite accumulation area was used to store waste

fuels, primarily gasoline, prior to off-base disposal. The slab runoff collected in a storm drain that discharged to Desert Cove. Stains observed on the concrete slab during the 1984 IAS suggest that liquids may have been released to the storm drain. Start-up information for this SWMU is not available.

According to the Navy's comments on the Draft RFA, the concrete in this area has been removed to allow for new construction. The satellite accumulation area has been relocated away from the storm drain.

The SEALs now handle their hazardous waste in new state-of-the-art hazardous material trailers. Also, the entire compound is now concrete.

2.2.3.21 SWMU 141- SEAL Delivery Vehicle 4 Satellite Accumulation Area, Building 3806

SWMU 141 is located in the same compound as SWMU 138. This compound is used to maintain boats and other equipment used by SEAL Team 4. The satellite accumulation area was located outside of Building 3806 in a separate fenced area. The accumulation area consisted of multiple 55-gallon drums on a concrete slab inside a locked fence. The drums were used to store waste paints and thinners prior to off-base disposal. At the time of the 1988 VSI, some of the drums were open. The slab runoff collects in a storm drain that flows to Desert Cove. Stains on the concrete slab for the satellite accumulation area suggest that liquids have been released to the storm drain. Start-up information for this SWMU is not available.

According to the Navy's comments on the Draft RFA, the concrete in this area has been removed to allow for new construction. The satellite accumulation area has been relocated in an area away from the storm drain.

The SEALs now handle their hazardous waste in new state-of-the-art hazardous material trailers. Also, the entire compound is now concrete.

2.2.3.22 SWMU 146 – SEAL Team 2 Material Storage Area, Building 3813

SWMU 146 is located near Building 3813. Flammable material containers holding gasoline and other equipment were stored inside a locked fenced area. The containers were stored on wooden pallets that rested on a concrete surface. The storage area measured about 7 feet on a side. The unit had a steel roof, but no walls, other than the steel fence. Stains were observed on the wooden pallets, the concrete surface, and the grassy area immediately behind the unit.

The start-up date for this unit is not known.

The SEAL teams now handle their hazardous waste in new state-of-the-art hazardous material trailers. Also, the entire compound is concrete.

This site was originally in the Scope of Work for the RRR Sampling event in 1995 but the site could not be identified with any reasonable accuracy.

2.2.3.23 AOC D - PCB Transformer Leak, Building 3530

Area of Concern D is a former PCB transformer that was situated near the front entrance to the MWR Hobby Shop at Building 3530. The transformer was located at ground level and appears to have leaked some oils, which were contained within a 4-inch high metal container

surrounding the transformer. About 1 to 2 inches of liquids (presumably precipitation and oils) were present in the metal pan during the 1988 VSI.

According to the Navy's comments on the Draft RFA, this transformer has been removed and disposed off base. A new PCB-free transformer replaced the PCB-containing transformer in the same location. The site was visited on May 6, 1999. Digital pictures are available. Oil stains were present on the concrete directly below the new transformer, but did not extend beyond 6 inches out onto the concrete slab. Annual inspections are now conducted on all transformers. Any leaks are fixed and cleaned up using degreasers.

2.2.3.24 AOC H - Pesticide Mixing Area, Buildings 3109 and 3630

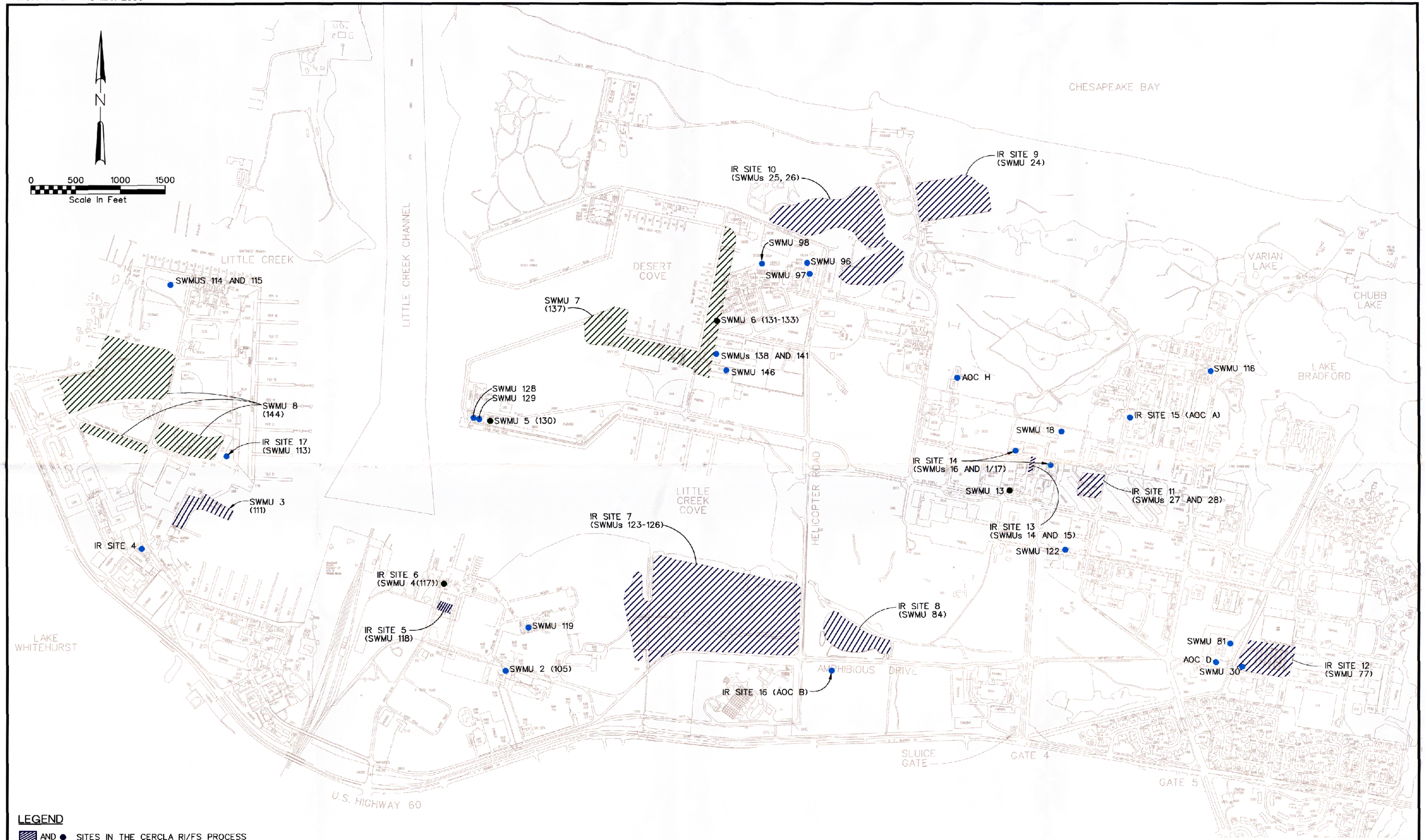
Pesticides are stored in Building 3630 and mixed in Building 3109. They are then applied to the golf course. There is the possibility that pesticide spills have occurred in the mixing area.

Table 2-1
Environmental Studies, Investigations, and Actions Conducted to Date at IR Sites and SWMUs
FY 2000 Site Management Plan
NAB Little Creek, Virginia Beach, Virginia

IR Site or SWMU	Preliminary Studies		Preliminary Investigations	Removal Actions	Remedial Investigations	Feasibility Studies	Decision Docs	Remedial Designs/Actions
	1984 IAS[a]	1989 RFA						
IR Site 1	X	X						
IR Site 2	X	X						
IR Site 3	X	X						
IR Site 4	X	X	PSI - Jul 1991					
IR Site 5	X	X	PSI - Jul 1991 SI - Nov 1994		1-Yr GWM - 1996		Draft NFRAP - 1998	
IR Site 6 ("New SWMU 4 (117))	X	X						
IR Site 7	X	X	RVS - Oct 1986 IRI - Nov 1991		RI - Nov 1994	PFS - Nov 1994 FS - Nov 1995	PRAP - Oct 1997 DD - Jan 1998	RD - Mar 1998 RA - Jun 1998 5-YR LTM - 1998 to 2002
IR Site 8	X	X	SI - Dec 1999					
IR Site 9	X	X	RVS - Oct 1986 IRI - Nov 1991		RI - Nov 1994	PFS - Nov 1994	Draft Prap/DD - 1996	5-YR LTM - 1996 to 2000 3-YR Rpt - Jul 1999 (Draft)
IR Site 10	X	X	RVS - Oct 1986 IRI - Nov 1991		RI - Nov 1994	PFS - Nov 1994	Draft Prap/DD - 1996	5-YR LTM - 1996 to 2000 3-YR Rpt - Jul 1999 (Draft)
IR Site 11	X	X	RVS - Oct 1986 IRI - Nov 1991	DD (soil) - Nov 1994 IRA (soil) - Nov 1995 Closeout Rpt (soil) - May 1996	RI - Nov 1994 1-Yr GWM - 1996 SRI - Ongoing	PFS - Nov 1994		
IR Site 12	X	X	RVS - Oct 1986 IRI - Nov 1991 EA Phase I - Aug 1990 EA Phase II - Apr 1991 SCR - June 1992		RI - Nov 1994 SRI - Jan 2000	PFS - Nov 1994		
IR Site 13	X	X	RVS - Oct 1986 IRI - Nov 1991	EE/CA (soil) - Mar 1999 IRA (soil) - Apr 1999 Closeout Rpt (soil) - Jul 1999	RI - Nov 1994 SRI - Ongoing	PFS - Nov 1994		
IR Site 14 ("New" SWMU 1 (17) and SWMU 16)	X	X	RRR - Jan 1996					
IR Site 15	X	X	PSI - Jul 1991					
IR Site 16	X	X	PSI - Jul 1991 SI - Nov 1994	DD - Nov 1994 RA - May 1995 Closeout Rpt - May 1996				
IR Site 17	X	X	PSI - Jul 1991					
"New" SWMU 2 (SWMU 105)		X	RRR - Jan 1996					
"New" SWMU 3 (SWMU 111)		X	SI - Dec 1999 RRR - Jan 1996					
"New" SWMU 5 (SWMU 130)		X	RRR - Jan 1996					
"New" SWMU 6 (SWMU 131-133)		X	RRR - Jan 1996					
SWMU 20		X	RRR - Jan 1996					
SWMU 32		X	RRR - Jan 1996					
SWMU 33		X	RRR - Jan 1996					
SWMU 84		X	RRR - Jan 1996					
SWMU 116		X	RRR - Jan 1996					
SWMU 120		X	RRR - Jan 1996					
SWMU 129		X	RRR - Jan 1996					

[a] - RFA identified 147 SWMUs and Several Areas of Concern (these included all of the IR Sites). Only those SWMUs and IR Sites that have susequently been the focus of other studies and investigations are listed

DD: Decision Document
EE/CA - Engineering Evaluation and Cost Analysis
FS: Feasibility Study
GWM: groundwater monitoring
IAS:Initial Assessment Study
IRA: Interim Remaval Action
IRI: Interim Remedial Investigation
LTM - Long Term Monitoring
PFS: Preliminary Feasibility Study
PSI: Preliminary Site Inspection
RD: Remedial Design
RFA: RCRA Facility Assessment
RI: Remedial Investigation
ROD: Record of Decision
RRRS: Relative Risk Ranking System
RVS: Round 1 Verification Step
SI: Site Inspection
SRI: Supplemental Remedial Investigation



LEGEND

- AND ● SITES IN THE CERCLA RI/FS PROCESS
- AND ● SITES REQUIRING SCREENING (FFA APPENDIX A)
- ● SITES REQUIRING DESKTOP AUDITS (FFA APPENDIX B)

SCOURCE: BASE MAP PROVIDED BY LANTDIV

CH2MHILL

Figure 2-1
LOCATIONS OF IR SITES, SWMUS AND AOC's,
FIVE-YEAR SITE MANAGEMENT PLAN FOR FY 2000
NAVAL AMPHIBIOUS BASE LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

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3.0 Proposed Activities for FY 2000

This section summarizes ongoing and planned IR/CERCLA activities at each site. The discussion focuses on activities that are proposed for FY 2000 but also includes currently funded activities that may expand beyond October 2000.

Additional scope items may be identified during, or as a result of, the execution of this scope of work. The scope is presented on a site-by-site basis. Section 3.1 discusses base-wide activities and Section 3.2 describes site-specific characterization, remediation and long-term monitoring and maintenance activities.

3.1 Multi-site and Base-wide Activities for 2000

3.1.1 Development of Federal Facilities Agreement

The listing of NAB Little Creek on the NPL requires that the Navy and EPA Region III enter into a written agreement that will lay out how and when CERCLA-related activities will be conducted at the base. This agreement is called a Federal Facilities Agreement (FFA). As part of this process, the FFA identifies each specific area (site) on the base that will be addressed under the FFA, and categorizes them as to how they will initially fit into the CERCLA process. The Draft FFA will be developed in FY 2000 and submitted for review by EPA and Navy counsel. The schedule for development, review and finalization of the FFA is presented in Section 4, Figure 4-1

3.1.2 Development of Master Project Plans

The Master Project Plans initially developed for NAB Little Creek in FY 1999 will be reviewed by the partnering team and finalized in FY 2000. The development of the Master Project Plans is designed to expedite project plan development for individual site investigations, risk assessments and studies at the base and to promote consistency in all project plans and investigations conducted at the base. The schedule for finalization of the base-wide Master Project Plans is presented in Section 4, Figure 4-1.

3.1.3 Base-wide Background Characterization for Soil and Groundwater

Due to the shortcomings of the previous background study conducted in the 1990's (see section 2.1.9), a more structured and documented characterization of the base-wide background conditions of groundwater and soil will be conducted in FY 2000.

The study will involve collecting and analyzing samples from the existing background wells (as appropriate) in addition to several other site wells and a newly installed background well. Statistically valid sets of surface soil and shallow subsurface soil samples will also be collected and analyzed.

The data collected and evaluated in this study will be used to help determine a statistically valid set of background concentrations for groundwater and for surface soil and shallow subsurface soil for each of the various major soil types found on NAB Little Creek. The

background data set will then be applied to each site during the SI, RI and risk assessment phases (human health and ecological) to help determine if the compounds found at each site (and the risks associated with them) are site related or are indicative of natural (or background) conditions.

The work planned for FY 2000 includes the preparation and approval of a work plan, the collection and analysis of samples, the evaluation of the data, and the preparation, review, and finalization of a background characterization report. The schedule for this work is presented in Section 4, Figure 4-1.

3.1.4 Multi-site Ecological Risk Assessment

Prior to being placed on the NPL, none of the sites at NAB Little Creek have been evaluated for potential risks to ecological receptors in a manner that was consistent with EPA's current policy. To meet this need, the NAB Little Creek Partnering Team and Ecological Risk Subgroup have decided to initiate the ecological risk assessment (ERA) process on all currently active sites (those sites which currently have a usable and adequate analytical data on potential media of concern) at this time in a single document.

The EPA ERA process has eight steps:

- Step 1: Preliminary Problem Formulation and Ecological Effects Evaluation
- Step 2: Preliminary Exposure Estimate and Risk Calculation
- Step 3: Assessment Endpoint Selection and Testable Hypotheses
- Step 4: Site Conceptual Model, Measurement Endpoint Selection, and Study Design
- Step 5: Site Assessment and Sampling Feasibility
- Step 6: Site Investigation
- Step 7: Risk Calculation
- Step 8 Risk Management

The scope of work for FY 2000 consists of completing Steps 1 and 2 for the ten active sites (Sites 5, 7, 8, 9, 10, 11, 12, 13, 16, and SWMU 3). The sites will then be divided into two groups before conducting the Step 3 evaluation based on whether they are expected to have any ecological risk issues. The sites in the first group (Sites 9, 10, 11, 12, 13, and 16) are expected to have little or no ecological risk and are likely to require only minor effort to finalize the ERA. The sites in the second group (Sites 5, 7, 8, and SWMU 3) may have ecological issues that require additional sampling to quantify and will likely be on a slower schedule.

Any work required beyond Step 3 is scheduled subsequent FYs. The schedule for this work is presented in Section 4, Figure 4-1.

3.2 Site Characterization and Remediation Activities for 2000

3.2.1 Site 5—Buildings 9 and 11 Motor Oil Disposal Area

The only activity scheduled for Site 5 during FY 2000 is the completion of the first three steps of the ERA process (See section 3.1.4). The 5-year schedule for Site 5 is presented in Section 4, Figure 4-2.

3.2.2 Site 7—Amphibious Base Landfill

The navy unilaterally signed the decision document for Site 7 in January 1998. The selected remedial alternative was implemented and completed in June 1998 (See Section 5.1.1). And the 5-year monitoring program for groundwater, surface water and sediment was initiated in the summer of 1998

As a result of the NPL listing of the base, each site that enters the CERCLA RI/FS process must be closed out with a ROD signed by EPA Region III. In order to provide documentation for a ROD, the navy must provide EPA with an RI/FS, human health and ecological risk assessments, and a proposed plan that meets EPA criteria. Because no ERA has been conducted and the HHRA was not completed in accordance with EPA guidance, it will be necessary to, at a minimum, conduct the an ERA and rewrite the HHRA for Site 7, summarize these findings in a new proposed plan, and sign a ROD. This does not mean that the remedy that was previously selected and implemented is inadequate.

The activities proposed for FY 2000 consist of:

- Rewriting the HHRA to meet the requirement of EPA's Risk Assessment Guidance (RAGS)Part D.
- Completing Step 3 of the ERA as described in Section 3.1.4.
- Conducting rounds 4 and 5 of long-term semi-annual monitoring of the groundwater, surface water and sediment .
- Conducting maintenance of the landfill cover and vegetation.

Two rounds of long-term monitoring of the groundwater, surface water and sediment are also proposed for FY 2000 (January 2000 and June 2000). In light of the need to conduct an ERA, and possibly collect additional samples/data to do this, the partnering team may decide to delay the completion of the long term monitoring rounds until after the ERA process reaches a point where additional data needs are identified and clarified so that they may be addressed by the monitoring effort.

The current scope of long-term monitoring requires groundwater and surface water samples to be analyzed for VOCs, SVOCs, PCBs, total and dissolved metals, and cyanide. Surface water samples are also analyzed for hardness. Sediment samples are analyzed for VOCs, SVOCs, PCBs, total metals, cyanide, and TOC. Periodic monitoring reports are submitted semi-annually following each round of monitoring.

In addition to regular groundwater, surface water, and sediment monitoring, the Site 7 landfill surface requires regular maintenance. It is anticipated that Site 7 will be maintained by mowing new growth in the central portion of the site to a 12" base using a bush hog every one or two years. Site 7 will be evaluated on a yearly basis with EPA and VDEQ oversight to determine the exact mowing requirements and schedules. The first mowing of Site 7 is anticipated to occur during a dry period in March or April of 2000 (per VDEQ).

The 5-year schedule for Site 7 is presented in Section 4, Figure 4-3.

3.2.3 Site 8—Demolition Debris Landfill

All SI activities have been completed at Site 8. The work planned for FY 2000 consists of:

- Submitting the final SI report in December 1999
- Completing the ecological risk assessment through Step 3 as discussed in Section 3.1.4.

Depending on the results of the ERA, Site 8 may undergo a full RI, however, because of the low relative ranking of Site 8, it is not likely that this work will be performed before FY 2002.

The 5-year schedule for Site 8 is presented in Section 4, Figure 4-4.

3.2.4 Site 9—Driving Range Landfill

The navy prepared a PRAP and unilaterally signed the decision document for Site 9 in January 1997. The selected remedial alternative (long-term monitoring of groundwater) was chosen due to the contents of the landfill and its proximity to the Chesapeake Bay and other surface water bodies. Monitoring was implemented in 1996 and is currently in its 5th and final year.

As a result of the NPL listing of the base, each site that enters the CERCLA RI/FS process must be closed out with a ROD signed by EPA Region III. The 1997 DD was not prepared with EPA consent. In order to provide documentation for a ROD, the navy must provide EPA with an RI/FS, human health and ecological risk assessments, and a proposed plan that meets EPA criteria. Because no ERA has been conducted and the HHRA and FS were not completed in accordance with EPA guidance, it will be necessary to conduct an ERA and rewrite the HHRA and FS for Site 9, summarize these findings in a new proposed plan, and sign a ROD. This does not mean that the remedy that was previously selected and implemented is inadequate.

The activities proposed for FY 2000 consist of:

- Rewriting the HHRA to meet the requirement of EPA's Risk Assessment Guidance (RAGS) Part D.
- Conducting a soil cover survey to determine the current thickness of the soil cover on the landfill
- Prepare a focussed Feasibility Study report that will include the HHRA and a summary of the findings of the 1993 RI and the subsequent 7 rounds of semiannual groundwater monitoring (June 1996-June 1999). The report will also present the findings of the soil cover survey.
- Completing Step 3 of the ERA as described in Section 3.1.4.
- Conducting rounds 8 an 9 of long-term semi-annual monitoring of the groundwater (January 2000 and June 2000).

The 5-year schedule for Site 9 is presented in Section 4, Figure 4-5.

3.2.5 Site 10—Sewage Treatment Plant Landfill

The navy prepared a PRAP and unilaterally signed the decision document for Site 10 in January 1997. The selected remedial alternative (long-term monitoring of groundwater) was chosen due to the contents of the landfill and its proximity to the Chesapeake Bay and other surface water bodies. Monitoring was implemented in 1996 and is currently in its 5th and final year.

As a result of the NPL listing of the base, each site that enters the CERCLA RI/FS process must be closed out with a ROD signed by EPA Region III. The 1997 DD for Site 10 was not prepared with EPA consent. In order to provide documentation for a ROD, the navy must provide EPA with an RI/FS, human health and ecological risk assessments, and a proposed plan that meets EPA criteria. Because no ERA has been conducted and the HHRA and FS for Site 10 were not completed in accordance with EPA guidance, it will be necessary to conduct an ERA and rewrite the HHRA and FS for Site 10, summarize these findings in a new proposed plan, and sign a ROD. This does not mean that the remedy that was previously selected and implemented is inadequate.

The activities proposed for FY 2000 consist of:

- Rewriting the HHRA to meet the requirement of EPA's Risk Assessment Guidance (RAGS) Part D.
- Conducting a soil cover survey to determine the current thickness of the soil cover on the landfill
- Prepare a focussed Feasibility Study report that will include the HHRA and a summary of the findings of the 1993 RI and the subsequent 7 rounds of semiannual groundwater monitoring (June 1996-June 1999). The report will also present the findings of the soil cover survey.
- Completing Step 3 of the ERA as described in Section 3.1.4.
- Conducting rounds 8 an 9 of long-term semi-annual monitoring of the groundwater (January 2000 and June 2000).

The 5-year schedule for Site 10 is presented in Section 4, Figure 4-5.

3.2.6 Site 11—School of Music Plating Shop

All planned SRI field activities have been completed at Site 11. The work planned for FY 2000 consists of:

- Conducting an baseline human health risk assessment in accordance with EPA RAGS Part D guidance.
- Completing the ecological risk assessment through Step 3 as discussed in Section 3.1.4.
- Completing the draft SRI report (by December 2000).

The 5-year schedule for Site 11 is presented in Section 4, Figure 4-6.

3.2.7 Site 12—Exchange Laundry Waste Disposal Area

All planned SRI field activities have been completed at Site 12. The work planned for FY 2000 consists of:

- Conducting an baseline human health risk assessment in accordance with EPA RAGS Part D guidance.
- Completing the ecological risk assessment through Step 3 as discussed in Section 3.1.4.
- Completing the draft SRI report by January 2000 and the final SRI by September 2000.
- Completing the microcosm tests and summary report being conducted by Virginia Tech as discussed below.
- Completing the modeling being conducted by Virginia Tech.

Additional data evaluation, through microcosm and sorption studies, will continue to be conducted by Virginia Tech through January 20000. During this time, the biodegradability and degradation rates of chlorinated VOCs by onsite microbial populations and the bioavailability and site-specific sorption constants of chlorinated VOCs will be assessed using laboratory-scale studies. The results of these studies will be implemented in a fate and transport model designed to simulate natural attenuation of chlorinated solvents at Site 12. The model will be developed and validation from August 1998 through June 2000. The results of the microcosm and sorption studies and the modeling will be used to evaluate remedial alternatives in the feasibility study.

The 5-year schedule for Site 12 is presented in Section 4, Figure 4-7.

3.2.8 Site 13—Public Works PCP Dip Tank and Wash Rack

All planned SRI field activities have been completed at Site 13. The work planned for FY 2000 consists of:

- Conducting a baseline human health risk assessment in accordance with EPA RAGS Part D guidance.
- Completing the ecological risk assessment through Step 3 as discussed in Section 3.1.4.
- Completing the draft SRI report (by November 2000).
- Planning and implementing a pilot study to remediate groundwater beneath the former dip tank location.

The proposed pilot study will likely consist of injecting an oxygen release compound into the aquifer and monitoring its effect on the pentachlorophenol concentrations in the groundwater. The test will run for at least 6 months. The results of the test will be used to evaluate full-scale remediation alternatives in a feasibility study.

The 5-year schedule for Site 13 is presented in Section 4, Figure 4-8.

3.2.9 "New" SWMU 3—Pier 10 Sandblast Yard

All SI activities have been completed at SWMU 3. The work planned for FY 2000 consists of:

- Submitting the final SI report in December 1999
- Completing the ecological risk assessment through Step 3 as discussed in Section 3.1.4.

It is proposed that SWMU 3 will undergo a full RI that will fully characterize the impacts to groundwater, soil, and sediment, and delineate the extent of blast grit at the site. This work is currently planned for FY 2001. It is likely that the results of the Step 3 ERA will influence the scope of sampling activities for the RI.

The 5-year schedule for SWMU 3 is presented in Section 4, Figure 4-9.

3.2.10 "New" SWMU 7-Small Boat Sandblast Yard Piers 51-59

The work planned at SWMU 7 for FY 2000 consists of:

- Preparing site-specific project plans to conduct an SI
- Conducting the SI field sampling activities
- Preparing and submitting an SI letter report

The SI will evaluate the presence of potential soil and groundwater contamination at the site and determine if there is residual sand blast grit in the soil. It will also characterize the blast grit (if any) for possible disposal criteria (e.g.: TCLP). The SI will include a comparison of the concentrations found at the site to RBCs and background concentrations.

The 5-year schedule for SWMU 7 is presented in Section 4, Figure 4-10.

3.2.11 "New" SWMU 8-West Annex Sandblast Area

The work planned at SWMU 8 for FY 2000 consists of:

- Preparing site-specific project plans to conduct an SI and EE/CA
- Conducting the SI field sampling activities.
- Preparing and submitting an SI letter report
- Preparing an EE/CA or the removal of sandblast material/residue.
- Conducting a removal action to excavate and dispose of the spent blast grit at the site.

The SI will evaluate the presence of potential soil, sediment and groundwater contamination at the site and delineate the extent of residual sand blast grit in the soil. It will also characterize the blast grit for possible disposal criteria (e.g., TCLP). The SI will include a comparison of the concentrations found at the site to RBCs and background concentrations.

The EE/CA will cost out and evaluate various disposal alternatives for the blast grit. The EE/CA will be made available for public review and comment before a final removal action is agreed to and implemented.

The 5-year schedule for SWMU 8 is presented in Section 4, Figure 4-11.

4.0 Five-year Site Management Schedules

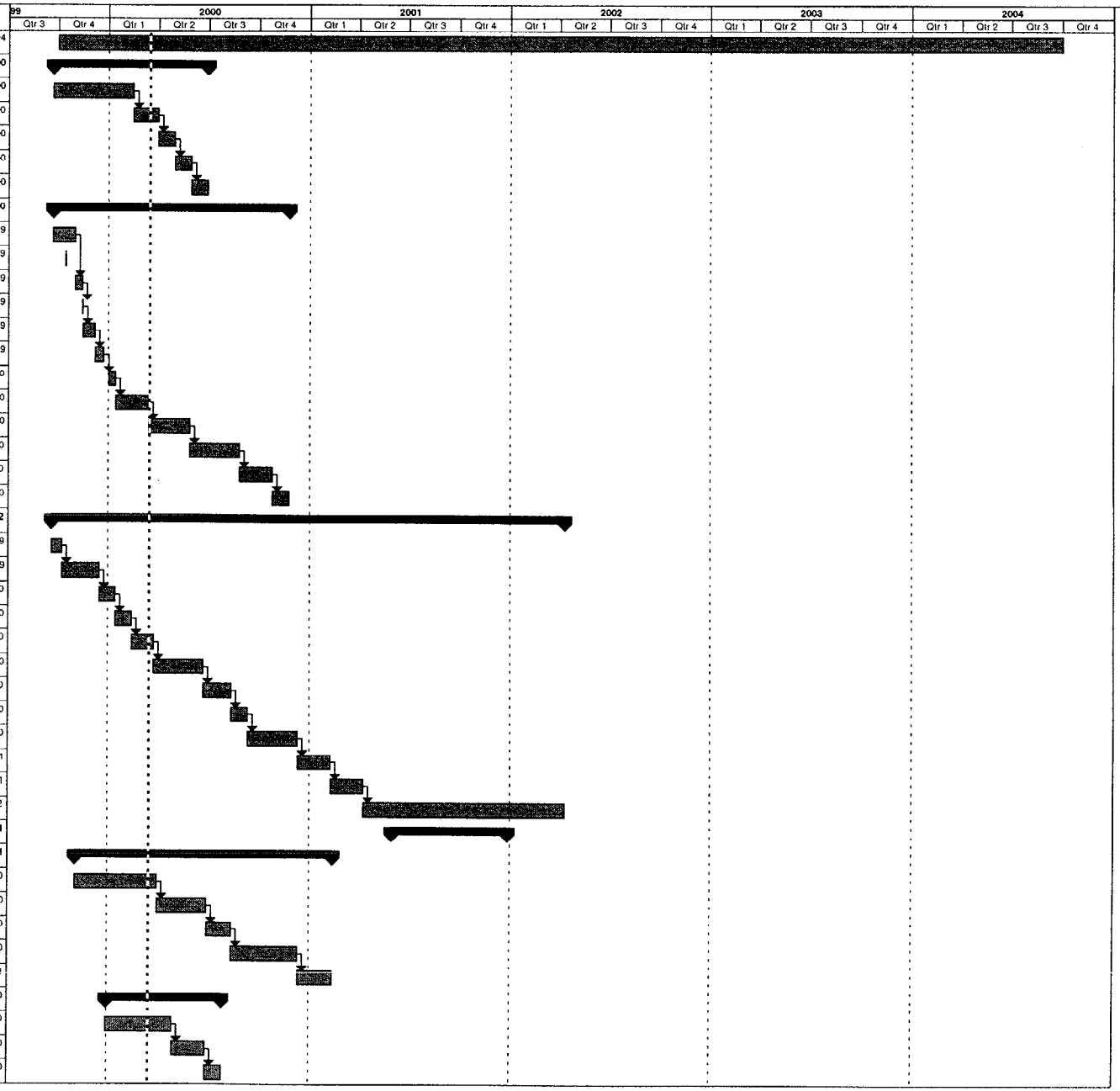
This section presents the 5-year project schedules for each site discussed in Section 3, as well as for the base-wide and multi-site activities described in Section 3. The 5-year period extends from FY 2000 through FY 2004 (October 1999 through September 2004). These schedules are adjusted annually in the SMP, as the future site activities are further defined and various administrative issues, including funding, are addressed.

The project schedule for base-wide and multi-site activities is presented in Figure 4-1. Site-specific schedules are presented in Figures 4-2 through 4-12.

The schedule for performing desktop audits of those sites currently identified as Appendix B sites in the FFA (see Section 2.2.3) will be developed by the NAB Little Creek Partnering Team. The sites will be prioritized and several audits will be conducted each year beginning with those sites having the highest priority.

Figure 4-1
Schedule for Base Wide Activities
FY 2000 Site Management Plan
NAB Little Creek, Virginia Beach, VA

ID	Task Name	Duration	Start	Finish
1	**BASE WIDE ACTIVITIES**	1828 days	Fri 10/01/99	Fri 10/01/04
2	**Master Project Plans**	**282 days**	**Wed 09/22/99**	**Thu 06/29/00**
3	PT Review Draft MPP	147 days	Wed 09/22/99	Tue 02/15/00
4	Response To Comments	45 days	Wed 02/16/00	Fri 03/31/00
5	Resolve Comments	30 days	Sat 04/01/00	Sun 04/30/00
6	Final Master Project Plans	30 days	Mon 05/01/00	Tue 05/30/00
7	Approv. Final Master Project Plans	30 days	Wed 05/31/00	Thu 06/29/00
8	**Background Study**	**430 days**	**Wed 09/22/99**	**Fri 11/24/00**
9	Draft Work Plan	41 days	Wed 09/22/99	Mon 11/01/99
10	Conference call	1 day	Fri 10/15/99	Fri 10/15/99
11	Partnenry Team Review	13 days	Tue 11/02/99	Sun 11/14/99
12	Meet and Resolve Comments	1 day	Mon 11/15/99	Mon 11/15/99
13	Final Work Plan	22 days	Tue 11/16/99	Tue 12/07/99
14	Approve Work Plan	16 days	Wed 12/08/99	Thu 12/23/99
15	Field Work	12 days	Mon 01/03/00	Fri 01/14/00
16	Obtain Valid data	60 days	Sat 01/15/00	Tue 03/14/00
17	Draft Report	75 days	Wed 03/15/00	Sun 05/28/00
18	P T Review	90 days	Mon 05/29/00	Sat 08/26/00
19	Final Report	60 days	Sun 08/27/00	Wed 10/25/00
20	Approve Final Report	30 days	Thu 10/26/00	Fri 11/24/00
21	**Multi Site Ecological Risk Assessment**	**934 days**	**Mon 09/20/99**	**Wed 04/10/02**
22	Interim Memos (ASL and BAC) to BTAG	19 days	Mon 09/20/99	Fri 10/08/99
23	BTAG Review and Resolve Comments	69 days	Sat 10/09/99	Thu 12/16/99
24	Interim Memos (ASL and BAC) to BTAG	29 days	Fri 12/17/99	Fri 01/14/00
25	Step 1 & 2	30 days	Sat 01/15/00	Sun 02/13/00
26	BTAG Review	40 days	Mon 02/14/00	Fri 03/24/00
27	Step 3 (Sites 9, 10, 11, 12, 13)	90 days	Sat 03/25/00	Thu 06/22/00
28	BTAG Review (Sites 9,10,11,12,13)	51 days	Fri 06/23/00	Sat 08/12/00
29	Final ERA (Step 3-Sites 9,10,11,12,13)	30 days	Sun 08/13/00	Mon 09/11/00
30	Step 3 (Sites 5,7,8, SWMU 3)	90 days	Tue 09/12/00	Sun 12/10/00
31	BTAG Review (Sites 5,7,8, SWMU 3)	60 days	Mon 12/11/00	Thu 02/08/01
32	Resolve Step 3 Comments/Issues	60 days	Fri 02/09/01	Mon 04/09/01
33	Steps 4 through 8 (as needed)	366 days	Tue 04/10/01	Wed 04/10/02
34	**Community Relations Plan**	**210 days**	**Fri 06/01/01**	**Thu 12/27/01**
38	**Federal Facility Agreement**	**468 days**	**Wed 11/03/99**	**Mon 02/12/01**
39	Draft Agreement	150 days	Wed 11/03/99	Fri 03/31/00
40	P T. Review	90 days	Sat 04/01/00	Thu 06/29/00
41	Draft Final Agreement	45 days	Fri 06/30/00	Sun 08/13/00
42	Legal Review	120 days	Mon 08/14/00	Mon 12/11/00
43	Final Agreement Submitted	63 days	Tue 12/12/00	Mon 02/12/01
44	**5-Year Site Management Plan**	**210 days**	**Fri 12/31/99**	**Thu 07/27/00**
45	DraftSMP	120 days	Fri 12/31/99	Fri 04/28/00
46	P T. Review	60 days	Sat 04/28/00	Tue 06/27/00
47	Final SMP	30 days	Wed 06/28/00	Thu 07/27/00

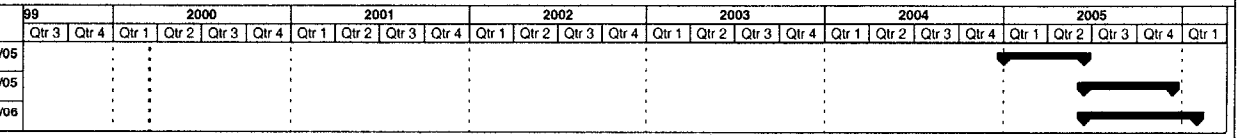


Project: BaseWide_05
Date: Wed 03/15/00

Task | Milestone | Rolled Up Task | Rolled Up Progress | Project Summary | Rolled Up Split
Progress | Summary | Rolled Up Milestone | External Tasks | Split

Figure 4-2
Schedule for Site 5 - Buildings 9 and 11, Motor Oil Disposal Area
FY 2000 Site Management Plan
NAB Little Creek, Virginia Beach, Virginia

ID	Task Name	DUR	Start	Finish
1	SITE 5 Focused Feasibility Study and HHRA	165 days	Mon 01/03/05	Thu 06/16/05
5	SITE 5 Proposed Remedial Action Plan	180 days	Fri 06/17/05	Tue 12/13/05
11	Site 5 Record of Decision	230 days	Fri 06/17/05	Wed 02/01/06

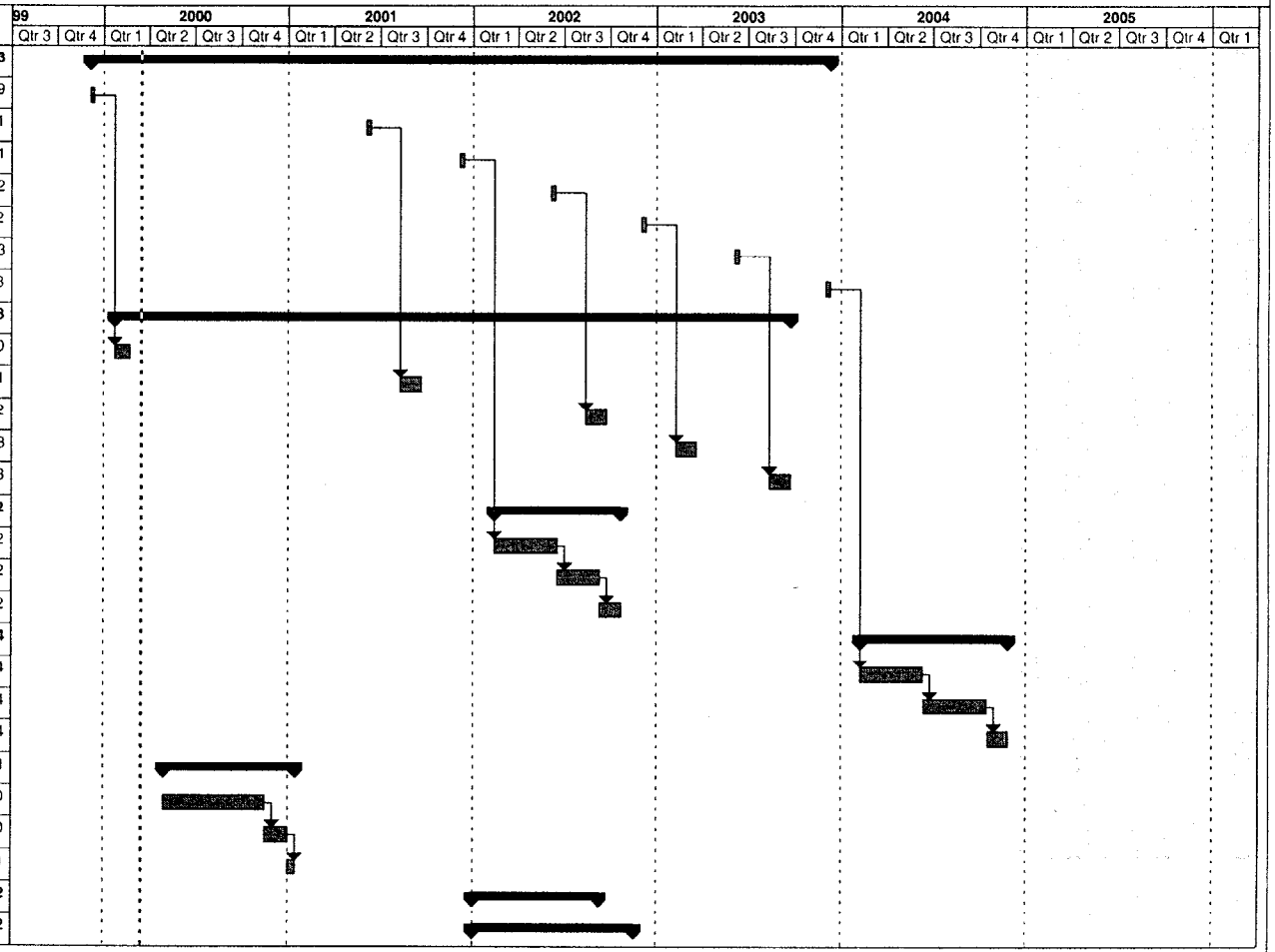


Date: Wed 03/15/00
REVISED:Wed 03/15/00

Task
Progress
Milestone
Summary
Rolled Up Task
Rolled Up Milestone
Rolled Up Progress
External Tasks
Project Summary
Split
Rolled Up Split

Figure 4-3
Schedule for Site 7 - Amphibious Base Landfill
FY 2000 Site Management Plan
NAB Little Creek, Virginia Beach, VA

ID	Task Name	DUR	Start	Finish
1	**SITES 7 LONG-TERM MONITORING PROGRAM**	**1168 days**	**Mon 12/06/99**	**Wed 12/10/03**
2	Sampling Round 4	7 days	Mon 12/06/99	Sun 12/12/99
3	Sampling Round 5 - on hold til ERA complete	7 days	Mon 06/04/01	Tue 06/12/01
4	Sampling Round 6 - on hold til ERA complete	7 days	Thu 12/06/01	Fri 12/14/01
5	Sampling Round 7 - on hold til ERA complete	7 days	Thu 06/06/02	Fri 06/14/02
6	Sampling Round 8 - on hold til ERA complete	7 days	Tue 12/03/02	Wed 12/11/02
7	Sampling Round 9 - on hold til ERA complete	7 days	Thu 06/05/03	Fri 06/13/03
8	Sampling Round 10 - on hold til ERA complete	7 days	Tue 12/02/03	Wed 12/10/03
9	**PERIODIC REPORTING**	**1063 days**	**Mon 01/24/00**	**Tue 09/23/03**
10	Letter Reports for Round 4	30 days	Mon 01/24/00	Tue 02/22/00
11	Letter Reports for Round 5	30 days	Fri 08/10/01	Thu 09/20/01
12	Letter Reports for Round 7	30 days	Wed 08/14/02	Tue 09/24/02
13	Letter Reports for Round 8	30 days	Mon 02/10/03	Fri 03/21/03
14	Letter Reports for Round 9	30 days	Wed 08/13/03	Tue 09/23/03
15	**3-YEAR GROUNDWATER MONITORING REPORT**	**180 days**	**Wed 02/13/02**	**Tue 10/22/02**
16	Draft 3-Year Monitoring Report Site 7	90 days	Wed 02/13/02	Tue 06/18/02
17	P. T. Review	60 days	Wed 06/19/02	Tue 09/10/02
18	Final 3-Year Monitoring Report Site 7	30 days	Wed 09/11/02	Tue 10/22/02
19	**5-YEAR GROUNDWATER MONITORING REPORT**	**210 days**	**Mon 02/09/04**	**Fri 11/26/04**
20	Draft 5-Year Monitoring Report Site 7	90 days	Mon 02/09/04	Fri 06/11/04
21	Regulatory Review	90 days	Mon 06/14/04	Fri 10/15/04
22	Final 5-Year Monitoring Report Site 7	30 days	Mon 10/18/04	Fri 11/26/04
23	**REVISED HUMAN HEALTH RISK ASSESSMENT**	**260 days**	**Mon 05/01/00**	**Mon 01/15/01**
24	Draft HHRA (w/ RAGS Part D Submittals)	200 days	Mon 05/01/00	Thu 11/16/00
25	P.T. Review	45 days	Fri 11/17/00	Sun 12/31/00
26	Final HHRA	15 days	Mon 01/01/01	Mon 01/15/01
27	**SITE 7 Proposed Remedial Action Plan**	**180 days**	**Tue 01/01/02**	**Mon 09/09/02**
33	**SITE 7 Record of Decision**	**230 days**	**Tue 01/01/02**	**Mon 11/18/02**

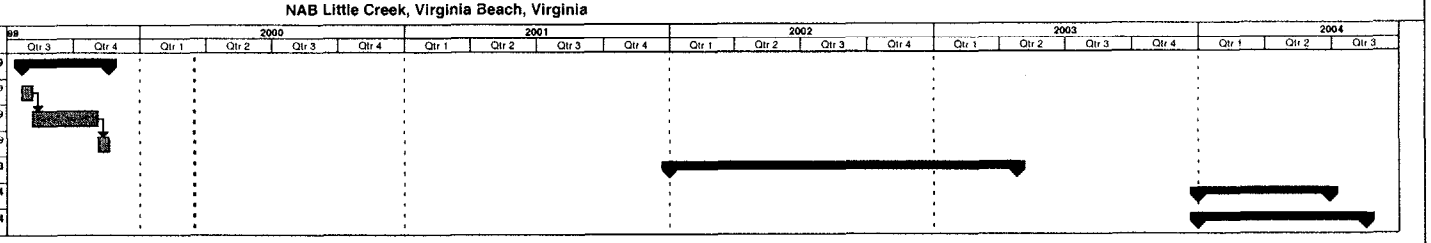


Date: Wed 03/15/00
Revised: Wed 03/15/00

Task | Summary | Project Summary | Rolled Up Split
Milestone | External Tasks | Split

Figure 4-4
Schedule for Site 8 - Demolition Debris Landfill
FY 2000 Site Management Plan
NAB Little Creek, Virginia Beach, Virginia

ID	Task Name	Duration	Start	Finish
1	**Site 8 Site Investigation Report**	**120 days**	**Fri 07/23/99**	**Fri 11/19/99**
2	Draft Final SI	15 days	Fri 07/23/99	Fri 08/06/99
3	Regulatory Review	90 days	Sat 08/07/99	Thu 11/04/99
4	Final SI Report	15 days	Fri 11/05/99	Fri 11/19/99
5	**Site 8 RI/FS**	**480 days**	**Tue 01/01/02**	**Fri 04/25/03**
13	**Site 8 Proposed Plan**	**180 days**	**Thu 01/01/04**	**Mon 06/28/04**
19	**Site 8 Record of Decision**	**230 days**	**Thu 01/01/04**	**Tue 08/17/04**



Project: CTO74_99
Date: Wed 03/15/00

Task | Milestone | Rolled Up Task | Rolled Up Progress | Project Summary | Rolled Up Split
Progress | Summary | Rolled Up Milestone | External Tasks | Split

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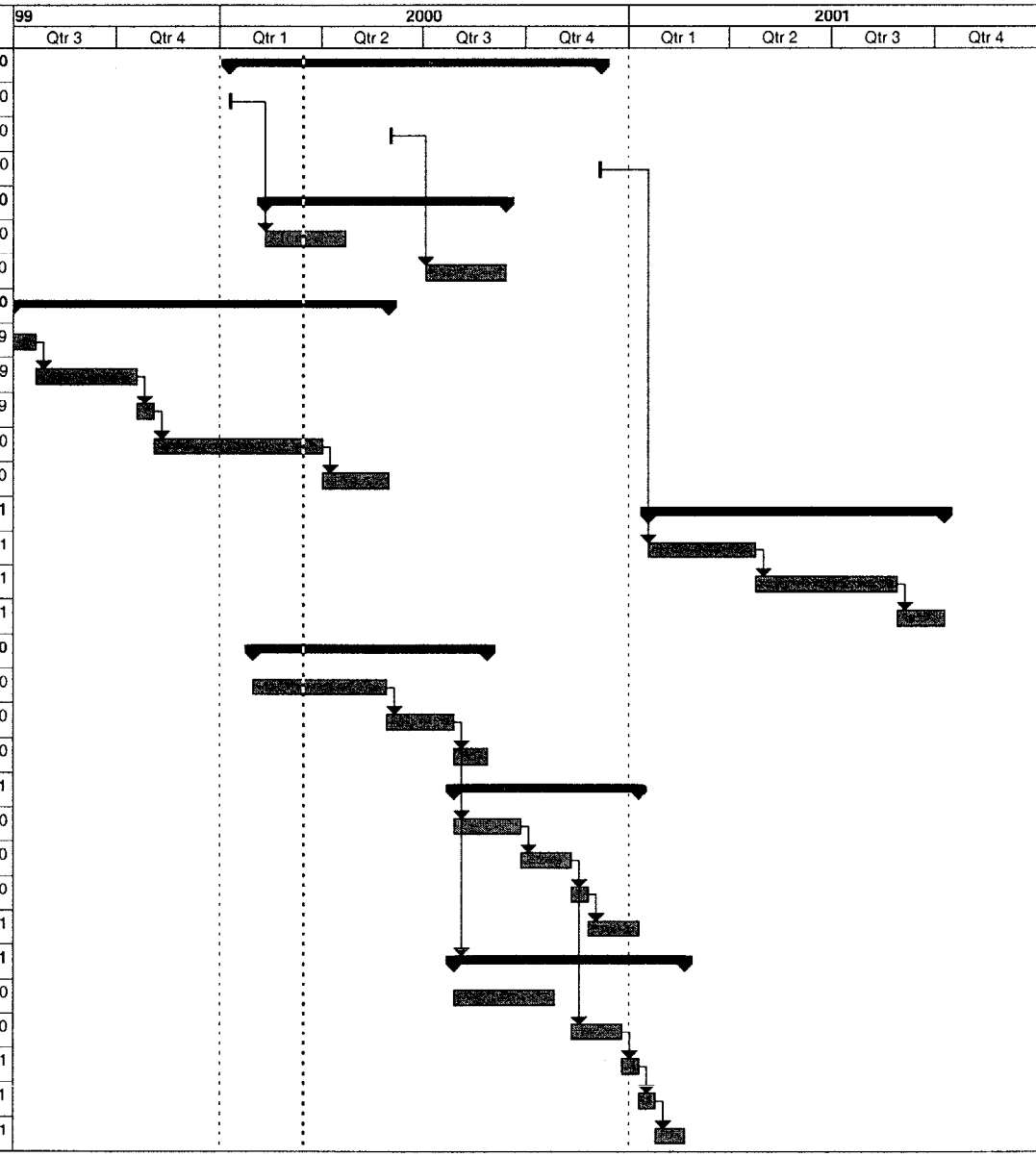
Figure 4-5
Schedule for Sites 9 and 10
FY 2000 Site Management Plan
NAB Little Creek, Virginia Beach, VA

ID	Task Name	DUR	Start	Finish
1	**SITES 9 AND 10 LONG-TERM MONITORING**	**333 days**	**Mon 01/10/00**	**Thu 12/07/00**
2	Sampling at Sites 9 and 10 (Round 8)	2 days	Mon 01/10/00	Tue 01/11/00
3	Sampling at Sites 9 and 10 (Round 9)	2 days	Fri 06/02/00	Sat 06/03/00
4	Sampling at Sites 9 and 10 (Round 10)	2 days	Wed 12/06/00	Thu 12/07/00
5	**SITES 9 AND 10 PERIODIC REPORTING**	**216 days**	**Fri 02/11/00**	**Wed 09/13/00**
6	Letter Report for Round 8	72 days	Fri 02/11/00	Sat 04/22/00
7	Letter Report for Round 9	72 days	Tue 07/04/00	Wed 09/13/00
8	**3-YEAR GROUNDWATER MONITORING REPORT**	**336 days**	**Thu 07/01/99**	**Wed 05/31/00**
9	Draft 3-YearMonitoring Report Sites 9 & 10	21 days	Thu 07/01/99	Wed 07/21/99
10	Navy Review	90 days	Thu 07/22/99	Tue 10/19/99
11	Draft Final 3-Year Monitoring Report Sites 9 & 10	15 days	Wed 10/20/99	Wed 11/03/99
12	Partnering Team Review	150 days	Thu 11/04/99	Sat 04/01/00
13	Final 3-Year Monitoring Report Sites 9 & 10	60 days	Sun 04/02/00	Wed 05/31/00
14	**5-YEAR GROUNDWATER MONITORING REPORT**	**192 days**	**Fri 01/19/01**	**Tue 10/09/01**
15	Draft 5-Year Monitoring Report Site 9 and 10	72 days	Fri 01/19/01	Tue 04/24/01
16	Partnering Team Review	90 days	Wed 04/25/01	Tue 08/28/01
17	Final 5-Year Monitoring Report Site 9 and 10	30 days	Wed 08/29/01	Tue 10/09/01
18	**REVISED RI/HHRA/FFS**	**210 days**	**Mon 01/31/00**	**Sun 08/27/00**
19	Draft RI/HHRA/FFS	120 days	Mon 01/31/00	Mon 05/29/00
20	Partnering Team Review and Comment Resolution	60 days	Tue 05/30/00	Fri 07/28/00
21	Final RI/HHRA/FFS	30 days	Sat 07/29/00	Sun 08/27/00
22	**SITES 9 AND 10 PRAP**	**165 days**	**Sat 07/29/00**	**Tue 01/09/01**
23	Draft PRAP w/ PT Review	60 days	Sat 07/29/00	Tue 09/26/00
24	Legal Review	45 days	Wed 09/27/00	Fri 11/10/00
25	Final PRAP	15 days	Sat 11/11/00	Sat 11/25/00
26	Public Comment and Meeting	45 days	Sun 11/26/00	Tue 01/09/01
27	**SITES 9 AND 10 RECORD OF DECISION**	**200 days**	**Sat 07/29/00**	**Mon 02/19/01**
28	Draft ROD w/ PT Review	90 days	Sat 07/29/00	Thu 10/26/00
29	Legal Review	45 days	Sat 11/11/00	Mon 12/25/00
30	Final ROD	15 days	Tue 12/26/00	Tue 01/09/01
31	Legal Review of Public Comments & RTC	15 days	Wed 01/10/01	Wed 01/24/01
32	ROD Approval and Public Notification	20 days	Thu 01/25/01	Mon 02/19/01

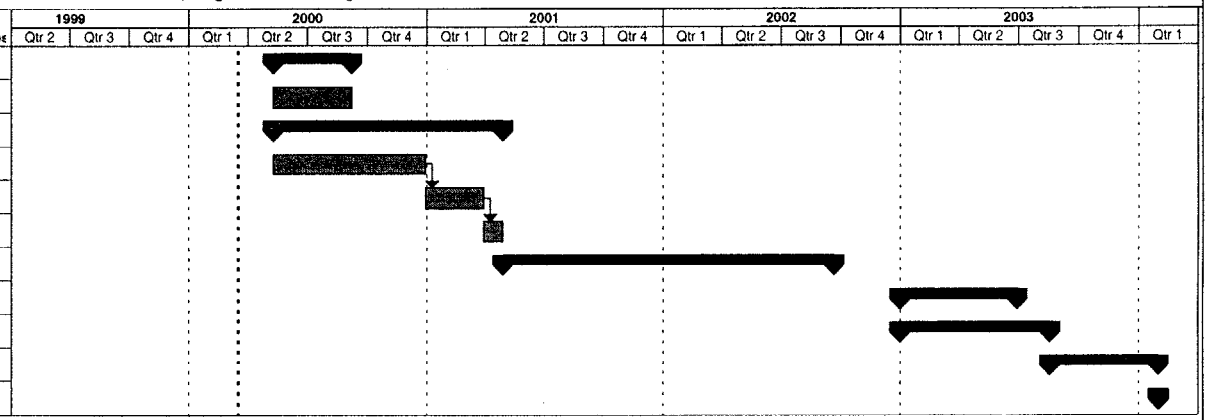


Date: Wed 03/15/00
Revised: Wed 03/15/00

Task
Milestone
Summary
External Tasks
Project Summary
Split
Rolled Up Split

Figure 4-6
Schedule for Site 11- School of Music Plating Shop
FY 2000 Site Management Plan
NAB Little Creek, Virginia Beach, Virginia

ID	Task Name	Duration	Start	Finish	Predeces
1	**SITE 11 RISK ASSESSMENT**	**120 days**	**Wed 05/10/00**	**Wed 09/06/00**	
2	Risk Assessment, Site 11	120 days	Wed 05/10/00	Wed 09/06/00	
3	**SITE 11 SRI REPORT**	**354 days**	**Wed 05/10/00**	**Sat 04/28/01**	
4	Site 11 Draft SRI	234 days	Wed 05/10/00	Fri 12/29/00	
5	Partnering Team Review	90 days	Sat 12/30/00	Thu 03/29/01	4
6	Site 11 Final SRI	30 days	Fri 03/30/01	Sat 04/28/01	5
7	**SITE 11 PILOT TEST & FS REPORTS**	**510 days**	**Sun 04/29/01**	**Fri 09/20/02**	
12	**Site 11 Proposed Remedial Action Plan**	**180 days**	**Wed 01/01/03**	**Sun 06/29/03**	
18	**Site 11 Record of Decision**	**230 days**	**Wed 01/01/03**	**Mon 08/18/03**	
25	**Site 11 Remedial Design**	**165 days**	**Tue 08/19/03**	**Fri 01/30/04**	
28	**Site 11Initiate Remedial Action WP**	**1 day**	**Sat 01/31/04**	**Sat 01/31/04**	



Project: STE11_99
Date: Wed 03/15/00

Task | Milestone | Rolled Up Task | Rolled Up Progress | Project Summary | Rolled Up Split
Progress | Summary | Rolled Up Milestone | External Tasks | Split

* WORK TO BE COMPLETED ON TIME PENDING FY 1999 FUNDING AVAILABILITY ON 11/30/98

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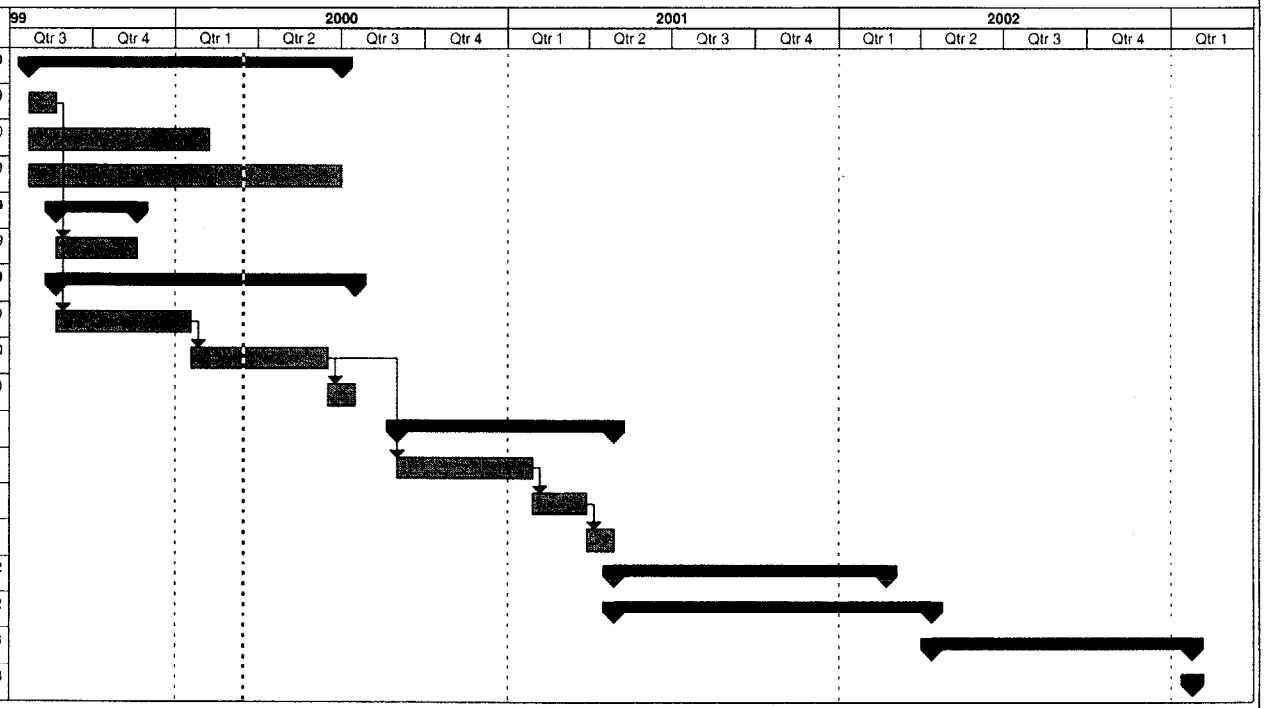
Figure 4-7
Schedule for Site 12 - Exchange Laundry Waste Disposal Area
FY 2000 Site Management Plan
NAB Little Creek, Virginia Beach, VA

ID	Task Name	Duration	Start	Finish
1	**SITE 12 SRI DATA EVALUATION**	**345 days**	**Fri 07/23/99**	**Sat 07/01/00**
2	Data Valid & Evaluation, Round 2	30 days	Fri 07/23/99	Sat 08/21/99
3	Microcosm Tests - VT	200 days	Fri 07/23/99	Mon 02/07/00
4	Modeling - VT	345 days	Fri 07/23/99	Sat 07/01/00
5	**SITE 12 SRI RISK ASSESSMENT**	**90 days**	**Sun 08/22/99**	**Fri 11/19/99**
6	Risk Assessment, Site 12	90 days	Sun 08/22/99	Fri 11/19/99
7	**SITE 12 SRI REPORT**	**330 days**	**Sun 08/22/99**	**Sun 07/16/00**
8	Site 12 Rev Draft SRI	150 days	Sun 08/22/99	Tue 01/18/00
9	Partnering Team Review	150 days	Wed 01/19/00	Fri 06/16/00
10	Site 12 Final SRI	30 days	Sat 06/17/00	Sun 07/16/00
11	**SITE 12 FS REPORTS**	**240 days**	**Fri 09/01/00**	**Sat 04/28/01**
12	Site 12 Draft FS	150 days	Fri 09/01/00	Sun 01/28/01
13	Partnering Team Review	60 days	Mon 01/29/01	Thu 03/29/01
14	Site 12 Final FS	30 days	Fri 03/30/01	Sat 04/28/01
15	**Site 12 Proposed Remedial Action Plan**	**300 days**	**Sun 04/29/01**	**Fri 02/22/02**
21	**Site 12 Record of Decision**	**350 days**	**Sun 04/29/01**	**Sat 04/13/02**
28	**Site 12 Remedial Design (as necessary)**	**285 days**	**Sun 04/14/02**	**Thu 01/23/03**
31	**Site 12 Initiate Remedial Action WP**	**1 day**	**Fri 01/24/03**	**Fri 01/24/03**



Project: STE12_00
Date: Wed 03/15/00

Task
Progress
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Summary
Rolled Up Task
Rolled Up Milestone
Rolled Up Progress
External Tasks
Project Summary
Split
Rolled Up Split

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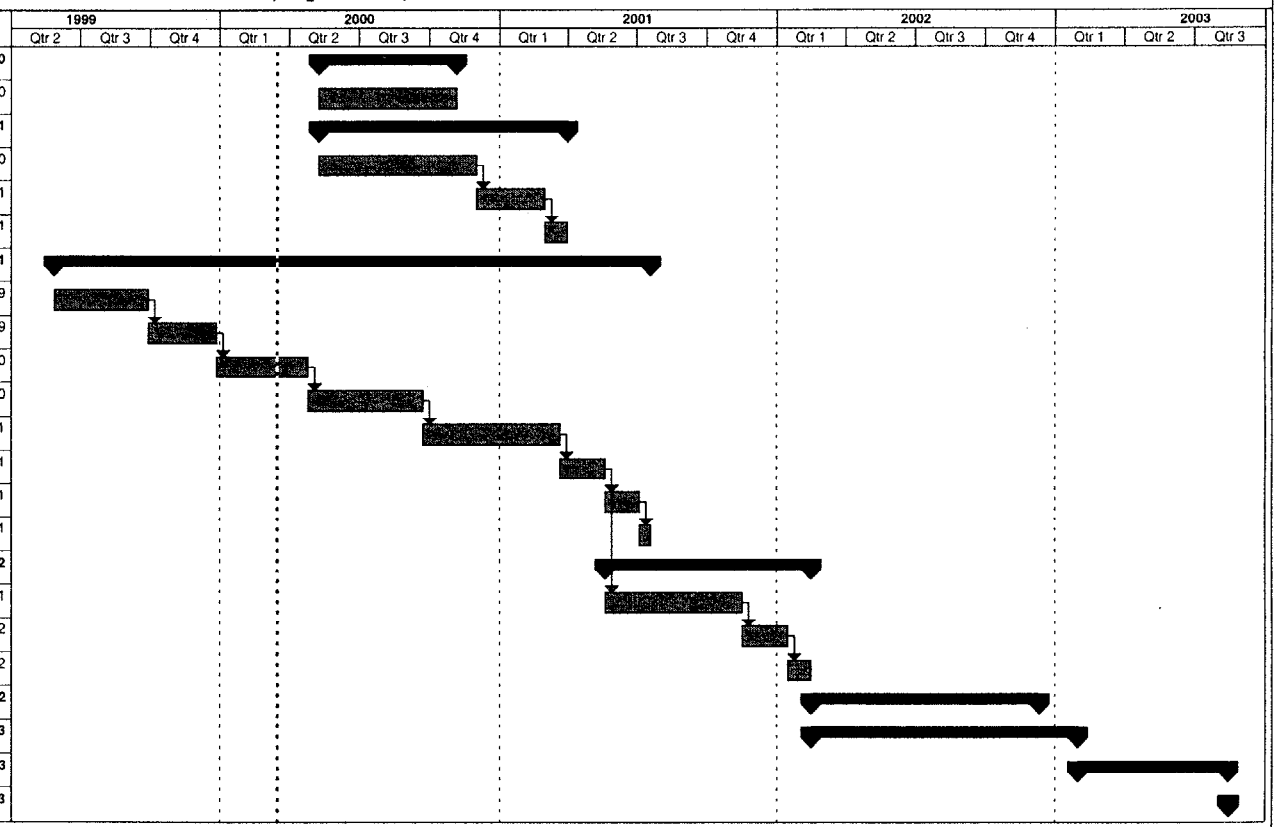
Figure 4-8
Schedule for Site 13 - Public Works PCP Dip Tank and Wash Rack
FY 2000 Site Management Plan
NAB Little Creek, Virginia Beach, VA

ID	Task Name	Duration	Start	Finish
1	**SITE 13 RISK ASSESSMENT**	**180 days**	**Wed 05/10/00**	**Sun 11/05/00**
2	Data Evaluation & Risk Assessment	180 days	Wed 05/10/00	Sun 11/05/00
3	**SITE 13 SRI REPORT**	**326 days**	**Wed 05/10/00**	**Sat 03/31/01**
4	Site 13 Rev Draft SRI	206 days	Wed 05/10/00	Fri 12/01/00
5	Partnering Team Review	90 days	Sat 12/02/00	Thu 03/01/01
6	Site 13 Final SRI	30 days	Fri 03/02/01	Sat 03/31/01
7	**Site 13 Pilot Test**	**784 days**	**Fri 05/28/99**	**Thu 07/19/01**
8	Draft Pilot Test Workplan	124 days	Fri 05/28/99	Tue 09/28/99
9	Partnering Team Review	90 days	Wed 09/29/99	Mon 12/27/99
10	Final Work Plan	120 days	Tue 12/28/99	Tue 04/25/00
11	Implementation	150 days	Wed 04/26/00	Fri 09/22/00
12	Monitoring	180 days	Sat 09/23/00	Wed 03/21/01
13	Draft Report	60 days	Thu 03/22/01	Sun 05/20/01
14	Partnering Team Review	45 days	Mon 05/21/01	Wed 07/04/01
15	Final Report	15 days	Thu 07/05/01	Thu 07/19/01
16	**SITE 13 FS REPORT**	**270 days**	**Mon 05/21/01**	**Thu 02/14/02**
17	Site 13 Rev Draft FS	180 days	Mon 05/21/01	Fri 11/16/01
18	Partnering Team Review	60 days	Sat 11/17/01	Tue 01/15/02
19	Site 13 Final FS	30 days	Wed 01/16/02	Thu 02/14/02
20	**Site 13 Proposed Remedial Action Plan**	**300 days**	**Fri 02/15/02**	**Wed 12/11/02**
26	**Site 13 Record of Decision**	**350 days**	**Fri 02/15/02**	**Thu 01/30/03**
33	**Site 13 Remedial Design (as necessary)**	**195 days**	**Fri 01/31/03**	**Wed 08/13/03**
36	**Site 13 Initiate Remedial Action WP**	**1 day**	**Thu 08/14/03**	**Thu 08/14/03**



Project: STE13_00
Date: Wed 03/15/00

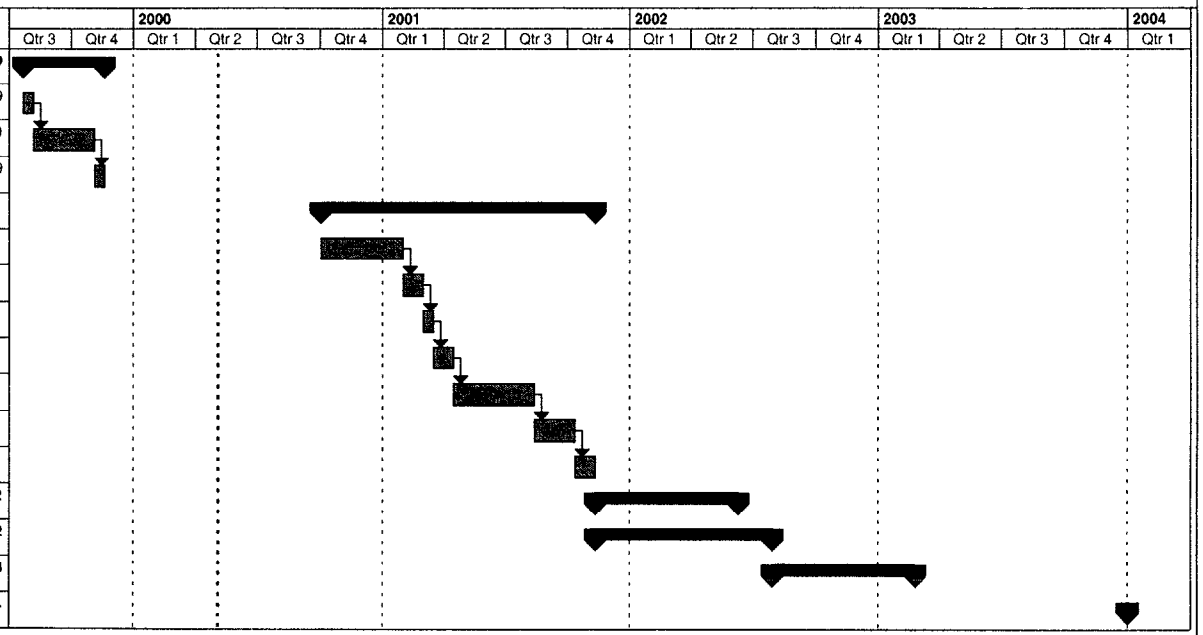
Task | Milestone | Rolled Up Task | Rolled Up Progress | Project Summary | Rolled Up Split
Progress | Summary | Rolled Up Milestone | External Tasks | Split

* WORK TO BE COMPLETED ON TIME PENDING FY 1999 FUNDING AVAILABILITY ON 11/30/98

Wed 03/15/00 12:55 PM

Figure 4-9
Schedule for SWMU 3 (111) - Pier 10 Sandblast Yard
FY 2000 Site Management Plan
NAB Little Creek, Virginia Beach, Virginia

ID	Task Name	Duration	Start	Finish
1	**SWMU 3 Site Investigation Report**	**120 days**	**Fri 07/23/99**	**Fri 11/19/99**
2	Draft Final SI	15 days	Fri 07/23/99	Fri 08/06/99
3	Partnering Team Review	90 days	Sat 08/07/99	Thu 11/04/99
4	Final SI Report	15 days	Fri 11/05/99	Fri 11/19/99
5	**SWMU 3 RI/HHRA/FS**	**405 days**	**Tue 10/03/00**	**Sun 11/11/01**
6	Draft RI/FS Work Plan	120 days	Tue 10/03/00	Tue 01/30/01
7	Partnering Team Review	30 days	Wed 01/31/01	Thu 03/01/01
8	Final Workplan	15 days	Fri 03/02/01	Fri 03/16/01
9	RI/FS Field Activities	30 days	Sat 03/17/01	Sun 04/15/01
10	Draft RI/FS	120 days	Mon 04/16/01	Mon 08/13/01
11	Partnering Team Review	60 days	Tue 08/14/01	Fri 10/12/01
12	Final RI/FS	30 days	Sat 10/13/01	Sun 11/11/01
13	**SWMU 3 Proposed Plan**	**210 days**	**Mon 11/12/01**	**Sun 06/09/02**
19	**SWMU 3 Record of Decision**	**260 days**	**Mon 11/12/01**	**Mon 07/29/02**
26	**SWMU 3 Remedial Design (if necessary)**	**210 days**	**Tue 07/30/02**	**Mon 02/24/03**
29	**SWMU 3 Initiate Remedial Action WP**	**1 day**	**Thu 01/01/04**	**Thu 01/01/04**



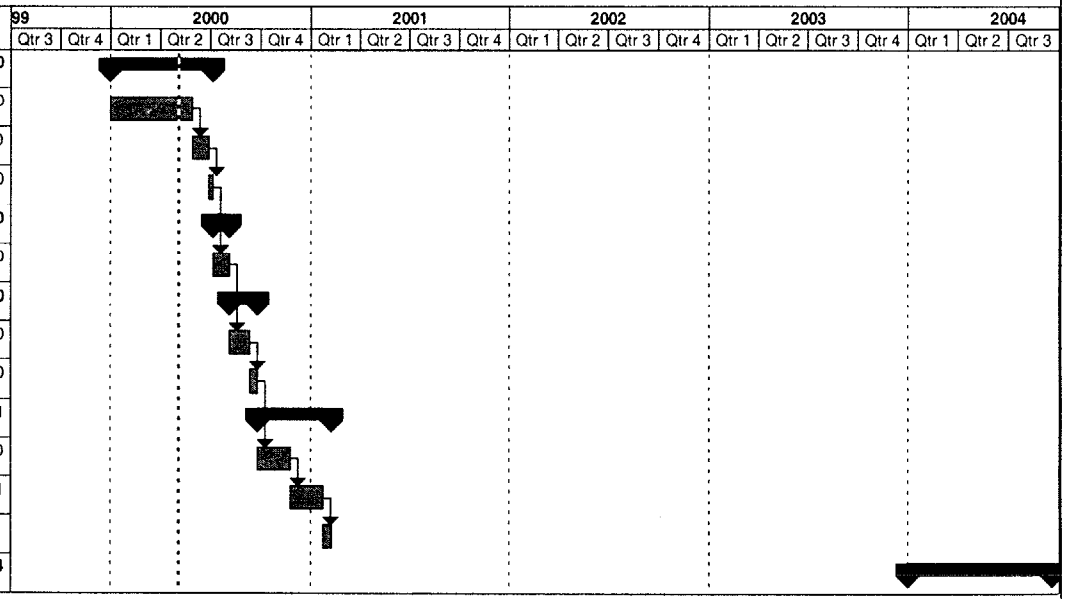
Project: CTO74_99
Date: Wed 05/03/00

Task
Progress
Milestone
Summary
Rolled Up Task
Rolled Up Milestone
Rolled Up Progress
External Tasks
Project Summary
Split
Rolled Up Split

Wed 05/03/00 8:49 AM

Figure 4-10
Schedule for SWMU 7 (137) - Small Boat Sandblast Yard Piers 51-59
FY 2000 Site Management Plan
NAB Little Creek, Virginia Beach, VA

ID	Task Name	Duration	Start	Finish
1	**SWMU 7 PROJECT PLANS**	**188 days**	**Sat 01/01/00**	**Thu 07/06/00**
2	Draft SI Project Plans	150 days	Sat 01/01/00	Mon 05/29/00
3	Partnering Team Review	30 days	Tue 05/30/00	Wed 06/28/00
4	Final Project Plans	8 days	Thu 06/29/00	Thu 07/06/00
5	**SWMU 7 FIELD INVESTIGATIONS**	**30 days**	**Fri 07/07/00**	**Sat 08/05/00**
6	Sampling/Installation Activities	30 days	Fri 07/07/00	Sat 08/05/00
7	**SAMPLE ANALYSIS**	**51 days**	**Sun 08/06/00**	**Mon 09/25/00**
8	Sample Management	37 days	Sun 08/06/00	Mon 09/11/00
9	Data Validation	14 days	Tue 09/12/00	Mon 09/25/00
10	**SWMU 7 SITE INVESTIGATION LETTER REPORT**	**135 days**	**Tue 09/26/00**	**Wed 02/07/01**
11	Draft SI Letter Report	60 days	Tue 09/26/00	Fri 11/24/00
12	PT Review	60 days	Sat 11/25/00	Tue 01/23/01
13	Final SI Letter Report	15 days	Wed 01/24/01	Wed 02/07/01
14	**SWMU 7 EE/CA (If Necessary)**	**261 days**	**Thu 01/01/04**	**Fri 09/17/04**

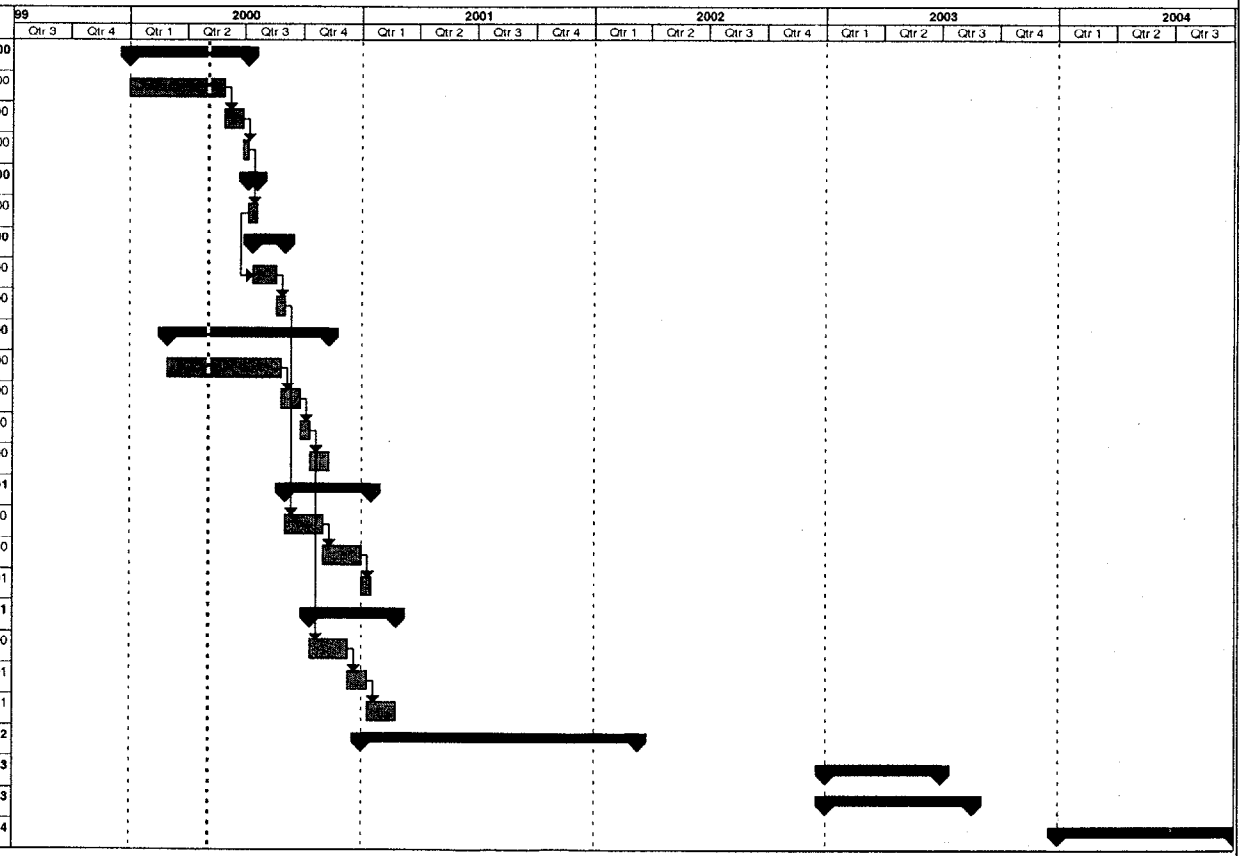


Project: Swmu8_00
Date: Wed 05/03/00

Task
Progress
Milestone
Summary
Rolled Up Task
Rolled Up Milestone
Rolled Up Progress
External Tasks
Project Summary
Split
Rolled Up Split

Figure 4-11
Schedule for SWMU 8 (144) - West Annex Sandblast Area
FY 2000 Site Management Plan
NAB Little Creek, Virginia Beach, VA

ID	Task Name	Duration	Start	Finish
1	**SWMU 8 PROJECT PLANS**	**188 days**	**Sat 01/01/00**	**Thu 07/06/00**
2	Draft SI and EE/CA Project Plans	150 days	Sat 01/01/00	Mon 05/29/00
3	Partnering Team Review	30 days	Tue 05/30/00	Wed 06/28/00
4	Final Project Plans	8 days	Thu 06/29/00	Thu 07/06/00
5	**SWMU 8 FIELD INVESTIGATIONS**	**14 days**	**Fri 07/07/00**	**Thu 07/20/00**
6	SWMU 8 Sampling/Installation Activities	14 days	Fri 07/07/00	Thu 07/20/00
7	**SAMPLE ANALYSIS**	**51 days**	**Fri 07/14/00**	**Sat 09/02/00**
8	Sample Management, SWMU 8	37 days	Fri 07/14/00	Sat 08/19/00
9	Data Validation, SWMU 8	14 days	Sun 08/20/00	Sat 09/02/00
10	**SWMU 8 EE/CA**	**255 days**	**Wed 03/01/00**	**Fri 11/10/00**
11	Draft EE/CA	180 days	Wed 03/01/00	Sun 08/27/00
12	Partnering Team Review	30 days	Mon 08/28/00	Tue 09/26/00
13	Final EE/CA	15 days	Wed 09/27/00	Wed 10/11/00
14	Public Comment Period	30 days	Thu 10/12/00	Fri 11/10/00
15	**SWMU 8 SITE INVESTIGATION LETTER REPORT**	**135 days**	**Sun 09/03/00**	**Mon 01/15/01**
16	SWMU 8 Site Investigation Letter Report	60 days	Sun 09/03/00	Wed 11/01/00
17	PT Review	60 days	Thu 11/02/00	Sun 12/31/00
18	Final SI Letter Report	15 days	Mon 01/01/01	Mon 01/15/01
19	**SWMU 8 REMOVAL ACTION**	**135 days**	**Thu 10/12/00**	**Fri 02/23/01**
20	IRA Work Plan	60 days	Thu 10/12/00	Sun 12/10/00
21	Removal Action	30 days	Mon 12/11/00	Tue 01/09/01
22	Post Remedial Action Report	45 days	Wed 01/10/01	Fri 02/23/01
23	**SWMU 8 RI/FS**	**435 days**	**Mon 01/01/01**	**Mon 03/11/02**
31	**SWMU 8 PROPOSED REMEDIAL ACTION PLAN**	**180 days**	**Wed 01/01/03**	**Sun 06/29/03**
37	**SWMU 8 RECORD OF DECISION**	**230 days**	**Wed 01/01/03**	**Mon 08/18/03**
44	**SWMU 8 Long Term Monitoring**	**274 days**	**Thu 01/01/04**	**Thu 09/30/04**



Project: Swmu8_00
Date: Wed 05/03/00

Task | Milestone | Rolled Up Task | Rolled Up Progress | Project Summary | Rolled Up Split
Progress | Summary | Rolled Up Milestone | External Tasks | Split

5.0 Remedial Actions and Removal Actions

Remedial actions (RAs) are conducted to prevent a potential release of contaminants and/or further migration of contaminants. Removal actions are taken to prevent immediate and substantial harm to human health. Examples include the removal of drums or tanks, or removal of contaminated soils.

Historic and proposed remedial and removal actions that have been conducted or identified at NAB Little Creek sites are presented below, listed according to site. The Navy will continue to identify possible remedial and removal actions as investigation activities proceed.

5.1 Historic Remedial Actions and Removal Actions

5.1.1 Site 7—Amphibious Base Landfill

In October 1994, best management practices (BMPs) were implemented at Site 7. Bare areas of the landfill were covered with a 6-inch topsoil layer. Access restrictions were also instituted for the site.

Remedial actions proposed at Site 7 in the final 1998 PRAP and DD, were completed on June 3, 1998. The remedy included removing 610 cy of debris along the shoreline of Site 7 and installing a new chain link fence along Amphibious Drive and Helicopter Road. Twenty thousand cubic yards of cover soil and topsoil were added to the site's open areas and the areas were revegetated. Erosion-prone areas of the site on each side of the canal crossing on the west side of the site were reinforced. A gravel access road and two entrances were constructed across the landfill and caution and restricted access signs were placed around the perimeter of the site.

Semi-annual groundwater, surface water, and sediment monitoring as described in Section 2.2.1.2 was proposed for 5 years. Semi-annual monitoring commenced at Site 7 in June 1998 (Round 1). The site will also be monitored to ensure the vegetation becomes established at the site. Further actions planned for the site are discussed in Section 3.2.2 .

5.1.2 Site 11—School of Music Plating Shop

A removal action to remove an underground tank and soil contaminated with plating wastes was completed in 1995. The action consisted of excavation of the neutralization tank, piping, and surrounding soil. An Interim Removal Action Draft Final Closeout Report was issued in May 1996. Further actions planned for the site are discussed in Section 3.2.6.

5.1.3 Site 13—Public Works PCP Dip Tank and Wash Rack

A removal action was implemented at Site 13 by OHM/IT to remove PCP-contaminated soil and to prevent further migration of PCP from the soil to the groundwater.

The removal action consisted of the excavation, characterization, and disposal of the contaminated soil. Approximately 442 tons of soil contaminated with PCP and other

contaminants detected above the industrial soil RBCs and soil leaching levels (16 ppm) were excavated from the area of the former PCP dip tank. Confirmatory samples were collected from the remaining soils at the sides and bottom of the excavated area, and verified that the soil was removed to the proposed levels. The soil was excavated to a depth of 8 feet in some locations (3 feet below to water table). The soil, which was characterized as an F-032 listed hazardous waste, was disposed of at an off-site landfill. The site was backfilled, regraded and paved.

A final Closeout report was submitted in July 1999.

5.1.4 Site 16—PCB Capacitor Spill, Pole No. 425

A removal action consisting of excavation and disposal of PCB-contaminated soil was completed in 1995 and the site was formally closed with the submittal of Draft Final Closeout Report in June 1996. The Closeout Report was reviewed by EPA and VDEQ and was finalized without additional comment. No further actions are planned for the site.

5.2 Proposed Remedial Actions and Removal Actions

5.2.1 SWMU 8 - West Annex Sandblast Area

It is anticipated that a removal action will be implemented at SWMU 8 in FY 2000 to remove soil and sandblast grit that remains at the site from previous storage activities. An EE/CA will be prepared that characterizes the type and volume of material to be removed and provides costs for various removal action options. The current estimate is that between 800 and 2000 cy of material will be excavated for off-site disposal or treatment.

6.0 References

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CH2M HILL, May 1997, Final Design Package for Soil Cover and Debris Removal at Site 7.

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CH2M HILL, March 1998, Draft No Further Response Action Planned Decision Document for Site 5.

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CH2M HILL, July 1998, Final Letter Report-Results of Long-Term Monitoring Rounds 2 and 3 at Sites 9 and 10.

CH2M HILL, July 1998, Final Letter Report-Results of Long-Term Monitoring Round 4 at Sites 9 and 10.

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