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SITE MANAGEMENT PLAN FOR YEARS 2010 THROUGH 2014 NWS EARLE NJ
12/01/2010
TETRA TECH NUS

**Site Management Plan
2010 Through 2014**

**Naval Weapons Station Earle
Colts Neck, New Jersey**



**Naval Facilities Engineering Command
Mid-Atlantic**

**Contract No. N62467-04-D-0055
Contract Task Order 534**

December 2010



TETRA TECH

**SITE MANAGEMENT PLAN
2010 THROUGH 2014**

**NAVAL WEAPONS STATION EARLE
COLTS NECK, NEW JERSEY**

**COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT**

Submitted to:
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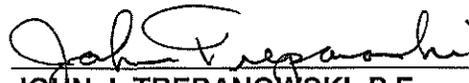
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ACRONYMS AND ABBREVIATIONS

ARAR	Applicable or Relevant and Appropriate Requirement
ATF	Department of Alcohol, Tobacco, and Firearms
AS/SVE	Air Sparging/Soil Vapor Extraction
BGS	Below Ground Surface
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
CEA	Classification Exception Area
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-Term Environmental Action Navy
CLP	Contract Laboratory Program
COD	Chemical Oxygen Demand
COPC	Chemical of Potential Concern
CTO	Contract Task Order
1,2-DCE	1,2-Dichloroethene
DOD	Department of Defense
DPDO	Defense Property Disposal Office
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
EPIC	Environmental Photographic Interpretation Center
ERP	Environmental Restoration Program
ESQD	Explosive Safety Quantity Distance
FBI	Federal Bureau of Investigation
FFA	Federal Facility Agreement
FS	Feasibility Study
FWEC	Foster Wheeler Environmental Corporation
GWQS	Groundwater Quality Standards
HASP	Health and Safety Plan
HI	Hazard Index
IAS	Initial Assessment Study
I-RACR	Interim Remedial Action Completion Report
IR	Installation Restoration
LNAPL	Light Non-Aqueous Phase Liquid
LUC	Land Use Controls
MSL	Mean Sea Level
NJDEP	New Jersey Department of Environmental Protection

ACRONYMS AND ABBREVIATIONS (Continued)

NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
NWS	Naval Weapons Station
O&M	Operations and Maintenance
OB	Open Burning
OD	Open Demolition
OU	Operable Unit
PA	Preliminary Assessment
PAH	Polynuclear Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyl
PCE	Tetrachloroethene
PRAP	Proposed Remedial Action Plan
PSI	Preliminary Site Investigation
RA	Remedial Action
RACR	Remedial Action Completion Report
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RI	Remedial Investigation
RME	Reasonable Maximum Exposure
ROD	Record of Decision
SCAPS	Site Characterization and Analysis Penetrometer System
SI	Site Investigation
SMP	Site Management Plan
SVOC	Semivolatile Organic Compound
TAL	Target Analyte List
TCE	Trichloroethene
TCL	Target Compound List
Tetra Tech	Tetra Tech NUS, Inc.
TOC	Total Organic Carbon
TPH	Total Petroleum Hydrocarbons
UFP-QAPP	Uniform Federal Policy for Quality Assurance Project Plans
UST	Underground Storage Tank
VOC	Volatile Organic Compound
WWTP	Wastewater Treatment Plant

1.0 INTRODUCTION

This Site Management Plan (SMP) for Naval Weapons Station (NWS) Earle, Colts Neck, New Jersey was prepared for the United States Department of the Navy (Navy) by Tetra Tech NUS, Inc. (Tetra Tech) under the Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract, Contract Number N62467-04-D-0055, Contract Task Order (CTO) 534. The SMP serves as a management tool by the Navy for planning, reviewing, and setting priorities for environmental investigative and remedial response activities at NWS Earle under the Navy's Environmental Restoration Program (ERP). The Navy formally referred to the ERP as the Installation Restoration (IR) Program. The ERP identifies environmental concerns and remediates contamination at U.S. Navy and Marine Corps facilities, and is similar to the United States Environmental Protection Agency's (EPA) Superfund process. Study sites typically undergo a preliminary assessment (PA), site investigation (SI), and remedial investigation (RI) intended to characterize the physical and chemical (contaminant) parameters of the site and the associated risks to human health and the environment, and a remedial action (RA) designed to control and mitigate contaminated media at the site. The Navy updates the SMP on a regular basis, to revise priorities and schedules of activities, as additional information (including funding availability) becomes available.

This version of the NWS Earle SMP presents the rationale for the sequence of future investigation and remediation activities and the estimated schedule for completion of these activities, with detailed schedules presented for the Years 2010 through 2014. The use of a SMP allows for adjustment of scheduled activities for reasons such as federal budgetary constraints, changes in scope of investigation/remediation activities, or other unanticipated events. In 1991, the Navy and EPA entered into a Federal Facility Agreement (FFA) for NWS Earle (EPA, 1991). The FFA establishes the roles and responsibilities of the Navy and EPA and serves as an Interagency Agreement for the completion of all necessary environmental investigation and remedial actions at NWS Earle. Requirements of the FFA are incorporated, as appropriate, into this SMP.

1.1 REPORT ORGANIZATION

The SMP is organized as follows:

- Section 1.0 consists of this introduction.
- Section 2.0 presents a summary of the facility background and environmental investigations, identifies the individual ERP sites, and discusses the status of each site.
- Section 3.0 provides a description of the CERCLA remedial process.

- Section 4.0 presents the sequence of activities and target dates for proposed actions at each of the sites currently addressed under this SMP, along with a discussion of their development.

2.0 BACKGROUND AND CURRENT SITE CONDITIONS

NWS Earle is located in Monmouth County, New Jersey, approximately 47 miles south of New York City. The station consists of two areas, the 10,248-acre Main Base (Mainside area), located inland, and the 706-acre Waterfront area (see Figure 2-1). A Navy-controlled right-of-way containing a private road and rail line connects the two base areas. The Navy commissioned the facility in 1943, and its primary mission is to supply ammunition to the Atlantic fleet. An estimated 1,500 people either work or live at NWS Earle.

This section presents a brief history and status for each site addressed in this SMP.

2.1 NWS EARLE BACKGROUND

2.1.1 Facility Description

The Mainside area is located approximately 10 miles inland from the Atlantic Ocean in Colts Neck, Howell and Wall Townships, and Tinton Falls Borough. The combined population of these municipalities is approximately 100,000 people. The surrounding area includes agricultural land, vacant land, and low-density housing. The Mainside area consists of a large, undeveloped portion associated with ordnance operations and storage; this portion of the Base is encumbered by explosive safety quantity distance (ESQD) arcs that restrict use and development. Other land use in the Mainside area consists of residences, offices, workshops, and warehouses, recreational space, open space, and undeveloped land (see Figure 2-2).

All facilities located in the Mainside Administration area are connected to a public water supply (New Jersey American Water Company). Water for the public supply network comes from surface water intakes, reservoirs, and deep wells. No public water supply wells or surface water intakes are located on the NWS Earle facility. A combination of private wells and public water from the New Jersey American Water Company serves businesses and residences in areas surrounding the Mainside facilities.

The Waterfront area, which is located approximately 10 miles north of the Mainside area, is located in Middletown Township. Land use at the Waterfront facility includes residences and office buildings; recreational areas, open space, and undeveloped land (see Figure 2-3). Approximately 20 percent of the Waterfront area is marshland. The area around the Waterfront includes commercial and single-family residential land. The Mainside and Waterfront areas are connected by an approximately 10-mile railroad and Navy-controlled road right-of-way. Munitions and other supplies destined for Navy ships pass from

the Mainside area along the railroad right-of-way to the Waterfront area and to waiting ships at piers located in the Lower Hudson River Bay near Sandy Hook, New Jersey.

2.1.2 Facility Operating History

The Navy commissioned NWS Earle as a Naval Ammunition Depot on December 13, 1943, with the primary responsibility of furnishing ammunition to the Atlantic fleet. The current mission of Earle is to operate/maintain a coastal ordnance handling and processing facility supporting Atlantic Fleet, Coast Guard, and Department of Defense (DOD) requirements, while providing force protection, logistics support and host services for personnel, homeported, and visiting ships.

Over 90 percent of the acreage at NWS Earle is dedicated to its primary mission of storage and delivery of ordnance. The actual amount of land used for storage and distribution facilities is much less than this, but ESQD arcs are established around each individual storage facility. Development within these areas is extremely restricted by safety requirements. The formal disestablishment or reclassification of a facility is required before any development can occur within an ESQD arc.

2.2 ENVIRONMENTAL INVESTIGATION HISTORY

The ERP identifies environmental concerns and remediates contamination at Navy and Marine Corps facilities. ERP study sites undergo a PA, SI, and RI, intended to characterize the physical and chemical (contaminant) parameters of the site and to identify, any associated risks to human health and the environment. Based on the investigation findings, a RA designed to control and mitigate contaminated media at the site is implemented, where necessary.

Potential hazardous substance releases at NWS Earle were addressed in a 1983 Initial Assessment Study (IAS) (Fred C. Hart and Associates, 1983); a 1986 Confirmation Study to Determine Existence and Possible Migration of Specific Chemicals In Situ (Roy F. Weston, Inc., 1986); a 1991-1992 Phase I Remedial Investigation (Roy F. Weston, 1993); and a Final SI Report (Roy F. Weston, Inc., 1994). These were preliminary investigations to identify potential source areas or sites, compile histories of waste handling and disposal practices at the source areas or sites, and acquire data on the types of contaminants present and potential human health and/or environmental receptors.

The purpose of the 1983 IAS (also referred to as the PA) was to identify and evaluate past waste disposal practices at NWS Earle and to assess the potential for environmental impacts. The IAS identified 29 areas of concern based on employee interviews, record searches, and site tours. The Navy later eliminated three of these 29 areas from consideration under the former IRP because they were active

operations regulated under the Resource Conservation and Recovery Act (RCRA). One additional area, Site 8, was investigated on an accelerated schedule to enable timely reuse. EPA issued a concurrence of no further investigation (i.e., No Further Action) for Site 8 in October 1994.

The 1986 Confirmation Study addressed nine areas of concern, initially identified in the IAS, and included the installation of monitoring wells at each site and collection and analysis of groundwater samples.

In October 1990, the EPA formally placed NWS Earle on the National Priorities List (NPL), which is a list of sites where uncontrolled hazardous substance releases may potentially present serious threats to human health and the environment. Following the listing of NWS Earle on the NPL, the Navy conducted a Phase I RI at 11 sites. The 11 sites included the nine sites investigated as part of the 1986 Confirmation Study and two additional sites, Sites 20 and 22. The purpose of the Phase I RI was to complete the characterization of contamination at each of these 11 sites and to identify if contamination was migrating from any of the sites. Results from this investigation are presented in the *Installation Restoration Program Remedial Investigation/Feasibility Study for 11 Sites at NWS Earle*, dated September 1993.

The Navy initiated a final SI at 16 sites that were identified during the previously conducted IAS (PA). This Final SI, *Installation Restoration Program Site Investigation for 16 Sites at NWS Earle*, did not include the sites investigated as part of the Phase I RI (mentioned above) (Weston, 1994). SI sampling was not included at two sites because cleanup activities had been conducted and no further investigation activities were warranted.

The Environmental Photographic Interpretation Center (EPIC) studies were an analysis of historical aerial photographs performed for the EPA by EPIC. The EPIC studies analyzed 22 known waste sites at NWS Earle and identified 17 additional sites where there was evidence of some environmental disturbance. After an initial screening of these sites in 1992, the Navy, EPA, and New Jersey Department of Environmental Protection (NJDEP) agreed to further investigation at three additional sites: Sites F, L, and Q. Since the extent of EPIC Site F overlaps existing Site 16, the Navy and EPA agreed that Site 16 would be expanded to include it. This site screening was summarized in the *Addendum to the Preliminary Assessment (Initial Assessment Study) of Naval Weapons Station Earle* (NEESA, 1992).

The NWS Earle sites were addressed during 1995-1996 Phase II RI activities to further define the nature and extent of contamination. Phase II activities included installation and sampling of groundwater monitoring wells, surface water and sediment sampling, surface and subsurface soil sampling, and test pit excavation. Between May and December 1995, RI fieldwork was conducted by the Navy at 27 former known or suspected waste disposal sites at NWS Earle. The RI included determinations and tabulations

of human health and ecological risk levels by site and media. The purpose was to identify priority sites where immediate action could be taken and proceed with remediation. The Navy also wanted to identify sites at which no significant human health or ecological risk existed so that those sites could be returned to beneficial use and available funds could be channeled toward site cleanups. The *Final RI Report for Naval Weapons Station Earle (Volumes IA, IB and II)* was released in July 1996 (B&R, 1996).

After review of the Final RI (i.e., Phase II), it was determined that additional data were required for seven of the 27 sites (Sites 3, 6, 12, 13, 16/F, 17, and 26). A *RI Addendum Report* was completed in January 1998 to address the data collection effort for these seven sites (B&R, 1998). Results from the 1996 Final RI and the 1998 RI Addendum, including human health and ecological risk assessments, were used as the basis for performing feasibility studies (FS) of potential remedial alternatives.

The following is a listing of the major studies, decision documents, and remedial actions performed at NWS Earle:

Site Investigation and/or Preliminary Assessment Documents (Basewide)

- *Initial Assessment Study* (Fred C. Hart, 1983).
- *Confirmation Study to Determine Existence and Possible Migration of Specific Chemicals in Situ*; (Sites 2 - 5, 7, 10, 11, 19, 20, 22, and 26); Interim Report, (Roy F. Weston, Inc., 1986).
- *Site Analysis of Aerial Photography at NWS Earle*; (22 sites plus 17 additional sites discovered during the analysis; Sites 1 - 29 and EPIC Sites A - Q); (EPIC, 1991).
- *Addendum to the Preliminary Assessment (Initial Assessment Study) at Naval Weapons Station Earle*; 17 Additional Sites; (Environmental Protection Department, Naval Energy and Environmental Support Activity, 1992).
- *Site Investigation Report for Site 8* (Roy F. Weston, Inc., 1991).
- *Wayside Area Naval Weapons Station Earle, Site Investigation Report* (Halliburton NUS, 1992).
- *Installation Restoration Program Site Investigation for 16 Sites at Naval Weapons Station Earle*; (Sites 1, 6, 8, 9, 12 - 17, 23 - 25, 27 - 29); (Roy F. Weston, Inc., 1994).

- *Study of Ambient Ground Water and Surface Water Conditions at Naval Weapons Station Earle (Basewide)*, (Environmental Branch NWS Earle, 1994).
- *Final Site Characterization and Analysis Penetrometer System Site 16/F* (Naval Facilities Engineering Service Center, 1996).
- *CPT Characterization with Fuel Fluorescence and Water Sample Collection at Naval Station Earle (Sites 16 and 26)* (Applied Research Associates, 1996).

Remedial Investigations

- *Installation Restoration Program Remedial Investigation/Feasibility Study for 11 Sites at Naval Weapons Station Earle, Volumes 1 to 3*; (Sites 2 - 5, 7, 10, 11, 19, 20, 22, and 26); (Roy F. Weston, Inc., September 1993).
- *Survey Report for the Remedial Investigation Activities*; (Sites 1 - 7, 9 - 17, 19, 20, 22 -27, 29, EPIC Site F, EPIC Site L, and EPIC Site Q); (James M. Stewart, Inc., 1995).
- *Remedial Investigation Report, Volumes IA, IB and II*; for 27 sites (Sites 1 - 7, 9 - 17, 19, 20, 22 -27, 29, EPIC Site F, EPIC Site L, and EPIC Site Q) (B&R, 1996).
- *Remedial Investigation Addendum Report*; for 7 sites (Sites 3, 6, 12, 13, 16/F, 17, and 26) (B&R, 1998).

Feasibility Studies

- Feasibility Study for OU1, OU2, and OU3 (B&R, 1997)
- Feasibility Study for OU5 (Tetra Tech, 2000c)
- Feasibility Study for OU6 (Tetra Tech, 2000a)
- Feasibility Study for OU8 (Tetra Tech, 2003b)
- Feasibility Study for OU7 (Tetra Tech, 2003d)
- Feasibility Study for OU9 (Tetra Tech, 2004)
- Feasibility Study for OU10 (Tetra Tech, 2008c)

Decision Documents

- Record of Decision OU1 (1997c)
- Record of Decision OU2 (1997e)
- Record of Decision OU3 (1998b)
- Record of Decision OU4 (1999)
- Record of Decision OU5 (2004a)
- Record of Decision OU8 (2004c)
- Record of Decision OU6 (2006)
- Record of Decision OU7 (2007)
- Record of Decision OU9 (2007)
- Record of Decision OU10 (2010)

Remedial Actions

- *Interim Remedial Action Report for Site 20* (NWS Earle, 1995).
- *Final Report on Remediation of the Pistol Ranges (Sites 24 & 25)* (Metcalf and Eddy, 1996b).
- *Evaluation Report for the Bioslurping Pilot Study (Site 16/F)* (Foster Wheeler Environmental Corp., 1996).
- *Close-out Report for Removal Actions at Sites 22, 23, and 27 (OU4)* (Foster Wheeler Environmental Corp., 1997).
- *IRP Sites 24 & 25 (OU4) Closed Pistol Target Ranges Remedial Action Report* (NWS Earle, 1997).
- *Coastal Zone Management Consistency Determination for Slope Stabilization at Site 6, Former Landfill Area (OU9)* (Foster Wheeler Environmental Corp., 1999).
- *Final Closure Report for Soil Excavation at Site 12 (OU9) - Former Battery Storage Area* (Foster Wheeler Environmental Corp., 2000a).
- *Slope Stabilization at Site 6 (OU9), Former Landfill Area Closure Report* (Foster Wheeler Environmental Corp., 2000b).

- *Operation and Maintenance Manual for Air Sparge/Soil Vapor Extraction System Site 26, Building GB-1* (Foster Wheeler Environmental Corp., 2001b).
- *Technical Memo for Extent of Groundwater Contamination at OU3* (Tetra Tech, 2003c).
- *Closeout Report for the Cleanup of the Scrap Metal Yard and Closure of Three Aboveground Storage Tanks (Site 10) (OU6)* (Foster Wheeler Environmental Corp., 2001).
- *Sparge System Operation Evaluation Operable Unit 3: Site 26* (Tetra Tech, 2008).
- *Operation and Maintenance User Manual for Site 13-Defense Property Disposal Office Yard (Operable Unit 5)* (Tetra Tech, 2005).
- *Bioslurper Optimization Report for LNAPL Recovery at Site 16/F – Buildings C-17/20/16/50* (Tetra Tech, 2009d).
- *Technical Memorandum: Site 7-Landfill South of “P” Barricades (OU10) and Evaluation of Soil Cover* (Tetra Tech, 2010a).

2.3 CURRENT SITE CONDITIONS

As indicated above, the 27 sites investigated under the July 1996 RI were identified in either the IAS completed in February 1983 or the EPIC studies of November 1991 and January 1992. The Navy identified these sites in agreement with the United States Environmental Protection Agency and in consultation with the State of New Jersey Department of Environmental Protection. Table 2-1 details the sites that are included in this Site Management Plan and summarizes their status. Figure 2-4 details the locations of the Mainside Area sites. Waterfront Area sites are shown on Figure 2-5.

A number of the ER program sites at NWS Earle have been grouped by EPA into operable units (OUs) comprising sites with similar site characteristics. The following list details the individual OUs and designated sites:

- OU1 - Sites 4 and 5
- OU2 - Site 19
- OU3 - Site 26
- OU4 - Sites 14, 20, 22, 23, 24, 25, 27, and 29
- OU5 - Site 13

- OU6 - Sites 3 and 10
- OU7 -Site 26 PCE Plume
- OU8 - Sites 1 and 11
- OU9 - Sites 6, 12, 15, and 17
- OU10 - Site 7

Twenty-two of the 27 sites investigated during the July 1996 RI have been grouped into the OUs noted above. The remaining five sites, listed below, have not been assigned an OU designation:

- Site 2 - Active Ordnance Demilitarization Site
- Site 9 - Landfill Southeast of "P" Barricades
- Site 16/ EPIC Site F - Diesel Fuel Line to Building C-50/Roundhouse Area
- EPIC Site L (Site 41) - MSC Van Parking Area
- EPIC Site Q (Site 46) - Fire Fighting School

In addition to the 27 sites investigated during the July 1996 RI, the Navy has identified other sites that have been, or are being addressed by the NWS Earle Environmental Department. Three of these sites require no further action and the remaining sites were closed per RCRA regulations. These sites have been included in this SMP however, no schedules have been developed. The six additional sites are:

- Site 8 - Landfill East of Building S-186
- Site 18 - Demilitarization Furnace
- Site 21 - Baghouse & Cyclone Dust Storage Near Building S-589
- Site 28 - Waste Oil Tank West of Building C-14
- Site 47 - Closed Pesticide Shop (Building S-86)
- Site 48 - Mine Battery Site at West Pond Area

2.4 SITE DESCRIPTIONS AND STATUS (PER OPERABLE UNIT DESIGNATION)

2.4.1 OU1 - Site 4 Landfill West of "D" Group and Site 5 Landfill West of Army Barricades

2.4.1.1 Site 4 - Landfill West of "D" Group

Site 4 is a five-acre landfill that received approximately 10,200 tons of mixed domestic and industrial wastes from 1943 until 1960. Materials disposed of include metal scrap, construction debris, pesticide and herbicide containers, paint residues, and rinse waters. It has been reported that containers of paint,

paint thinners, varnishes, shellacs, acids, alcohols, caustics, and asbestos may have been disposed at Site 4. The landfilled materials were covered by a thin layer of sandy soil.

The Record of Decision for remediation of Site 4 was signed in August 1997. Capping, including regrading and erosion control, institutional controls, and long-term monitoring are the components of the selected remedy. Landfill cap construction was completed in July 1998 and the Second Five-Year Review was completed in July 2008. Site inspections and long-term groundwater monitoring are currently being conducted on an annual basis.

In July 2008, the Navy was notified by the NJDEP that the groundwater Classification Exception Area (CEA) as required by the state groundwater quality protection criteria for Site 4 was not formally approved. Based on this notification, the Navy intends to submit documentation for the CEA which will cover the area immediately adjacent and downgradient of the landfill. In addition, the Navy intends to submit a request for a reduction in the current sampling frequency from annual to 2-year intervals and a reduction in the analytical parameter list. Currently, groundwater samples are collected from six wells on an annual basis and analyzed for EPA Target Analyte List (TAL) metals (total and dissolved), Target Compound List (TCL) Volatile Organic Compounds (VOCs), chemical oxygen demand (COD), nitrate/nitrite, alkalinity, fluoride, sulfate, chloride, total phenols, total organic carbon (TOC), and ammonia-nitrogen. Based on the 2003 and 2008 Five-Year Reviews, it is recommended that the list of parameters be reduced to the site chemicals of potential concern (COPCs), trichloroethene (TCE), 1,2-dichloroethene (1,2-DCE), vinyl chloride, and several metals, aluminum, iron, and manganese.

2.4.1.2 Site 5 - Landfill West of Army Barricades

The Landfill West of Army Barricades site is approximately 13-acres in size and received approximately 6,600 tons of mixed domestic and industrial wastes between 1968 and 1978. Wastes included paper, glass, plastics, construction debris, pesticide and herbicide containers, containers of paint, paint thinners, varnishes, shellacs, acids, alcohols, caustics, and small amounts of asbestos. A sand and vegetated soil layer ranging in depth from one to 3 feet covered the landfilled materials. Approximately 1 acre of the site was used as a skeet shooting range.

The Record of Decision (ROD) for remediation of Site 5 was signed in August 1997. Capping, institutional controls, and long-term monitoring are the components of the selected remedy. Construction of the landfill cap was completed in July 1998. Lead-impacted soil from the shot fall area of the shooter's club skeet range was disposed off site. Site inspections and long-term groundwater monitoring are currently being conducted on an annual basis. The Second Five-Year Review completed in July 2008.

In July 2008, the Navy was notified by the NJDEP that the groundwater CEA as required by the state groundwater quality protection criteria for Site 5 was not formally approved. Based on this notification, the Navy intends to submit documentation for the CEA which will cover the area immediately adjacent and downgradient of the landfill. In addition, the Navy intends to submit a request for a reduction in the current sampling frequency from annual to 2-year intervals and a reduction in the analytical parameter list. Currently, groundwater samples are collected from seven wells on an annual basis and analyzed for EPA TAL metals (total and dissolved), TCL VOCs, COD, nitrate/nitrite, alkalinity, fluoride, sulfate, chloride, total phenols, TOC, and ammonia-nitrogen. Based on the 2003 and 2008 Five-Year Reviews, it is recommended that a data review be conducted and that the parameter list be reduced to specific metals (those identified as COCs), TCE and 1,2-DCE.

2.4.2 OU2 - Site 19 Paint Chip and Sludge Disposal Area

Paint chips and sludges from an ordnance maintenance area were disposed of, from the early 1940s until the early 1960s, in a topographic depression near Building S-34. Paint slurries and solvent residues were also discharged into an open drainage swale. The site is a 300-foot circular area; half is paved with asphalt and half is covered by gravel. The depression is 50 feet in diameter, with a depth ranging from five to 10 feet. The drainage swale runs from the depression to a small stream in the wetlands adjacent to the site. The asphalt paved portion of the site was used by the Navy for training of forklift operators.

Based on findings from remedial investigations completed in 1993 and 1995, elevated concentrations of several metals in site sediments and soils, including cadmium, lead, and zinc were detected. Low concentrations of volatile organic compounds, pesticides, and elevated concentrations of metals were also detected in groundwater during the 1995 RI/FS.

The ROD for remediation of Site 19 was signed by the Navy and EPA in August 1997. Excavation and off-site disposal of contaminated soils and sediments, institutional controls and long-term groundwater monitoring are the components of the selected remedy. In 1998, the Navy conducted several remedial measures, including the removal of vegetation and trees from the settling basin and ditch and excavation of contaminated sediments. Following the collection of confirmatory samples, the settling basin was backfilled to surrounding grade and paved with asphalt. The Second Five-Year Review was completed in July 2008.

In 2009, the Navy submitted a Technical Memorandum to the EPA and NJDEP that provided an evaluation of the long-term groundwater monitoring results and recommended that further sampling of groundwater be discontinued (Tetra Tech, 2009a). Based on their review, the EPA indicated that long-term monitoring for metals is still required. No comments were received from the NJDEP. Groundwater,

surface water, and sediment monitoring are being conducted on an annual basis. New Jersey Groundwater Quality Standards (GWQS) will eventually be met through natural attenuation and a CEA will be established in the area immediately adjacent and down gradient of the site to protect potential receptors until the GWQS are achieved.

2.4.3 OU3 - Site 26 Explosive "D" Washout Area

Site 26, which is approximately 200 by 200 feet in size, is located at the intersection of Macassar and Midway Roads within the Mainside Area of NWS Earle. Two railway lines adjacent to the site run toward the northeast. The ground surface at the site is relatively flat, approximately 150 feet above mean sea level (MSL).

For one year in the late 1960s, the Navy used the site for the removal and recovery of ammonium picrate (known as Explosive D) from artillery shells. The water-soluble Explosive D was removed from the shells by a hot water wash and the resulting solution flowed into a cooling/settling tank inside Building GB-1. Upon cooling, the ammonium picrate precipitated and was collected for reuse or disposal. Overflow from the settling tank flowed into a tile-lined open pipe that ran from the building to a percolation pit located in the center of the site that measured approximately 30 feet in diameter and 10 feet in depth. A process leaching system north of the western end of Building GB-1, thought to consist of a grease trap and a cesspool-type leach tank, was used for process waste disposal.

Building GB-1 was also reportedly used by the Navy for the reconditioning of munition casings/shells. Solvents were used in the reconditioning process. Spent solvents and wash waters were discarded into an unknown receptacle, possibly a collection tray at the formerly used paint spray booth, which drained to the process leaching system. The GB-1 process leaching system appears to have been used for the disposal of TCE, 1,2-DCE, or related compounds.

Several studies have been conducted at Site 26, dating back to the Initial Assessment Study in 1992. Site inspections and a RI/FS were conducted in the early 1990s. In 1996, the Navy completed a Phase II RI that included a soil gas survey at 68 locations; installation and sampling of groundwater monitoring wells; soil sampling; "direct push" groundwater sampling with on-site laboratory analysis; and cone penetrometer studies to delineate subsurface soil stratigraphy.

Groundwater samples collected from the direct push investigation revealed an elongated plume of chlorinated compounds in shallow groundwater immediately southwest of Building GB-1. A contaminant plume approximately 420 feet long by 150 feet wide that is confined to an upper sand aquifer which

extends to a depth of approximately 25 feet below ground surface (BGS) was reported. This upper sand aquifer is underlain by approximately 15 feet of low permeability silts and clays.

The OU3 ROD, which addresses soil and groundwater contamination, was signed by the Navy and EPA in August 1998. Components of the remedy include excavation and off-site disposal of the leach tank and adjacent soils, treatment of contaminated groundwater, institutional controls, and long-term groundwater monitoring. The Navy removed the process leaching system and associated sludge immediately northwest of Building GB-1 in 1998. An air sparging/soil vapor extraction (AS/SVE) system was designed, constructed and operated to remediate groundwater contaminated with TCE and 1,2-DCE in accordance with the approved remedial action. Construction of the AS/SVE system was completed in December 2000 and the system began operating in early January 2001. The system continued operating until December 2004 at which time it was shut down due to reduced groundwater contaminant concentrations.

The Navy completed four quarters of post-operational groundwater sampling in 2005. Significant rebound of TCE and 1, 2-DCE concentrations was not observed during the year-long monitoring. An additional four rounds of groundwater monitoring are being conducted by the Navy over the next five years. Three rounds of post-operational groundwater samples have been collected from Site 26. Based on review of these results, there has been a slight increase in TCE concentrations at two locations, 26MW01 and 26AS-1 since the November 2005 fourth quarter shutdown sampling event. However, the detected concentrations are significantly below the concentrations observed prior to the AS/SVE operation. In addition, the contaminant plume is not expanding or migrating beyond the boundaries of the proposed CEA and there is no risk of exposure to TCE or PCE associated with the current site usage.

The ROD remedy includes establishment of a CEA immediately adjacent to Site 26 to bar the use of groundwater during the remediation period and long-term periodic groundwater monitoring. A decision on the need for a CEA will be made after the fourth round of post operation groundwater sampling which will be conducted in 2011.

2.4.4 OU4 - Sites 14, 20, 22, 23, 24, 25, 27, and 29

OU4 at NWS Earle consists of Site 14 - Mercury Spill Area, Site 20 - Grit Blasting Area, Site 22 - Paint Chip Disposal Area (Building D-2), Site 23 - Paint Disposal Area (Building D-5), Site 24 - Closed Pistol Range, Site 25 - Closed Pistol Range, Site 27 - Projectile Refurbishing Area, and Site 29 - PCB Spill Site. Sites 14, 20, 22, 23, 24, 25, 27, and 29 are all located within the 10,248-acre Mainside area.

2.4.4.1 Site 14 - Defense Property Disposal Office Warehouse (Mercury Spill Area)

One to several ounces of mercury was spilled on a concrete floor within the Defense Property Disposal Office Warehouse in 1970. The Navy reportedly cleaned up the spill with a vacuum at the time of the spill. As part of the 1996 RI, floor-sweeping samples were consolidated and analyzed for mercury. Mercury was detected at 8.6 mg/kg in the collected floor sweepings, which is below the State of New Jersey Residential Direct Contact Soil Cleanup Criterion of 14 mg/kg. The corresponding EPA residential level, based on a Hazard Index of 1.0, was approximately equal to the detected concentration and would therefore be considered protective of human health. Based on the RI, no evidence of a wider environmental contamination or risk to human health was found.

It was apparent from the investigation that a spill that occurred two decades ago was cleaned up using good housekeeping procedures. There is no current threat to human health or the environment from this spill.

The Navy and EPA signed the ROD for OU4 in September 1999. No further action was the selected remedy for Site 14.

2.4.4.2 Site 20 - Grit Blast Disposal Site (Near Building 544)

Spent material (grit and paint chips containing lead and zinc) from the blasting of paint from ordnance was dumped in an open pile outside near Building 544. A portion of the site was also reportedly used by the Navy for leaching unknown liquid waste. This area also contains an operating septic tank. In December 1994, the Navy excavated approximately 300 cubic yards of tainted soils from the pile. The Navy carried out additional excavation work in March 1995 in order to meet State of New Jersey residential surface soil clean-up standards. During the 1995 RI, samples were collected from surface soil, subsurface soil, and sediment in the area, as well as from the septic tank.

Based on the RI sampling, slightly elevated levels of beryllium were detected in two of five samples in surface soil; other metals and semivolatiles were below New Jersey Soil Cleanup Criteria. In subsurface soils, there were no elevated levels of inorganics, semivolatiles, or volatiles in comparison to New Jersey Residential Contact Soil Cleanup Criteria.

There were no elevated levels of inorganics, semivolatiles, or volatiles in comparison to the Sediment Ecological Toxicity Threshold Values. One sediment sample did have low levels of inorganics and organics; however, since the waste pile has been removed, future off-site migration should be negligible.

There was no sludge in the septic tank, only aqueous waste. The sample showed low levels of semivolatiles and metals. It is believed that the septic tank and associated leach field (no longer used) at one time may have contributed to the low level of metals and organic compounds (below the New Jersey Residential Contact Cleanup Criteria) in the subsurface soils.

The contents of the septic tank are periodically pumped out for disposal in the NWS Earle wastewater treatment plant (WWTP). This tank is used for temporary holding of municipal-type waste for disposal at the regulated WWTP. There is no current or anticipated risk to human health or the environment anticipated from the proper use of this tank. After removal action under CERCLA, the cancer risks associated with the future residential and current industrial exposure scenarios were estimated to be within the mid-range of the target risk range. The noncarcinogenic Hazard Indices were less than 1.0, indicating no adverse noncarcinogenic effects. Ecological risk assessment screening concluded that potential ecological risks from the site appear to be low, not requiring any further actions.

At Site 20 it was determined that there was no unacceptable risk to human health or the environment under current or planned land use however, NJDEP residential soil cleanup standards were not met for all compounds of concern. Based on this, the OU4 ROD signed by the Navy and EPA in September 1999, outlined that a notation be made to the NWS Earle Master Plan indicating that further measures would be required prior to allowing unrestricted (residential) use of the site. The Site 20 designation was added by the Navy to the Master Plan in 1999. The Second Five-Year Review was completed in July 2008. Because contaminants remain at the site at levels that do not allow for unlimited use and unrestricted exposure, future five-year reviews will be required.

2.4.4.3 Site 22 - Paint Sludge Disposal Site (Building D-2)

Site 22 is a former paint chip disposal area where waste sand blasting material and paint wastes were disposed. The site is located south of Building D-2 and previously consisted of approximately 50 square feet of stressed vegetation and discolored (black) soils. Contaminants of concern included cadmium, lead, petroleum hydrocarbons, 1,1,1-trichloroethane, 4,4-DDT, and two phthalates. Due to the presence of elevated levels of the aforementioned contaminants, the Navy conducted a removal action in December 1996.

A human health risk assessment estimated reasonable maximum exposure (RME) risks for the future resident exposure scenario at the upper end of the EPA target acceptable risk range. Ecological risk assessment screening concluded that polynuclear aromatic hydrocarbons (PAHs) and metals at concentrations above ecological toxicity threshold values could migrate with surface water. The Navy,

with EPA and NJDEP concurrence, opted to use the removal response authority suggested under CERCLA.

Approximately 250 tons of contaminated soil were excavated and disposed off site. Confirmatory soil sampling demonstrated that levels were below NJDEP Residential Direct Contact, Non-Residential Direct Contact, and Impact to Groundwater Standards. Based on these results, the OU4 ROD signed by the Navy and EPA in September 1999, outlined no further remedial action for Site 22.

2.4.4.4 Site 23 - Paint Sludge Disposal Site (Building D-5)

The Navy reportedly used an area near Building D-5 from the early 1970s until approximately 1993 to dispose of paint sludge generated from the repainting and stenciling of torpedoes, aerial bombs, and other large ordnance. The site consists of approximately 200 square feet of ground surface west of the northwest corner of Building D-5.

The human health risk assessment estimated RME risks for the future industrial worker and future resident exposure scenarios above the upper end of the EPA target acceptable risk range for metals. Ecological risk assessment screening concluded that potential risks to ecological receptors from compounds found at the site were low. Based on the results of the human health risk assessment, the Navy, with EPA and NJDEP concurrence, opted to use the removal response authority suggested under CERCLA.

Approximately 86 tons of contaminated soil (chemicals of concern included lead and chromium) were excavated and disposed of off site via a removal action in December 1996. The excavation depth was approximately 3 feet and confirmatory soil sampling demonstrated that post-removal levels were below NJDEP Residential Direct Contact, Non-Residential Direct Contact, and Impact to Groundwater Standards, except for thallium. Thallium was present in four of eight post-excavation samples within the same order of magnitude as the then applicable direct contact cleanup standard (2 mg/kg). However, the current direct contact cleanup standard is 5.0 mg/kg. The residual contamination will be evaluated during the next five-year review scheduled for 2013. EPA deemed the removal action to be satisfactory and complete on March 27, 1997.

At Site 23, it was determined that there were no unacceptable risks to human health or the environment under the current or planned land use. However, NJDEP cleanup standards were not met for all compounds of concern. Based on this, the OU4 ROD signed by the Navy and EPA in September 1999, outlined that a notation be made to the NWS Earle Master Plan indicating that further measures would be required prior to allowing unrestricted (residential) use of the site. The Site 23 designation was added by

the Navy to the Master Plan in 1999. The Second Five-Year Review was completed in 2008 and recommended that groundwater be sampled for TAL metals. In accordance with 2005 EPA Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP), a groundwater sampling plan for Site 23 was developed. Final EPA and NJDEP approval of the proposed sampling plan was received by the Navy in July 2010. The Navy intends to implement the proposed sampling in the fall of 2010. Because contaminants remain at the site at levels that do not allow for unlimited use and unrestricted exposure, future five-year reviews are required.

2.4.4.5 Sites 24 and 25 - Closed Pistol Ranges

Sites 24 and 25 are closed pistol ranges located within the Mainside Area that were once used for target practice. Due to the site's similar nature, history, and close proximity, Sites 24 and 25 were investigated together during the RI. Lead- and copper-jacketed bullets were fired into 70-foot berms (natural sand banks) at Sites 24 and 25 as part of target practice exercises. A significant amount of lead slugs were present in the impact berms.

The human health risk assessment estimated RME risks for the future resident exposure scenario near the middle of the EPA target acceptable risk range. Ecological risk assessment screening concluded that there were no significant contamination pathways to potential receptors and that potential risk to ecological receptors was insignificant. Human health and ecological risk assessments concluded no further action would be required. However, based on the volume of bullets present and good housekeeping policy, the Navy, with EPA and NJDEP concurrence, decided to perform a cleanup action in 1996.

Approximately 10 tons of metal bullets were mechanically removed from the soil and the soil itself was washed. Approximately 1,500 tons of soils were processed during this action. The recovered bullets were sold to a local metal recycler. Lead-containing sludge from the soil washing system was sent to an asphalt batch plant for recycling. The washed soils were backfilled at each site and the wash water was discharged to the NWS Earle wastewater treatment plant for final processing. Confirmatory soil samples collected after the excavation was complete demonstrated residual lead levels were below New Jersey Residential Direct Contact Soil Cleanup Criteria.

The ROD for OU4 was signed by the Navy and EPA in September 1999. No further remedial action was outlined as the selected remedy for Sites 24 and 25.

2.4.4.6 Site 27 - Projectile Refurbishing Area

Site 27 is a small area located behind Building E-14 within the Mainside Area at NWS Earle. Oil-contaminated rags, paint chips, and spent sandblasting shot were disposed in this area, which was used for the refurbishing (shot-blasting, repainting, and restenciling) of projectiles. Contaminants of concern included metals, polychlorinated biphenyls (PCBs), and semivolatiles.

A human health risk assessment estimated RME risks for the future resident exposure scenario above the upper end of the EPA target acceptable risk range. Ecological risk assessment screening concluded that metals at concentrations above ecological toxicity threshold values were present in site soils that pose significant risk to ecological receptors. The Navy, with EPA and NJDEP concurrence, opted to use the removal response authority suggested under CERCLA.

Approximately 54 tons of contaminated soil were excavated and disposed off site during a 1996 removal action. Subsequent to the initial removal, additional soil was excavated because of lead in the confirmation samples at concentrations above the NJDEP soil cleanup criterion.

After removal activities, the area was covered with clean soil. EPA deemed the removal action to be satisfactory and complete on March 27, 1997.

At Site 27, it was determined that there was no unacceptable risk to human health or the environment under current or planned land use however, NJDEP cleanup standards were not met for all compounds of concern. Based on this, the OU4 ROD signed by the Navy and EPA in September 1999, outlined that a notation be made to the NWS Earle Master Plan indicating that further measures would be required prior to allowing unrestricted (residential) use of the site. The Site 27 designation was added by the Navy to the Master Plan in 1999. The Second Five-Year Review was completed in July 2008. Because contaminants remain at the site at levels that do not allow for unlimited use and unrestricted exposure, future five-year reviews are required.

2.4.4.7 Site 29 - PCB Spill Site

An unknown quantity of PCBs spilled from a transformer in a storage yard north of former Mainside Area Building C-16 in 1981. Within 5 days of the spill, the Navy had excavated and disposed off site over 120 cubic yards of discolored soil. Surface soil and subsurface soil showed only trace levels of pesticides, PCBs, and total petroleum hydrocarbons (TPH), with the exception of one elevated level of TPH (28,000 mg/kg). No PCBs were detected in sediment samples or groundwater.

A human health risk assessment estimated RME risks for the future resident exposure scenario above the upper end of the EPA target acceptable risk range. Ingestion of iron from groundwater was the primary contributor to the human health risk. Further assessment of potential human health risks, following EPA guidelines, resulted in the conclusion that the iron in the groundwater was not, in itself, sufficient justification to require remediation of local groundwater. Ecological risk assessment screening concluded that potential ecological risks from the site appear negligible.

A new permitted hazardous waste storage facility has been constructed on Site 29. Two new monitoring wells were installed downgradient of Site 29 because the previous wells were abandoned during construction of the storage facility. Because Site 29 is in close proximity to Site 16/F, the new monitoring wells will be retained for possible use in the Site 16/F long-term monitoring program.

The ROD for OU4 was signed by the Navy and EPA in September 1999. No further remedial action was outlined as the selected remedy for Site 29.

2.4.5 OU5 - Site 13 Defense Property Disposal Office Yard

OU5 consists of Site 13, an area of fill material that extended into a marsh near the rail classification yards north of the Defense Property Disposal Office (DPDO) yard located in the Mainside area. The site covered approximately 1.7 acres, with a total landfill volume estimated at 4,000 cubic yards. An existing fence enclosed the northern portion of the Navy DPDO yard. Activities at the site reportedly included storage of scrap metals and batteries and the burial of material such as cars, trucks, electronic equipment, clothing and shoes, sheet metal, furniture, scrap metal, and batteries. Additionally, batteries were broken open at the site for lead recovery and the acid allowed to drain onto the ground. Obvious fill material was present at the ground surface at several places across the site, although NWS Earle public works employees performed a partial removal of exposed debris in the summer of 1997.

The top of the site was flat with little topographic relief. Runoff from the site drained to the marsh to the north and west to a perennial drainage that flows to Hockhockson Brook. The toe of the landfill extended into the marsh area and was clearly defined by an abrupt decrease in elevation of several feet between the top of the landfill slope and the marsh.

Metals and PCBs were detected in on-site soils. Additional sampling concluded that migration had been minimal.

The ROD for Site 13 was signed on July 2004. The selected remedy for Site 13 was an engineered low-permeability cover system that meets RCRA criteria for municipal solid waste landfills, land use controls

(LUCs), and long-term groundwater monitoring. The remedy included the clearing and grubbing of vegetative growth, grading, compaction of the soils and landfill materials as necessary over the former landfill. Land use controls will be implemented by the Navy according to DOD guidelines as set forth in the DOD document titled Principals and Procedures for Specifying, Monitoring and Enforcement of Land Use Controls and Other Post-ROD Actions as agreed between EPA and the DOD. A restriction will be incorporated into the Base Master Plan to limit future uses of the site to prevent disturbance of the landfill cover system or direct contact with contaminated media, such as landfill contents and groundwater, prevent residential development of the site and prohibit groundwater use. Activities to be prohibited include digging into or disturbing the landfill cover or contents of the landfill, residential development on the site, and use of the aquifer beneath the site for purposes other than environmental monitoring and testing without Navy approval until groundwater is found to meet New Jersey groundwater standards. A CEA pursuant to N.J.A.C. 7:9-6 will be established to provide the state official notice that the constituent standards will not be met for a specified duration and to ensure that use of groundwater in the affected area is prohibited until two consecutive sampling events result in no groundwater contaminant concentrations in excess of NJDEP GWQS. The LUCs will be maintained until the concentrations of hazardous substances in the soil and groundwater are at such levels to allow for unrestricted use and exposure.

These LUC objectives will be implemented through mechanisms, such as the RD for LUC amended to the Base Master Plan, fencing and signage at the landfill cap, 30 years of operations and maintenance (O&M) and annual status reporting for the cap, establishment of the NJDEP-compliant CEA and conduct of a site review every five years.

The Final Design for the Site 13 remedy was completed in May 18, 2005. The construction began the next week and was completed in October 2005. The construction was delayed due to the discovery of ordnance debris during earth moving activities. Unexploded ordnance technicians were brought on site to clear some areas and excavate other areas. The final inspection was held on October 27, 2005.

An O&M Manual that detailed long-term monitoring and site maintenance activities for Site 13 was submitted to regulatory agencies for review and comment in August 2005. The draft CEA Investigation Report for establishment of the CEA was also submitted to EPA and NJDEP in August 2005. In October 2006 EPA indicated that they had no comments on the O&M Manual. Long-term monitoring is being conducted at Site 13 in accordance with the program outlined in the August 2005 submittals. NJDEP comments on the CEA Investigation Report were received in June 2008. Concurrence on the O&M Manual by NJDEP was received in October 2008. Site inspections and long-term monitoring are conducted on an annual basis.

2.4.6 OU6 - Site 3 Landfill Southwest of "F" Group and Site 10 Scrap Metal Landfill

2.4.6.1 Site 3 - Landfill Southwest of "F" Group

Site 3 is an approximately five-acre former landfill located in the Mainside Area that used by the Navy from 1960 to 1968 for the disposal of domestic and industrial wastes. Industrial wastes disposed of at Site 3 consisted of paints and paint thinners, solvents, varnishes, shellac, acids, alcohols, caustics, pesticide containers and rinse water, wood, and small amounts of asbestos. Navy records, reviewed for the IAS in 1982 indicated that the industrial wastes comprised only a small portion of the approximately 4,800 tons of waste. Test pits performed at Site 3 in 1995 confirmed the IAS findings. The waste materials identified included aged municipal trash consisting of plastic, wood, old newspaper, rusted tin cans, oil filters, empty antifreeze bottles, and glass bottles. Trash was found within two feet of the ground surface. Sandy soil was the only cover material.

Evidence was found on the surface of the property indicating that sportsmen used the area for shotgun target practice at some unknown time period in the past. Lead values in surface soil and sediment samples indicated no significant impact from past skeet shooting practices.

Site 3 was investigated during the IAS (1983), SI (1986), Phase I RI/FS (1993), Phase II RI (1995), and RI Addendum Investigation (1996).

The OU6 ROD was signed in August 2006. The selected remedy for Site 3 included construction of a landfill cover system, institutional controls, and long-term monitoring. The site had not been used for many years and was moderately vegetated with grasses and pine trees. Any exposed debris and the remnants of the former skeet range were removed and additional soil cover material was placed to grade the site to encourage runoff. Clearing and grubbing of the vegetative growth was performed as necessary in parts of the site to prepare for soil cover placement. Where possible, the additional cover and grading was placed around the existing trees. The impermeable cap was constructed for the Navy by Foster Wheeler Environmental Corporation (FWEC) and completed in June 2003.

Access restrictions were attached to the Base Master Plan in 2004 to limit future uses of the site to prevent disturbance of the soil cover or direct contact with contaminated media. Restricted activities include excavation, vehicular traffic (off-road vehicles and bikes) and use of untreated groundwater for drinking water.

A cable-type fence with appropriate warning signs was erected around the landfill to limit access to the site, to restrict human contact with contaminated landfill materials, and to protect the integrity of the soil cover.

Because site groundwater does not meet New Jersey groundwater quality standards, a CEA pursuant to N.J.A.C 7:9-6 needs to be established to provide the state official notice that the constituent standards will not be met for a specified duration. Long-term periodic groundwater monitoring is currently conducted to assess contaminant status and potential threats to human health and the environment. Site inspections and groundwater sampling are conducted on an annual basis. Since wastes have been left in place, site conditions and risks will be reviewed every 5 years. The Second Five-Year Review was completed in July 2008.

2.4.6.2 Site 10 - Scrap Metal Yard

Site 10 is a two-acre scrap metal landfill located within the NWS Earle Mainside Area used by the Navy from 1953 to 1965 for the disposal of demilitarized metals from munitions and spent munitions cases. There is no known evidence that any live ammunition is interred at the site. Only certified inert (i.e., no energetic potential remaining) materials were reported to have been disposed here. An estimated 65,000 cubic yards of material including cover soil, were disposed at the site. The disposed material consisted primarily of aluminum and steel containers. Spent grit and paint chips from the ammunition rework operations were also buried. The landfill was primarily covered with a sandy soil. The site was vegetated with grasses and scrub pines, except for the access road and an open, disturbed, vehicle turn-around area, where no vegetation existed. Since cessation of disposal at this site, the sandy soil cover material has eroded and 40-mm shell cases were exposed.

Site 10 was investigated during the IAS (1983), IS (1986), Phase I RI/FS (1993), and Phase II RI (1995). The OU6 ROD was signed in August 2006. Capping, institutional controls, and long-term groundwater monitoring are the components of the selected remedy. Soil capping was completed in June 2003. Site inspections and groundwater sampling are conducted on an annual basis.

Because site groundwater does not meet New Jersey groundwater quality standards, a CEA pursuant to N.J.A.C 7:9-6 needs to be established to provide the state official notice that the constituent standards will not be met for a specified duration. Long-term periodic groundwater monitoring is currently conducted to assess contaminant status and potential threats to human health and the environment. Since wastes have been left in place, site conditions and risks will be reviewed every 5 years. The Second Five-Year Review was completed in July 2008.

2.4.7 OU7 - Site 26 PCE Plume

Operable Unit 7 consists of the tetrachloroethene (PCE) portion of the Site 26 groundwater solvent plume southwest of Building GB-1 which is situated at the intersection of Macassar and Midway Roads within the Mainside area of NWS Earle. For one year in the late 1960s, the Navy used the site for removal and recovery of ammonium picrate (known as Explosive D) from artillery shells. The water-soluble explosive was removed from shells by a hot water wash and the resulting solution flowed into a cooling/settling tank inside Building GB-1. Upon cooling, an ammonium picrate precipitated and was collected for reuse or disposal. Overflow from the settling tank flowed into a tile-lined open pipe that ran from the building to a percolation pit located in the center of the site. The percolation pit measured approximately 30 feet in diameter and 10 feet in depth. A process leaching system north of the western end of Building GB-1, thought to consist of a grease trap and a cesspool-type leach tank was used for process waste disposal. Building GB-1 was reportedly also used for the reconditioning of munitions casings/shells using solvents. Spent solvents and wash waters were discarded into an unknown receptacle, possibly a collection tray at a formerly used paint spray booth, which drained to the process leaching system. The GB-1 process leaching system appears to have been used for the disposal of TCE, 1,2-DCE, or related compounds. PCE has been found to be associated with the OU3 TCE plume at Site 26.

There are two OUs defined within the solvent plume in Site 26 groundwater southwest of Building GB-1. OU3 consists of the portion of the solvent plume southwest of Building GB-1 that is composed primarily of TCE and 1,2-DCE. A feasibility study and a ROD have been completed for OU3. Active remediation to remove the solvent components of the plume was conducted by the Navy from January 2001 to October 2004 in accordance with the ROD for OU3. The estimated PCE component of the solvent plume at Site 26 (that is, OU7) overlaps, and partially coincides, with the estimated OU3 solvent plume.

OU7 was investigated during the IAS (1983), SI (1986), Phase I RI (1993), and Phase II RI (1995). Phase II activities included a soil gas survey, installation and sampling of groundwater monitoring wells, and surface and subsurface soil sampling. The Phase II RI was initiated in 1995 and completed in July 1998, when the final RI Addendum report was released.

The purpose of the FS for OU7 was to evaluate clean up alternatives available for the Site 26 PCE plume component.

A Final Proposed Plan for OU7 was prepared in September 2004. The Navy, with EPA and NJDEP, has selected limited action, institutional controls, and long-term monitoring as its preferred alternative. The OU7 ROD and Remedial Design for Land Use Controls Site 26 PCE Plume document were finalized in January 2007. Final EPA approval and signature of the OU7 ROD was received in August 2007. The

Draft Site 26 CEA Documentation was submitted in October 2005; comments from the NJDEP were received by the Navy in June 2008. The Second Five-Year Review was completed in July 2008. The Navy is currently conducting groundwater monitoring in accordance with the *Annual Report for Four Post-Operation Groundwater Sampling Rounds in 2005* that recommended that four additional rounds of groundwater sampling for monitoring natural attenuation of chlorinated hydrocarbons be conducted over the next five years. As of 2010, three sampling events have been completed. An additional round of sampling is scheduled for 2011.

Institutional controls will be enacted to preclude use of untreated groundwater for drinking water. Because site groundwater does not meet New Jersey groundwater quality standards, a CEA pursuant to N.J.A.C 7:9-6 will be established if warranted, to provide the state official notice that the constituent standards will not be met for a specified duration.

2.4.8 OU8 - Site 1 Former Ordnance Demilitarization Site and Site 11 Contract Ordnance Disposal Area

2.4.8.1 Site 1 - Former Ordnance Demilitarization Site

Site 1 is a six acre open field that was used for ordnance demolition between 1943 and 1975. During site abandonment, the area was plowed, and a layer of diesel-soaked hay was burned on site to remove any residual from the burning/detonation of ordnance. For several years during the early 1990s, a United States Army communications station and tower were located near the center of the site. However, these structures have been removed and no structures are currently present at the site.

Site 1 is bordered by Macassar Road to the east, a railroad spur to the north, and an 8- to 10-foot-high berm to the west and south. No drainage swales or streams are located on the site.

Site 1 was investigated during the IAS (1983), Phase I of the RI/FS (1993) and Phase II of the RI (1995). The Phase I and II activities at Site 1 included the installation and sampling of groundwater monitoring wells, and sampling of surface soil and subsurface soil.

The Phase II Site Investigation indicated low levels of metals, explosives, and organics in the soil and groundwater at Site 1. Additional soil and groundwater samples taken during the 1995 RI delineated the extent of the affected area. The FS was completed in October 2002.

The Site 1 ROD was signed in September 2004. The remedy for Site 1 addresses groundwater contamination, including arsenic, by instituting land use controls, long-term monitoring, and five-year reviews. The Base Master Plan will be amended to add a notice to future land owners stating that arsenic

has been detected at a concentration above the NJDEP residential direct contact cleanup criteria in subsurface soil. The Second Five-Year Review was completed in July 2008. Because contaminants remain on the site, a review of site conditions and risks will be conducted every five years, as required by CERCLA. The Navy received NJDEP comments on the Draft CEA Documentation for Site 1 in June 2008. In 2009, the Navy elected to prepare a UFP-SAP for additional groundwater sampling. An initial groundwater sampling event was completed in 2009 (Tetra Tech, 2009b) and the results submitted to EPA and NJDEP. NJDEP has indicated that a CEA for Site 1 is no longer required. Based on comments received from the EPA, the Navy elected to replace three existing monitoring wells and conduct further groundwater sampling in 2010 and 2011. Data from these sampling events will be evaluated by the Navy to determine the extent of long-term monitoring at Site 1.

2.4.8.2 Site 11 - Contract Ordnance Disposal Area

Site 11 is a two acre site that was used for burning/detonation of obsolete ordnance material for several years. Obsolete ordnance could include munitions with an expired shelf life or unknown munitions such as explosives recovered from a public place or munitions captured abroad and transported to the U.S. for study and eventual disposal. Typically, disposal of ordnance or munitions consists of detonation or burning the unwanted material above ground or in a trench. No explosives remain after the disposal process. The site was occasionally used from 1974 to 1977 for firefighting training exercises. Training activities took place in two unlined pits, approximately 20 feet long. During firefighting training, reject vehicles were soaked with fuel or waste oil and ignited and then extinguished. Unburned fuel and waste oil used for ignition were allowed to evaporate or soak into the soil. It has been estimated that 50 gallons of oil per year may have been lost in this manner. Site activities were discontinued approximately 30 years ago. Currently, there is little evidence remaining that fuel and/or oil was ever deposited in this way.

Site 11 was investigated during the IAS (1983), Phase I of the RI/FS (1993) and Phase II of the RI (1995). The Phase I and II activities at Site 11 included the installation and sampling of groundwater monitoring wells and sampling of soil. Some soil samples had low TPH detections, but no explosive compounds were detected. Groundwater analyses indicated no pesticides, PCBs, or explosives. Concentrations of most metals in groundwater were similar to background levels.

The Site 11 ROD was signed in September 2004. Based on the RI findings, no further action or future monitoring is warranted at Site 11. Remediation of soil at this site was determined to be undesirable since it would interfere with propagation of Knieskern's Beaked Rush, an endangered plant species. The Navy currently mows the Site 11 on an annual basis to facilitate plant propagation.

2.4.9 OU9 - Sites 6, 12, 15, and 17

OU9 consists of Site 6 (Landfill West of Normandy Road), Site 12 (Battery Storage Area), Site 15 (Sludge Disposal Area), and Site 17 (Landfill). All of the OU9 sites are located within the Waterfront area of NWS Earle which is not encumbered by ESQD arcs. Future land use is not expected to vary significantly from current land use unless a major Base realignment was to occur.

A human health and ecological risk assessment was performed for the OU9 sites during the RI, and a FS was performed in 2003 to evaluate clean-up alternatives available for Sites 6, 12, 15, and 17. The ROD for OU9 was signed by the Navy and EPA in September 2007.

The Navy discussed the need for additional groundwater sampling and CEAs at Sites 6 and 17 with EPA and NJDEP in April 2009. A UFP-SAP for groundwater sampling at Sites 6 and 17 was prepared and submitted in September 2010. The need for CEAs at these two sites is pending upon the results of the groundwater sampling.

2.4.9.1 Site 6 - Landfill West of Normandy Road

Site 6 is a four acre area used between 1943 and 1965 to dispose of refuse consisting of dunnage lumber, glass, paper, packing material, and small amounts of paint and solvent from the Waterfront area. It was reported that the wastes were burned before they were covered, and an estimated 2,500 tons of waste were deposited annually at the landfill. The landfill area may have been part of a salt marsh before disposal began. Surface stabilization work was performed at the landfill by the Navy in 1999. The work included delineation of adjacent wetlands to determine boundaries for the stabilization, clearing and removal of brush and trees, placement of additional soil cover, and grading and seeding of the area to stabilize the northern slope of the site. Currently, the majority of the landfill surface is paved or covered with buildings. The remainder of the landfill surface is 3 to 10 feet higher than the adjacent marsh and wetland areas, and the toe of the landfill is covered with vegetation.

The ROD for OU9 was finalized by the Navy and EPA in September 2007. As outlined in the ROD the selected remedy for Site 6 relies on long-term monitoring and institutional controls to limit exposures to site risks. Long-term periodic groundwater monitoring will be conducted to assess contaminant status and potential threats to human health and the environment. Since landfill constituents would remain in the groundwater, site conditions and risks would be reviewed every 5 years. Because site groundwater does not meet New Jersey groundwater quality standards, a CEA pursuant to N.J.A.C 7:9-6 will be established to provide the state official notice that the constituent standards will not be met for a specified duration and to ensure that use of groundwater in the affected area is prohibited. The draft CEA

Documentation Report was submitted to NJDEP and EPA in July 2006; NJDEP comments were received in June 2008. The Second Five-Year Review was completed in July 2008 and included Site 6.

2.4.9.2 Site 12 - Battery Acid Spill Site (i.e., Battery Storage Area)

Site 12 is a paved area next to the loading dock east of Building R-10 which is located in the Waterfront Area. The site was used as a temporary staging area for forklift batteries being sent off site to be reclaimed. The storage area occupied various portions of the paved area at different times but was generally limited to approximately 7,500 to 10,000 square feet at the northern end of the paved area adjacent to Building R-10. Elevated lead levels were found in soil samples collected from the site. Based on the sampling results, the Navy conducted soil excavation activities in 1999. The site was subsequently backfilled with clean fill and graded.

The OU9 ROD outlined no further action as the selected remedy at Site 12. The previously conducted excavation of contaminated soils at Site 12 achieved the remediation goal for protection of human health and the environment, including prevention of human exposure to contaminated surface and subsurface soils (removed) and migration of contaminants to the adjacent marsh.

2.4.9.3 Site 15 - Sludge Disposal Area

The Site 15 sludge disposal area reportedly occupied a small drainage swale (approximately one acre in size) along former railroad tracks near the main entrance to the Waterfront area. In the early 1970s, the site was used for disposal of an unknown amount of oily bilge sludge. It is estimated that over 5,000 gallons of sludge, which may have ranged from 1 percent to 25 percent oil, may have been disposed at the site. The exact location of the sludge disposal activities was not apparent during site inspections. The site is currently wooded and covered with heavy vegetation.

The ROD for OU9 was signed by the Navy and EPA in September 2007. The Navy, with EPA and NJDEP, has selected long-term monitoring and institutional controls to limit exposures to site risks at Site 15. Fencing and signage around the perimeter of the site will provide notification and limit access to the site. Access restrictions would be placed in the Base Master Plan to limit future uses of the site that may result in direct contact with contaminated soil. Based on past sampling events no organic contamination was found in groundwater at a level of significant concern. The site had been isolated by the existing security fencing and protected against further dumping or spill activity for a number of years before the RI activities were carried out in the 1990s.

Long-term periodic monitoring and five-year reviews will assess soil contaminant status and potential threats to human health and the environment. Since waste constituents will remain in place, five-year reviews will provide interim protection by prohibiting use of the site until soil cleanup criteria are achieved. The Second Five-Year Review was completed in July 2008 and included Site 15. The Navy is currently preparing an O&M Plan, including a UFP-SAP for soil monitoring. Upon completion, the report will be submitted to EPA and NJDEP for review and comment.

2.4.9.4 Site 17 - Disposal Site Behind Training Barge

The Site 17 former landfill occupies three acres in the Waterfront area, adjacent to a tidal marsh in the Ware Creek drainage basin. The site was reportedly used for the disposal of wood, heavy equipment, empty paint cans, and construction debris. The former landfill surface is covered with gravel and pavement for use as a parking area for Navy personnel working at the Waterfront area.

The OU9 ROD recommends long-term monitoring and institutional controls to limit exposures to site risks at Site 17. Long-term periodic groundwater monitoring would be conducted to assess contaminant status and potential threats to human health and the environment. Since landfill constituents would remain in the groundwater, site conditions and risks would be reviewed every five years.

Institutional controls would be enacted to preclude use of untreated groundwater for drinking water. Because site groundwater does not meet New Jersey groundwater quality standards, a CEA pursuant to N.J.A.C 7:9-6 would be established to provide the state official notice that the constituent standards will not be met for a specified duration and to ensure that use of groundwater in the affected area is prohibited. The draft CEA Documentation Report was submitted to NJDEP and EPA in July 2006; NJDEP comments were received in June 2008. The Second Five-Year Review was completed in July 2008 and included Site 17.

2.4.10 OU10 - Site 7 Landfill South of "P" Barricades

Site 7, the Landfill South of "P" Barricades, is a five acre site that from 1965 to 1977, was used for the disposal of municipal-type solid waste and waste from Waterfront industrial operations. The disposed materials consisted of munitions shipping wastes (dunnage, packing), shop wastes from the Waterfront Public Works Shop and the Munitions Handling Laboratory (glass, wood, and small quantities of waste paint, thinners, and solvents), and domestic refuse. The waste materials were covered with loose sand quarried from the surrounding area.

The site is characterized as an open area surrounded by woodlands and wetlands. The landfill is primarily covered with sandy soil and vegetated with white pines and various grasses. An unpaved road borders the site to the north, west, and south. The ground surface slopes downward to the north from approximately 160 feet MSL to approximately 125 feet MSL. Groundwater generally flows toward the north, based on measured groundwater levels. The closest surface water body is located approximately 1,500 west of the site; there are no surface water bodies located downstream of the site.

During the 1993 RI/FS, groundwater samples showed low levels of metals and volatile organic compounds. RI test pits found mostly trash and construction debris; the cover soil was thin, ranging in thickness from 0 to 0.5 feet.

Groundwater sampling performed in April 2005 and July 2009 showed that VOC concentrations were below State of New Jersey GWQS. Three inorganics, aluminum, iron, and manganese were present at levels above GWQS. However, manganese was also detected in an upgradient well at a level significantly above its respective GWQS. These metals are considered secondary drinking water standards and are not considered a substantial risk to human health. Data collected during the 1993 RI/FS and the 1996 RI indicate that potential risk to ecological receptors is negligible at Site 7.

The FS for Site 7 was finalized in July 2008. The Proposed Remedial Action Plan and ROD for Site 7 were completed in 2010. As outlined in the ROD, the selected remedy for Site 7 is no action.

2.5 SITE DESCRIPTIONS AND CURRENT STATUS (NON-OPERABLE UNIT SITES)

2.5.1 Site 2 - Active Ordnance Demolition Range

The Active Ordnance Demolition Range (i.e., open burning (OB)/open demolition (OD) site) is located in the explosive ordnance disposal (EOD) area at NWS Earle and is used by the Navy for the treatment of hazardous waste munitions and explosives. It is approximately 15.5 acres in size and appears as a shallow, open, non-vegetated, oval-shaped area with a berm ranging from approximately 2 to 10 feet in height and bordered by woodlands consisting of mixed pine and deciduous forest. Two undeveloped dirt roads access the site, one from the east and one from the west. A more developed dirt road is the primary route of access to the site, from the south. The topography at the site slopes gently towards the north from approximately 125 feet above mean sea level at the bunker, located near the main (south) entrance, to approximately 90 feet MSL along the north side of the bermed area. An elongated sand berm, approximately 270 feet long and 15 feet high, oriented northeast to southwest is situated in the center of the site and is the dominant physical feature. There are no structures within 2,500 feet of the EOD area. The OB/OD unit consists of the following:

- Emergency safety shelter
- Unloading area
- Open burning area with burn pans
- Personnel bunker
- Open detonation area (blast craters)

The OB/OD treatment unit has been in operation since 1974 and is currently subject to RCRA Subpart X regulations which address miscellaneous hazardous waste treatment units.

OD operations are conducted in much the same manner today as when the EOD area was originally certified. OB operations were initially conducted by laying the burn material flat on the ground and igniting it. Today burn pans are used to prevent burn material from contacting and contaminating the soil. The general area that was used for the burns was in the same location as the demolition pits or slightly southwest, towards the safety shelter.

Currently, the OB/OD unit is used to treat obsolete, excess, and unsafe military munitions and explosives owned by the Department of Defense. The unit is also used to conduct explosives/ordnance disposal proficiency testing. OB/OD treatments are currently conducted by an EOD detachment assigned to NWS Earle. The treatment methods consist of open burning for propellants, small arms ammunition, and some bulk explosives and open detonations for explosives and munitions.

The OB/OD unit was previously used by state and federal agencies such as the EPA, Department of Alcohol, Tobacco and Firearms (ATF), Federal Bureau of Investigation (FBI), NJDEP, and state and local law agencies to treat reactive substances obtained off Base. As currently operated, the OB/OD unit would only be used by these agencies in emergency situations.

NWS Earle has submitted a hazardous waste permit application to NJDEP for operation of the OB/OD unit as a permitted facility. Currently, the OB/OD is operated as an interim status RCRA treatment unit per the Subpart X regulations. NJDEP is currently in the process of determining appropriate permit conditions including conditions for environmental monitoring. As part of the process of determining permit conditions NJDEP is requiring NWS Earle to conduct baseline environmental monitoring of soils, groundwater, sediment, and surface waters at the OB/OD unit. Soil, groundwater, surface water, and sediment samples have been collected in two rounds of sampling. A third round of baseline environmental monitoring was recently conducted to further delineate contamination. Future work will also include installation of monitoring wells and periodic collection of groundwater. For purposes of this SMP, no detailed schedule or additional activity listing are provided for Site 2, because of its RCRA regulatory status.

After discussion with NJDEP, fifteen (15) additional groundwater monitoring wells were installed in January 2010 to further define groundwater quality. Generally, the wells were installed in groups of three at specific target depths (15, 35, and 55 feet). Two rounds of groundwater sampling and analyses for explosives, metals, and perchlorates in the new and original monitoring wells were completed during February and May 2010.

2.5.2 Site 8 - Landfill East of Building S-186

The Landfill East of Building S-186 is an approximately one-acre site located within the Waterfront Area. Site 8 was reportedly used from 1943 to 1972 for dunnage lumber disposal. Dunnage is lumber that is used to secure and space a ship's cargo during transport. As noted in the October 1991 Site 8 SI Report (Weston, 1991), the dunnage lumber was removed from ships, stacked, and then burned. The ashes were then spread over the site and covered with soil. Based on analytical results from soil samples collected during a 1991 test pit investigation it was concluded the data indicate that no further investigations are necessary and that no remedial action is required. The EPA and NJDEP concurred with the Navy. A parking lot is currently located on the site.

2.5.3 Site 9 - Landfill Southeast of "P" Barricades

Site 9, the Landfill Southeast of "P" Barricades, is an isolated three acre site located in the Waterfront area at NWS Earle. From 1967 to 1972, the site was used for the disposal of dunnage lumber and construction debris. Lumber was stacked, burned (using a petroleum ignition source), and then covered with local soil. An estimated 4,500 to 7,500 cubic yards of lumber was disposed in this manner (IAS, 1983). Pine species reforestation was completed several years ago in the immediate vicinity of the site and mature hardwood stands currently surround the area on all sides. The landfill cover is thin and a small amount of waste is exposed in some areas where vegetation is sparse. The landfill surface slopes gently toward the south. A small, discontinuous stream is present approximately 300 feet south of the site. The stream has been found to be intermittent due to low stream flow volume during periods of dry weather.

The 1983 IAS consisted of interviews that concluded minimal impact because available records indicated only waste lumber was disposed at Site 9. The site was not recommended for confirmation study. During the SI, construction type debris, wood, some trash, and metal debris were encountered during six test pits that were constructed at the site to define the general limits of the landfill and to determine if any of the deposited materials had impacted subsurface soils. Subsurface soil analysis in the test pit samples indicated low levels of TPH, VOCs, pesticides, metals, and cyanide. RI test pits found mostly construction debris and some household trash. Groundwater was not encountered in any test pit.

No risk to human health was apparent from the site. Several metals were detected in Wagner Creek sediments and surface water at concentrations above background levels however; the source of the metals is not defined. Site 9 resides on the edge of the Wagner Creek watershed in the eastern section of the Waterfront Area. As outlined in the RI and exact source(s) of contamination in the surface water and sediments is unclear (B&R, 1996).

The Navy has concluded that extensive remedial activity at Site 9 is not warranted and is currently in discussions with the EPA and NJDEP. Further investigation of metals in surface water and sediments of Wagner Creek may be indicated. A FS to support no further action is currently being prepared.

2.5.4 Site 16/EPIC Study Site F - Diesel Fuel Line to Building C-50/Roundhouse Area

Site 16 is located northwest of Building C-19, a forklift maintenance facility, and addresses leakage from an underground fuel line that was used to transport diesel fuel from underground storage tanks to a dispensing station located approximately 100 feet north/northwest of Building C-50. Building C-19 is located within the Mainside Area at NWS Earle. The leak in the fuel transfer line was discovered in 1977 when soil residue was found in locomotive fuel tanks. Use of the fuel line was discontinued after subsequent excavation activities confirmed the leak. Part or all of the diesel transfer line is still in place. The underground storage tanks were removed.

Site F (C-50 Roundhouse Area), was identified during an analysis performed for the Environmental Protection Agency at the Environmental Monitoring Systems Laboratory, Las Vegas, Nevada (i.e., EPIC Study). The two sites are referred to as Site 16/F because Site 16 is located within the approximate outline of EPIC Site F. Site 16/F is the entire railroad maintenance yard that has been active since the late 1940s.

EPIC Site F includes two former diesel tank areas around Building C-50, an oil water separator and a leach field east of Building C-50, a solvent leach field northwest of Building C-50, and a locomotive wash area north of Building C-19. Building C-50 is known as the Roundhouse and is used for the maintenance and repair of locomotives and rail cars. Investigations at these areas have been concerned with petroleum hydrocarbon and solvent contamination of soil, groundwater, surface water, and sediment.

In 1992, as part of the investigation of Site 16, five soil borings were completed in the area northwest of Building C -19 in the reported location of the underground fuel line leak. One soil sample was collected from each soil boring at approximately 8 feet below ground surface. This sample location is below the depth of the fuel pipeline and above the depth of groundwater. All soil samples contained elevated levels of TPH ranging from 4,700 mg/kg to 22,000 mg/kg. Low levels of semivolatile compounds were also

detected. A geophysical survey of the area during the 1992 investigation indicated a number of buried lines at the site; however, the exact location of the leaking fuel line was not determined.

The SI determined that Site 16 had elevated levels of site-derived contaminants and recommended further sampling to fully delineate their extent.

In 1995 a soil gas survey was completed across Site 16/F. A total of 96 soil gas samples were collected and analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX), TCE, and PCE. Twenty soil borings and six monitoring wells were installed based on the results of the soil gas survey. Petroleum in the free phase was found in monitoring wells MW16-04 and MW16-05 during gauging activities. An analysis of the free phase petroleum found that it was consistent with weathered No. 2 diesel fuel.

A Site Characterization and Analysis Penetrometer System (SCAPS) investigation was conducted from October to November 1995 at Site 16/F. Twenty-nine SCAPS pushes were completed and three soil samples were collected for analysis to determine soil lithology, and the vertical and lateral extent of hydrocarbon contamination.

A pilot scale vacuum-enhanced free product recovery (bioslurper) study was performed in 1996. In 1997, NJDEP approved the Remedial Action Work Plan (RAWP) with monitored natural attenuation selected as the remedial action. The CEA documents for Site 16 were approved by NJDEP in 1998. A full-scale bioslurping system was operated from February 1998 to May 1999 to remove approximately 5000 gallons of diesel fuel "free product". An optimization study was performed in June 2004 and additional wells were installed for free product removal. A second optimization study, conducted in 2009, reviewed system operation and results. The 2009 optimization study recommended continuing final phase operation of the bioslurper for up to one year with the goal of removing recoverable light non-aqueous phase liquid (LNAPL) from selected recovery wells at Site 16/F. The Navy submitted the optimization report to NJDEP in January 2010. NJDEP approved the optimization report in June 2010. The Navy is currently operating the bioslurping system and conducts routine groundwater monitoring as required per the NJDEP underground storage tank (UST) program.

Installation of the recommended new monitoring well for Site 16/F will be implemented after NJDEP approval of the well permit application. Work on a revised CEA at Site 16/F is pending on NJDEP resolution of comments on the most recent bioslurper status and groundwater monitoring report.

For purposes of this SMP, no detailed schedule or additional activity listing are provided for Site 16/EPIC Site F because work at the site is addressed by NJDEP Bureau of Case Management program requirements.

2.5.5 Site 18 - Demilitarization Furnace (Building 589)

Site 18 is located within the Mainside Area of NWS Earle and included a rotary furnace operated by the Navy from 1978 to 1989 to demilitarize, by burning, small caliber (up to 40 mm) ammunition. As outlined in the February 1983 IAS, waste areas at Site 18 consisted of about 50 square feet of soil that was contaminated by metal fragments dropping off the furnace discharge conveyor (FCH, 1983). The fragments or metal chips were in such a form that the metals (typically iron and copper) were inert and as such did not pose a threat to human health or the environment.

The furnace was regulated under RCRA as a hazardous waste incinerator. In April 1991, the Navy submitted to NJDEP a closure plan for the site. A plan for soil sampling was also submitted and implemented by the Navy. RCRA closure certification documents were submitted to NJDEP in October 1995. The Closure Report was approved by the NJDEP in November 1995.

2.5.6 Site 21 - Baghouse & Cyclone Dust Storage Area near Building S-589

Site 21, located within the Mainside Area, was previously a RCRA permitted hazardous waste storage area formerly used for storage of dust recovered from the air pollution control equipment on the demilitarization furnace (Site 8). The furnace and associated storage area were operated by the Navy from 1978 -1989. Additional containerized solid hazardous wastes were reportedly periodically stored at Site 21 until December 1998. The 1983 IAS indicated that some of the baghouse and cyclone dust was spilled onto the soil surrounding the drummed wastes (FCH, 1983). However, the site was paved over to eliminate water infiltration and subsequent movement of any metals present in the soil.

The site has undergone closure per RCRA regulations and waste materials are no longer stored at this location. A new state-of-the-art hazardous waste storage facility was constructed by the Navy in 1998.

2.5.7 Site 28 – Waste Oil Tank West of Former Building C-14

A 2,000 gallon underground storage tank located just west of former Building C-14 within the Mainside Area, was used for the collection of waste oil. The tank was identified in the February 1983 IAS and did not warrant any additional confirmation study. A closure plan for removal of the tank and associated piping was approved by NJDEP in March 1987. The Navy removed the tank in May 1988 and conducted soil sampling. Final closure certification was submitted by the Navy in June 1992. NJDEP concurrence of the closure certification was received in July 1992. No further action is required at this site.

2.5.8 EPIC Study Site L (Site 41) - MSC Van Parking Lot

EPIC Site L (also known as Site 41) is comprised of a 15.7-acre area near Asbury Avenue and Pine Brook Road within the Mainside Area of NWS. Approximately one-third of the site is currently used by the Navy for storage of new and old telephone poles, railroad ballast stone, miscellaneous metal, plastic, and wood scrap material, and small asphalt and concrete piles. Materials have been stored at the site for 25 to 30 years and past storage practices are not well documented. The 1992 Preliminary Assessment Addendum consisted of interviews and aerial photo analysis. A stained area near a treated utility pole storage area and a hardened pile of asphalt were observed.

The 1996 RI determined that low levels of two organic compounds typically encountered in treated lumber were found in surface soil at or below NJDEP Non-Residential Direct Contact Soil Cleanup Criterion. These compounds tend to migrate with surface soil in runoff but not to groundwater. The low-concentration, combined with topography that is unlikely to result in significant off-site migration, indicated minimal risk to the surrounding habitat. The site is currently being used by the Navy for normal base maintenance activities.

Based on final communication from EPA, the Navy will prepare a Feasibility Study and Record of Decision for Site 41.

2.5.9 EPIC Study Site Q (Site 46) - Military Sealift Command Fire Fighting School

EPIC Site Q (also known as Site 46) occupies a 5.5-acre area at the southwestern corner of the NWS Earle Mainside Area. The fire-fighting school has been in use since 1975 and is used by the Navy and a variety of state and county groups to practice fire fighting. The station is operated by the Military Sealift Command, which reports having all necessary operating permits and is inspected on a regular basis by the NJDEP. Prior to 2006 the facility had an oil/water separator and retention pond for the treatment of training waste waters and a National Pollutant Discharge Elimination System (NPDES) permit for disposal of the water from the separator to the pond. Firefighting training takes place on a concrete pad, which prevents the infiltration of flammable material into the soil. Although water falling on the concrete pad is normally collected for treatment in the oil/water separator, there was some evidence noted that water flowed over the berm to the southeast portion of the pad.

The 1992 PA Addendum consisted of interviews and aerial photo analysis. Discharges from the oil/water separator to the adjacent pond were monitored and were in compliance under terms of the NPDES permit. No further action was deemed necessary.

The 1996 RI evaluation determined that no compounds were found at concentrations above identified applicable or relevant and appropriate requirements (ARARs). Benzo(b)fluoranthene, chrysene and pyrene, were detected at levels exceeding sediment ecological toxicity threshold values. These PAH compounds are typically found associated with treated lumber such as utility poles or railroad ties, and tend to adhere to soil carbon content. PAHs in soil tend to migrate with surface runoff but have little propensity to percolate to groundwater.

The low concentration of chloroform found in groundwater was detected below the MCL, but above the New Jersey GWQS. However, the concentration detected does not represent a significant threat to human health and shallow groundwater from the area are not likely to be used for human consumption.

The fire-fighting school is an active facility used by the Navy. In 2006, the containment system was reconfigured to collect and recirculate all training wastewaters and to prevent future releases.

Based on final communication from EPA, the Navy will prepare an FS and ROD for Site 46.

2.5.10 Site 47 - Pesticide Shop (Building S-86)

The Pesticide Shop was a small brick building, 25 feet by 12 feet, used by the NWS Earle Public Works Department for storage and mixing of various pesticides and herbicides used at the base for insect and weed control. A concrete pad, 15 feet by 8 feet, was located on the northwest side of the building. In addition, an in-ground former septic leach tank was also reportedly located just north of the building. Soil sampling conducted in the vicinity of the building identified various pesticide compounds including chlordane and 4,4-DDT at levels above the NJDEP Residential and Non-Residential Cleanup Criteria. Analysis of shallow groundwater samples also indicated the presence of chlordane at slightly elevated concentrations.

In 1991, the Navy removed all pesticide and herbicide materials from the Pesticide Shop and disposed the materials as hazardous waste. The Navy conducted the excavation and off-site disposal of contaminated soils and the septic tank and its contents, and the demolition of the pesticide shop, in 2000. Based on the removal action and additional groundwater sampling, the EPA and NJDEP issued in 2002 and 2003, respectively, concurrence letters that no further action was required for Site 47.

2.5.11 Site 48 - Mine Battery Site at West Pond Area

The Site 48, Mine Battery Site, is located along the northern fence line of the Mainside Area, west of Highway 34. The area was the location of a farm prior to acquisition by the Navy during the 1950s. The site consists of a cleared area within a wooded area adjacent to a pond (West Pond).

As outlined in the January 2004 PA/SI Report, a NWS Earle employee hunting on the station property in 1998, observed numerous small cylindrical objects on the ground surface. The objects were identified as inert actuator assemblies containing small battery cells. Reportedly as part of the disassembly of obsolete mines and associated equipment, the actuator/timing housing (including the electronic components and batteries) were disposed in West Pond between layers of sawdust. During the 1980s the Navy attempted to dredge the pond and remove sediment and batteries. Materials were removed from approximately one-third of the pond along the southern bank. The dredge spoils were spread in the cleared area to the south and southwest of the pond and visible actuators were collected and removed from the area.

As part of the 2003 PA/SI, test pits were constructed in and around Site 48. Surface and subsurface soil samples were collected and submitted for laboratory analyses. Based on the soil sampling results and a limited risk assessment screening, it was determined that no remedial action is required for site soils or groundwater (EA, 2004). A removal action was completed in 2004 and consisted of the excavation and off-site removal of mine actuators from the pond and adjacent upland and wetland areas. The NJDEP issued a letter of concurrence in September 2004 indicating that no further action was required for Site 49 (NJDEP, 2004).

3.0 CERCLA PROCESS ACTIVITIES

The FFA describes the major milestones or phases of environmental work to be completed at NWS Earle and identifies Superfund (or CERCLA and the NCP) as the primary regulatory process guidance to be used in completing the work under this SMP (U.S. EPA Administrative Docket No. II-CERCLA-FFA-00103). This section briefly describes the major investigation and remediation phases that have been, or will be, implemented at NWS Earle in accordance with the FFA. For those actions remaining to be completed, the most recent EPA guidance available describing the methods to be used in performing specific activities under these phases will be consulted and applied in implementing this SMP.

3.1 DESCRIPTION OF CURRENT SITE CONDITIONS

Section 2.0 of this SMP presents the current site conditions and identifies the areas addressed by this SMP. Sections 4.0 and 5.0 present the proposed actions and schedules for those sites addressed under this SMP.

3.2 SITE SCREENING PROCESS

The FFA does not specifically include a site screening process; however, the guidance referenced in the FFA does. Under Superfund, the site screening process consists of conducting a PA and SI. The PA is a limited-scope investigation performed to collect readily available information about a site and its surrounding area. A PA is designed to screen sites or to distinguish, based on limited data, sites that pose little or no threat to human health and the environment and sites that may pose a threat and require further investigation. The PA also identifies sites requiring assessment for possible removal or early actions. If the PA results in a recommendation for further investigation, a SI is performed (EPA, 1991).

The SI provides the data needed to complete a screening level evaluation of the potential risks posed to human health and the environment. An SI typically includes the collection of environmental and waste samples to determine what hazardous substances are present at a site. The data are then used to determine if these substances are being released to the environment and to assess if they have reached nearby targets. The SI can be conducted in one stage or two. The first stage, or focused SI, typically focuses sampling efforts to determine the presence or absence of contamination at areas of suspected release and migration to yield information sufficient to determine if further investigations are necessary to characterize the site risks. If further information is necessary to characterize the risks, an expanded SI or a RI is conducted (EPA, 1992).

Potential hazardous substance releases at NWS Earle were addressed in an IAS in 1982, a Site Inspection Study in 1986, and a Phase I RI in 1993. These were preliminary investigations to determine the number of sources, compile histories of waste handling and disposal practices at the sites, and acquire data on the types of contaminants present and potential human health and/or environmental receptors.

Based on the IAS and SI performed at NWS Earle, 29 areas of concern were identified and recommended for further investigation. Three of these 29 areas were eliminated from consideration under the former IRP because they were active operations regulated under RCRA. EPIC studies were used by EPA to identify additional sites where there was evidence of some environmental disturbance. After an initial screening of these sites, the Navy, EPA, and the NJDEP agreed to further investigation at three additional sites, Sites F, L, and Q. Since Site F overlapped existing Site 16, it was agreed that Site 16 would be expanded to include it (i.e., Site 16/EPIC Site F). Of the remaining 28 sites, one area, Site 8, has been investigated on an accelerated schedule to enable timely reuse. EPA concurrence of no further investigation (i.e., No Further Action) of Site 8 was received in October 1994.

3.3 REMEDIAL INVESTIGATIONS

A RI is performed at sites where a release has been confirmed and where that release poses an unacceptable risk to public health and/or the environment. Whereas a removal action addresses actual or imminent threats, a RI is typically performed to define the need for actions necessary to mitigate long-term threats. To support this objective, the RI should be designed to define or characterize the source of and the nature and extent of contamination, characterize the contaminant migration pathways, define the actual or potential risks to receptors, and provide data sufficient to support the development of remedial alternatives (EPA, 1988).

An EPA-approved work plan is required for the performance of an RI. At NWS Earle, NJDEP concurrence on a work plan will also be requested. The work plan shall include a management plan, data collection quality assurance plan, data management plan, community involvement plan, and schedule to meet the objectives described above. A Health and Safety Plan (HASP) should also be made available to EPA at the time of work plan submittal.

At NWS Earle, a Phase I RI was conducted in 1993. In September 1993, an additional investigation of 11 sites was conducted to complete the characterization of contamination at each of the study sites and to identify if migration of any contaminants was occurring. Phase II RI activities were conducted at 27 sites (included in this SMP) between May and December 1995. These RI activities included field investigations (i.e., soil gas surveys; soil sampling; groundwater sampling; and surface water/sediment sampling), data

collection and validation, human health risk assessment, and a preliminary ecological risk assessment. Sampling methodology and detailed results are presented in the July 1996 *Remedial Investigation Report, Volume 1A through Volume 11B* prepared by Brown and Root Environmental. Between October 1996 and February 1997, the Navy conducted additional investigation tasks at seven of the 27 sites investigated during the 1995 investigation. Results from these investigation tasks (i.e., RI Addendum) are detailed in the January 1998 *Remedial Investigation Addendum Report* prepared by Brown and Root Environmental.

3.4 FEASIBILITY STUDIES

A FS is required when the RI identifies that site-related contaminants present an unacceptable risk to human health or the environment. EPA has defined the cancer risk range of 10^{-4} to 10^{-6} as the "target range" or maximum "acceptable risk range" for most sites evaluated under the CERCLA program. This risk range represents the potential for contaminant exposure to cause one additional case of cancer in a population of ten-thousand people to one additional case of cancer in a population of one million people. Cumulative cancer risks greater than 10^{-4} generally will indicate that some degree of remediation is required, and cancer risks below 10^{-6} normally will not result in remedial efforts. When the calculated risk falls between 10^{-4} and 10^{-6} , decisions are typically made on a case-by-case basis. Noncancer risks are evaluated using the Hazard Index (HI) system. EPA has established this system to evaluate the potential for noncarcinogenic health effects of contamination. An HI of 1.0 or less is not expected to result in adverse health effects. The HI for an exposure scenario and for specific target organs are both evaluated under this system. In general, if the total HI exceeds 1.0 then the specific target organs expected to be affected by the contaminants are further evaluated to determine the HI for that organ. The HI value is not a numeric indication of risk. Rather, an HI that exceeds 1.0 indicates that a noncancer health effect cannot be ruled out. The need to take actions based on the HI is typically made on a case-by-case basis. Risks to the environment are evaluated by assessing the potential impacts of site-related contamination to ecological receptors. EPA has established numerical screening methods and risk evaluation guidelines for the performance of ecological risk assessments. However, the need to take action based on ecological risks is typically made on a case-by-case basis considering the results of site-specific studies and evaluations.

The purpose of an FS is to define the goals or end points required to mitigate an unacceptable risk and to identify a range of remedial alternatives that meet those goals. The FS shall, at a minimum, develop a list of remedial alternatives, and screen and evaluate those alternatives according to the latest EPA guidance. The evaluation or analysis of alternatives shall be conducted to provide sufficient information to allow for the comparison of alternatives and, when combined with risk management judgments, the selection of a site remedy that satisfies CERCLA requirements (EPA, 1988).

The FS is to be submitted to EPA for review and approval and NJDEP for review and concurrence and provides the basis or rationale for selecting a preferred alternative which is to be presented in a Proposed Remedial Action Plan (PRAP).

At NWS Earle, Feasibility Studies have been prepared and finalized for a number of the sites. The following is a listing of those FSs:

- Feasibility Study for OU1, OU2, and OU3 (B&R, 1997)
- Feasibility Study for OU5 (Tetra Tech, 2000c)
- Feasibility Study for OU6 (Tetra Tech, 2000a)
- Feasibility Study for OU8 (Tetra Tech, 2003b)
- Feasibility Study for OU7 (Tetra Tech, 2004)
- Feasibility Study for OU9 (Tetra Tech, 2003d)
- Feasibility Study for OU10 (Tetra Tech, 2008c)

3.5 PUBLIC COMMENT AND PARTICIPATION

3.5.1 Proposed Remedial Action Plan (PRAP)

The public is provided an opportunity to comment on and participate in the selection of a CERCLA remedy. After EPA approval of the FS, the Navy presents to the public the proposed remedial alternative in a PRAP. The purpose of the PRAP is to solicit public involvement in the remedial selection process. The PRAP should briefly describe the remedial alternatives analyzed in the FS, present the preferred alternative, and provide the rationale that supports the proposal of the preferred alternative (EPA, 1999). The PRAP, along with the final RI and FS, are made available to the public for review and comment for at least 30 days before the final selection of a remedy.

At NWS Earle, PRAPs have been prepared and submitted for the following sites:

- OU1 (Site 4 and Site 5) - March 1997
- OU2 (Site 19) - March 1997
- OU3 (Site 26) - December 1997
- OU4 (Sites 14, 20, 22, 23, 24, 25, 27, and 29) - April 1998
- OU5 (Site 13) - December 2002
- OU6 (Site 3 and Site 10) - May 2001
- OU8 (Site 1 and Site 11) - November 2003
- OU9 (Sites 6, 12, 15, and 17) - September 2004

- OU10 (Site 7) - August 2010

3.5.2 Record of Decision (ROD)

Comments received from the public are evaluated and presented with responses in a Record of Decision. The purpose of the ROD is to document the selection of the remedial action to be implemented. The ROD is a legal document that certifies that the remedy selection process was performed in accordance with CERCLA requirements. The ROD also serves as a technical document that summarizes the information presented in the RI and FS, provides sufficient information to support a conceptual design of the final remedy, and defines the remedial action objectives and cleanup levels to be achieved (EPA, 1999). The Navy, after consulting with EPA and the NJDEP and requesting concurrence, will select the final remedy to be documented in the ROD. The final ROD will be made available to the public and a notice of its availability will be published.

At NWS Earle, the following operable units and/or sites have signed RODs:

- OU1 (Site 4 and Site 5) - September 1997
- OU2 (Site 19) - September 1997
- OU3 (Site 26) - September 1998
- OU4 (Sites 14, 20, 22, 23, 24, 25, 27, and 29) - September 1999
- OU5 (Site 13) - September 2004
- OU6 (Site 3 and Site 10) - August 2006
- OU7 (Site 26) - August 2007
- OU8 (Site 1 and Site 11) - January 2005
- OU9 (Sites 6, 12, 15, and 17) - September 2007

3.6 REMEDIAL DESIGN/REMEDIAL ACTION

3.6.1 Remedial Design

After issuance of the ROD, a remedial design (RD) shall be prepared. The RD establishes the scope and character of the final remedy and provides the technical details and requirements, including construction and technical specifications and schedules, for implementing the remedy. The RD must clearly define how the remedial action objectives and goals defined in the ROD will be achieved (EPA, 1995).

An EPA-approved RD work plan is required for the preparation of a RD. The RD work plan shall clearly state the remedial action objectives and goals presented in the ROD, define the remedial action to be

implemented, and provide the rationale or basis for the design of the remedy. The RD work plan will be submitted to the NJDEP for review and concurrence. The work plan will include a listing of deliverables to be provided as part of the RD and a schedule for completion of the RD.

The RD must be approved by EPA before it is implemented.

3.6.2 Remedial Action

Remedial action (RA) is the actual implementation, including construction and operation, of the selected remedy. Before the remedy is implemented, a RA work plan must be prepared and submitted to EPA and NJDEP for review and approval. The RA work plan should include a management plan, reference the RD, identify the means and methods to be used in implementing the RD, and present schedules for completion of the action. A RA HASP shall also be prepared concurrent to the RA work plan.

The RA will be implemented in accordance with the EPA-approved RA work plan.

3.6.3 Remedial Action Completion Report

Current Navy guidance details that a remedial action completion report (RACR) will be prepared after the complete implementation of the RA. The intent of the RACR is to show that the remedial action objectives for a particular site have been achieved. The RACR will be submitted to EPA for review and approval and NJDEP for review and concurrence. The RACR shall be prepared after the physical construction of the RA or implementation of the RA is complete. The report shall describe the activities performed during the implementation, provide actual specifications for components of the implemented remedy, and present an initial assessment of the RA performance. The purpose of the RACR is to provide sufficient detail to document that the implemented remedy is consistent with the EPA-approved RD and the requirements set forth in the ROD. The RACR may serve as the basis for deletion of a site from the NPL.

For those individual sites where the remedy for an OU has been constructed and is in place and operating successfully, but the remedial action objectives are not anticipated to be met for a number of years (i.e., groundwater quality standards), the Navy may issue an Interim RACR or I-RACR. The I-RACR documents that the remedy is in place and operating properly and successfully. The determination that a remedy is operating properly and successfully is typically determined by periodic monitoring and/or inspection. The I-RACR will be submitted to EPA for review and approval and NJDEP for review and concurrence.

For those sites where a No Further Action determination has been made and agreed to by EPA a remedial action report is not required.

3.6.4 Remedial Action Monitoring and O&M Plans

Remedial action monitoring and O&M plans for measuring the effectiveness of and maintaining the components of the remedial action must be prepared and submitted, where appropriate, to EPA for review and approval and to NJDEP for review and concurrence.

Long-term monitoring plans shall state the remedial action objectives and goals, present the methods to be used in monitoring the performance of the remedial action, establish schedules for conducting the monitoring, define the criteria that will be used in determining the effectiveness of the remedy and for determining when the remediation goals have been achieved (decision criteria), and outline the reporting components that will be included in the RA assessment report (EPA, 2004).

The O&M plan is required to define what measures are necessary to ensure that the remedy remains protective of human health and the environment. The plan should define the administrative and technical details and requirements for inspecting, operating, and maintaining the RA (EPA, 2001a).

3.6.5 Five Year Review Reports

For those sites at NWS Earle where waste materials and/or contaminants remain following remedial action, no later than five years after the commencement of the remedial action and every five years thereafter until a Certificate of Completion is issued by EPA, a Five-Year Review Report will be submitted to EPA for review and approval and to NJDEP for review and concurrence. The purpose of the Five-Year Review Report is to present an evaluation of the past and projected effectiveness of the RA in attaining the performance criteria defined in the RD and to determine whether or not it remains protective of human health and the environment. The five-year review should include a review of the remedial action objectives and cleanup goals, the RACR or I-RACR, past O&M records, a site inspection, interviews, and an evaluation of the validity of the cleanup goals and the effectiveness of the remedy in meeting those goals and the objectives stated in the ROD (EPA, 2001b). The Five-Year Review report may also be the basis for recommending modifications or changes to the selected remedy or for proposing an alternative remedy.

At this time, the following sites at NWS Earle require Five-Year Review documentation as outlined in their respective RODs. If a Five-Year Review Report has/have been submitted, the submittal date(s) is also presented.

- Site 1, Former Ordnance Demilitarization Site (2008)
- Site 3, Landfill Southwest of "F" Group (2003; 2008)
- Site 4, Landfill West of "D" Group (2003; 2008)
- Site 5, Landfill West of Army Barricades (2003; 2008)
- Site 6, Landfill West of Normandy Road (2008)
- Site 10, Scrap Metal Landfill (2003; 2008)
- Site 13, Defense Property Disposal Office Yard (2008)
- Site 15, Sludge Disposal Site (2008)
- Site 17, Landfill (2008)
- Site 19, Paint Chip and Sludge Disposal Site (2003; 2008)
- Site 20, Grit Blasting Area At Building 544 (2008)
- Site 23, Paint disposal Area (2008)
- Site 26, Explosive "D" Washout Area (2003; 2008)
- Site 27, Projectile Refurbishing Area (2008)

4.0 SITE MANAGEMENT PLAN SCHEDULES

Historical summaries for major investigative and project activities for each site are provided in Section 2.0. Projected schedules for the sites for the five-year period, Years 2010 through 2014, are presented in this section.

The 1991 FFA details timetables and deadlines for completion of RIs, FSs, RAs, RODs, and Plans for RAs. As a number of these deliverables have already been submitted and approved for the majority of the IRP sites addressed by this SMP, the schedules presented have been developed based on currently available information and are intended to be adjusted periodically during the decision making process or after new data become available.

4.1 SITE-SPECIFIC SCHEDULES

Project schedules have been developed for fifteen (15) of the sites listed in Table 2-1 and where appropriate, those tasks that have been implemented since the ROD for each site was finalized have been identified. In addition, work completed over the last year that is awaiting either EPA and/or NJDEP review and comment and anticipated work to be performed over for the five-year period 2010 through 2014 are presented in Tables 4-1 through 4-15. Dates have been provided where possible; however, the performance of many of the SMP milestones is contingent on the completion and approval of activities in sequence.

Schedules have not been prepared for the following sites due to the reasons outlined:

- Site 2, Active Ordnance Demilitarization Site
Site 2 is currently a permitted treatment facility under the RCRA Subpart X program.
- Site 11, Contract Ordnance Disposal Area (OU8)
A ROD outlining No Further Action for Site 11 was signed in September 2004.
- Site 14, Defense Property Disposal Office Warehouse (OU4)
A ROD outlining No Further Action for Site 14 was signed in September 1999.
- Site 16/F, Building C-50 Diesel Fuel Line/EPIC Site F
Site 16/F is currently being remediated by the Navy per the NJDEP Bureau of Case Management program.
- Site 22, Paint Sludge Disposal (Building D-2) (OU4)
A ROD outlining No Further Action for Site 22 was signed in September 1999.
- Site 24, Closed Pistol Range (OU4)
A ROD outlining No Further Action for Site 24 was signed in September 1999.

- Site 25, Closed Pistol Range (OU4)
A ROD outlining No Further Action for Site 25 was signed in September 1999.
- Site 29, PCB Spill Site (OU4)
A ROD outlining No Further Action for Site 29 was signed in September 1999.

Schedules for 2010 through 2014 for each SMP site are discussed separately below.

4.1.1 Site 1 - Former Ordnance Demilitarization Site (OU8)

Table 4-1 presents completed activities and the schedule of deliverables anticipated for Site 1 over the next five years. As noted in Section 2.4.8, all investigative activities have been completed for Site 1 and a remedy selected, as outlined in the September 2004 ROD. The remedy which addresses groundwater contamination includes three elements:

- Institutional Controls
- Long-Term Monitoring
- Five-Year Reviews

To address the remedy component on institutional controls, the Navy prepared and submitted a *Draft Groundwater CEA Documentation* report to EPA and NJDEP on September 26, 2005. Comments were received from the NJDEP on June 25, 2008. In 2009, the Navy elected to initiate a groundwater sampling investigation to address NJDEP review comments and the length of time since the last sampling investigation (i.e., 1995). A UFP-SAP for groundwater sampling was prepared and approved by EPA and NJDEP and implemented by the Navy in July 2009. Results from the sampling were summarized in the *Draft Site 1 Sampling Report* that was submitted to NJDEP and EPA in September 2009. In November 2009, the NJDEP notified the Navy that a CEA for Site 1 is not warranted. The EPA formally notified the Navy in January 2010 that long-term monitoring should continue at Site 1. In August 2010 the Navy installed three new monitoring wells to replace older and/or damaged existing wells. Two additional rounds of groundwater sampling are scheduled for Fall 2010 and Spring 2011 to address seasonal effects on groundwater quality and to have sufficient data for evaluation by the Navy to determine the extent of long-term monitoring at Site 1.

The First Five-Year Review for Site 1 was completed in July 2008. Because contaminants remain at the site that do not allow for unlimited use and unrestricted exposure, future five-year reviews are required. The next Five-Year Review is scheduled to be completed in 2013.

4.1.2 Site 3 - Landfill Southwest of "F" Group (OU6)

Table 4-2 presents completed activities and the schedule of deliverables anticipated for Site 3 over the next five year period. As noted in Section 2.4.8, all investigative activities have been completed for Site 3 and a remedy selected as outlined in the August 2006 ROD. The remedy which addresses groundwater contamination includes three elements:

- Institutional Controls (Base Master Plan access restrictions; fencing and signage; CEA establishment)
- Landfill Cover System
- Long-Term Groundwater Monitoring

Because waste constituents remain at the site, Five-Year Reviews as outlined under CERCLA are also required.

The Operations & Maintenance Manual that detailed long-term monitoring requirements for Site 3 was finalized in June 2003. Groundwater monitoring is currently conducted on an annual basis and will continue to be conducted during Years 2010 through 2014. The First Five-Year Review was completed in February 2003. No major deficiencies were identified during the initial five-year review. The Second Five-Year Review for Site 3 was completed in July 2008 and included the following recommendations:

- An addendum should be issued for the 2003 O&M Manual to reflect current Navy and regulatory agency personnel for distribution of inspection and monitoring reports, and any revisions to sampling procedures based on Navy, EPA and NJDEP guidance.
- Continue enforcement of access restrictions. A review of the NWS Earle Master Plan should be performed to verify that information regarding Site 3 is up-to-date and reflects current site conditions.
- Continue implementation of long-term monitoring. A review of site monitoring data collected since the soil cap system was installed could be conducted to determine if a reduction in sampling frequency or sampling parameters is recommended.
- Because contaminants will remain at the site that do not allow for unlimited use and unrestricted exposure, future five-year reviews will be required.

4.1.3 Site 4 - Landfill West of "D" Group (OU1)

Table 4-3 presents completed activities and the schedule of deliverables anticipated for Site 4 over the next five years. As noted in Section 2.4.8, all investigative activities have been completed for Site 4 and a

remedy selected as outlined in the August 1997 ROD. The Site 4 remedy which addresses groundwater contamination includes three elements:

- Institutional Controls (Base Master Plan access restrictions; fencing and signage; CEA establishment)
- Landfill Cover System (Capping)
- Long-Term Groundwater Monitoring

Because waste constituents remain at the site, Five-Year Reviews as outlined under CERCLA are also required.

The *Operations and Maintenance Manual* which details long-term monitoring requirements for Site 4 was finalized in March 1999. Groundwater monitoring is currently conducted on an annual basis and is expected to continue to be conducted from 2010 through 2014. The First Five-Year Review was completed in February 2003. No major deficiencies were identified during the initial five-year review. The Second Five-Year Review for Site 4 was completed in July 2008 and included the following recommendations:

- An addendum should be issued for the 2003 O&M Manual to reflect current Navy and regulatory agency personnel for distribution of inspection and monitoring reports, and any revisions to sampling procedures based on Navy, EPA and NJDEP guidance.
- Continue restricting access to the site.
- Continue enforcement of access restrictions. A review of the NWS Earle Master Plan should be performed to verify that information regarding Site 3 is up-to-date and reflects current site conditions.
- Consider reducing the groundwater sampling frequency to 2 year intervals.
- Consider reducing the analytical parameter list to specific VOCs – TCE, 1,2-DCE, and VC and metals (i.e., aluminum, iron and manganese).
- Because contaminants will remain at the site that do not allow for unlimited use and unrestricted exposure, future five-year reviews will be required.

4.1.4 Site 5 - Landfill West of Army Barricades (OU1)

Table 4-4 presents completed activities and the schedule of deliverables anticipated for Site 5 over the five-year period 2010 through 2014. As noted in Section 2.4.8, all investigative activities have been completed for Site 5 and a remedy selected as outlined in the August 1997 ROD. The Site 5 remedy which addresses groundwater contamination includes three elements:

- Institutional Controls (Base Master Plan access restrictions; fencing and signage; CEA establishment)
- Landfill Cover System (Capping)
- Long-Term Groundwater Monitoring

Because waste constituents remain at the site, Five-Year Reviews as outlined under CERCLA are also required.

The *Operations and Maintenance Manual* which details long-term monitoring requirements for Site 5 was finalized in March 1999. Groundwater monitoring is currently conducted on an annual basis and will continue to be conducted during Years 2010 through 2014. The First Five-Year Review was completed in February 2003. No major deficiencies were identified during the initial five-year review. The Second Five-Year Review for Site 5 was completed in July 2008 and included the following recommendations:

- An addendum should be issued for the 1999 O&M Manual to reflect current Navy and regulatory agency personnel for distribution of inspection and monitoring reports, and any revisions to sampling procedures based on Navy, EPA and NJDEP guidance.
- Continue restricting access to the site.
- Continue enforcement of access restrictions, including the CEA. A review of the NWS Earle Master Plan should be performed to verify that information regarding Site 5 is up-to-date and reflects current site conditions.
- Continue to conduct long-term monitoring in accordance with the O&M Manual.
- Consider reducing the groundwater sampling frequency to 2-year intervals.
- Consider reducing the analytical parameter list to specific metals.

Because contaminants remain in the groundwater at concentrations above NJDEP GWQS, continued groundwater monitoring and reporting are required. Additional five-year reviews are required because wastes remain on the site. The Third Five-Year Review is scheduled for completion in 2013.

4.1.5 Site 6 - Landfill West of Normandy Road (OU9)

Table 4-5 presents completed activities and the schedule of deliverables for Site 6 during 2010 through 2014. The First Five-Year Review for Site 6 was completed in July 2008 and included the following recommendations:

- Implement the LUCs including establishment of the CEA for groundwater, as outlined in the OU9 Remedial Design for Land Use Controls.
- Conduct long-term monitoring and five-year reviews in accordance with the ROD.

To address comments on the initial CEA documentation submittal and the length of time since the last sampling event (i.e., 1995), the Navy prepared a UFP-SAP for groundwater sampling at Sites 6 and 17 and submitted it to EPA and NJDEP for review and comment in September 2010. The need for CEAs at these two sites will be reviewed upon completion and reporting of the proposed groundwater investigation. Interim remedial measures were completed by the Navy in 1999 and consisted of stabilization of the side slopes, clearing and removal of brush and trees, placement of additional soil or stone cover, grading, and seeding. The Site 6 remedy which addresses groundwater contamination includes three elements:

- Land Use Controls (Base Master Plan access restrictions; CEA establishment)
- Fencing and Signage
- Long-Term Groundwater Monitoring

Because waste constituents remain at the site, Five-Year Reviews as outlined under CERCLA are also required.

4.1.6 Site 7 - Landfill South of "P" Barricades (OU10)

Table 4-6 presents completed activities and the schedule of deliverables anticipated for Site 7 in 2010. As noted in Section 2.4.10 a Feasibility Study was completed for Site 7 in July 2008. The FS report identified and screened several remedial alternatives for Site 7. The Navy, in agreement with the EPA and NJDEP has recommended No Action as the selected remedy. The selected remedy was presented in the August 2009 *Proposed Remedial Action Plan for Site 7 (OU10)* and at the September 2010 public meeting. A final *Record of Decision* has been prepared by the Navy and was submitted for signature to the Navy and EPA on September 30, 2010. Following Navy and EPA approval, no additional actions will be required for Site 7.

The Navy has elected to construct a vegetated soil cover at Site 7. Construction work at the site was initiated in July 2010 and is expected to be completed in November 2010.

4.1.7 Site 10 - Scrap Metal Landfill (OU6)

Table 4-7 presents completed activities and the schedule of deliverables anticipated for Site 10 during 2010 through 2014. As noted in Section 2.4.6, all investigative activities have been completed for Site 10 and a remedy selected as outlined in the August 2006 ROD. The remedy, which addresses groundwater contamination, includes three elements:

- Institutional Controls (Base Master Plan access restrictions; fencing and signage; CEA establishment)
- Landfill Cover System
- Long-Term Groundwater Monitoring

Because waste constituents remain at the site, Five-Year Reviews as outlined under CERCLA are also required.

The Operations & Maintenance Manual that detailed long-term monitoring requirements for Site 10 was finalized in June 2003. Groundwater monitoring is currently conducted on an annual basis and will continue to be conducted from 2010 through 2014. The First Five-Year Review was completed in February 2003. No major deficiencies were identified during the initial five-year review. The Second Five-Year Review for Site 3 was completed in July 2008 and included the following recommendations:

- An addendum should be issued for the 2003 O&M Manual to reflect current Navy and regulatory agency personnel for distribution of inspection and monitoring reports and any revisions to sampling procedures based on Navy, EPA and NJDEP guidance.
- A review of the NWS Earle Master Plan should be performed to verify that information regarding Site 10 is up-to-date and reflects current site conditions.
- Continue implementation of long-term monitoring. However, a review of site monitoring data collected since the RCRA-type cap system was installed should be conducted to determine if a reduction in sampling frequency or sampling parameters is recommended.
- Because contaminants will remain at the site that do not allow for unlimited use and unrestricted exposure, future five-year reviews will be required.

4.1.8 Site 13 - Defense Property Disposal Office Yard (OU5)

Table 4-8 presents completed activities and the schedule of deliverables for Site 13 during 2010 through 2014. As noted in Section 2.4.5, all investigative activities have been completed and a remedy selected

as outlined in the ROD signed in July 2004. The Site 13 remedy which addresses groundwater contamination includes three elements:

- Landfill Cap System
- Land Use Controls (Base Master Plan access restrictions, CEA establishment, Fencing and signage)
- Long-Term Groundwater Monitoring

Because waste constituents remain at the site, Five-Year Reviews as outlined under CERCLA are also required.

The *Operations & Maintenance User Manual for Site 13, Operable Unit 5* was finalized in 2008 and detailed long-term monitoring requirements for Site 13. A Draft *Classification Exception Area Investigation Report* was also submitted to EPA and NJDEP in August 2005. Site inspections and groundwater monitoring are currently being conducted on an annual basis. The First Five-Year Review for Site 13 was completed in July 2008 and included the following recommendations:

- Continue to conduct long-term periodic groundwater monitoring in accordance with the ROD.
- Continue enforcement of access restrictions. A review of the NWS Earle Master Plan should be performed to verify that information regarding Site 13 is up-to-date and reflects current site conditions.

4.1.9 Site 15 - Sludge Disposal Area (OU9)

Table 4-9 presents completed activities and the schedule of deliverables for Site 15 over the next five-year period (2010-2014). As noted in Section 2.4.9, all investigative activities have been completed and a remedy selected as outlined in the ROD for OU9 that was signed by the Navy and EPA in September 2007. The Site 15 remedy which addresses residual soil contamination includes three elements:

- Land Use Controls (Base Master Plan access restrictions; CEA establishment)
- Fencing and Signage

Because waste constituents remain at the site, Five-Year Reviews as outlined under CERCLA are also required.

As outlined in the ROD, a draft Operations and Maintenance Plan for implementation of the proposed long-term soil monitoring program and site maintenance will be submitted to EPA for review and comment per the outlined schedule durations. The anticipated field work for the Year 1 monitoring event includes baseline soil sampling and surveying. Soil sampling is expected to be conducted on a five year basis as

needed for the Five-Year Review. The First Five-Year Review for Site 15 was completed in July 2008 and included the following recommendations:

- Enact LUCs outlined in the *OU9 Remedial Design for Land Use Controls*.
- Conduct soil sampling and five-year reviews in accordance with the ROD. Sampling expected to be conducted in 2012.

4.1.10 Site 17 - Disposal Site Behind Training Barge (OU9)

Table 4-10 presents completed activities and the schedule of deliverables for Site 17 for 2010 through 2014. The first Five-Year Review for Site 17 was completed in July 2008 and included the following recommendations:

- Enact LUCs, including establishment of a CEA for groundwater, as outlined in the *OU9 Remedial Design for Land Use Controls*.
- Conduct long-term monitoring and five-year reviews in accordance with the 2007 ROD.

To address comments on the initial CEA documentation submittal and the length of time since the last sampling event (i.e., 1995), the Navy prepared a UFP-SAP for groundwater sampling at Sites 6 and 17 and submitted it to EPA and NJDEP for review and comment in September 2010. The need for CEAs at these two sites will be reviewed upon completion and reporting of the proposed groundwater investigation. Interim remedial measures were completed by the Navy and consisted of grading, topsoil or stone cover placement, and seeding of the site. A wooden barricade was also installed along a portion of the site.

The ROD for OU9 was signed by the Navy and EPA in September 2007. Because waste constituents remain at the site, Five-Year Reviews as outlined under CERCLA are also required.

4.1.11 Site 19 - Paint Chip and Sludge Disposal Site (OU2)

Table 4-11 presents completed activities and the schedule of deliverables for Site 19 during 2010 through 2014. The September 1997 ROD for Site 19, which addresses groundwater contamination, includes three remedy components:

- Excavation and Off-Site Disposal of Contaminated Soils and Sediments
- Institutional Controls (Base Master Plan access restrictions; CEA establishment)
- Long-Term Groundwater Monitoring

Because waste constituents remain at the site, Five-Year Reviews as outlined under CERCLA are also required.

Excavation and off-site disposal of contaminated soils and sediments were completed in July 2000. Restrictions on the future use of the site were also placed in the NWS Base Master Plan.

The *Long-Term Monitoring Work Plan for Ground Water, Surface Water, and Sediment at Site 19* was finalized in 2001. Groundwater, surface water, and sediment monitoring are currently conducted on an annual basis and will continue to be conducted in 2010 through 2014. The first Five-Year Review was completed in February 2003. No major deficiencies were identified during the initial five-year review. The second Five-Year Review for Site 19 was completed in July 2008 and included the following recommendations:

- Determine if formal notification regarding the establishment and expected duration of the CEA was prepared. If not, prepare and submit in accordance with the ROD.
- Continue enforcement of access restrictions. A review of the NWS Earle Master Plan should be performed to verify that information regarding Site 19 is up-to-date and reflects current site conditions.
- Continue implementation of long-term monitoring.
- Because contaminants remain at the site that do not allow for unlimited use and unrestricted exposure, future five-year reviews will be required.

In 2009, the Navy submitted a Technical Memorandum to the EPA and NJDEP that provided an evaluation of the long-term groundwater monitoring results and recommended that further sampling of groundwater be discontinued. Based on their review, the EPA indicated that long-term monitoring for metals is still required. No comments were received from the NJDEP. Groundwater, surface water, and sediment monitoring are being conducted on an annual basis. New Jersey GWQS will eventually be met through natural attenuation and a CEA will be established in the area immediately adjacent and down gradient of the site to protect potential receptors until the GWQS are achieved.

4.1.12 Site 20 - Grit Blasting Area at Building 544 (OU4)

Table 4-12 presents completed activities and schedule of deliverables anticipated for Site 20 in 2010 through 2014. The Navy completed interim remedial actions at Site 20 in 1995. The OU-4 ROD outlined institutional controls and five-year reviews as the selected remedy. Site 20 was not included in the 2003 First Five-Year Review for NWS Earle, but was included in the Second Five-Year Review which was completed in July 2008. Based on the 2008 Five-Year Review, because contaminants remain at the site

at levels that do not allow for unlimited use and unrestricted exposure, five-year reviews are required for Site 20. The next Five-Year Review is scheduled for completion in 2013.

4.1.13 Site 23 - Paint Disposal Area (OU-4)

Table 4-13 presents completed activities and schedule of deliverables anticipated for Site 23 during 2010 through 2014. Interim remedial actions were completed at Site 23 in 1997. The OU-4 ROD outlined institutional controls and five-year reviews as the selected remedy. Site 23 was not included in the 2003 First Five-Year Review for NWS Earle, but was included in the Second Five-Year Review which was completed in July 2008. The following recommendations for Site 23 were outlined in the July 2008 review:

- Since groundwater results obtained during the RI investigation exceed current New Jersey GWQS, the Navy proposed to sample the existing Site 23 monitoring wells (23MW01, 23MW02 and 23MW03) and analyze them for EPA Contract Laboratory Program (CLP) TAL metals.
- Because contaminants remain at the site at levels that do not allow for unlimited use and unrestricted exposure, future five-year reviews will be required.

A UFP-SAP for groundwater sampling at Site 23 was approved by EPA and NJDEP in August 2010. The Navy intends to implement the sampling during November 2010. Results from the sampling will then be summarized and presented to EPA and NJDEP.

4.1.14 Site 26 - Explosive "D" Washout Area (OUs 3 and 7)

Table 4-14 presents completed activities and the schedule of deliverables anticipated for Site 26 during 2010 through 2014. As noted in Section 2.4.3, all investigative activities have been completed for Site 26 and a remedy selected as outlined in the August 1998 OU3 ROD and the January 2007 OU7 ROD. The Final Proposed Plan for OU7 was issued in September 2004. The OU3 remedy addresses soil and groundwater contamination at the site and includes the following elements:

- Excavate and dispose of the process leach tank and adjacent contaminated soils.
- Treat residual soil and groundwater contamination through the use of air sparging/ soil vapor extraction (AS/SVE) followed by monitored natural attenuation.
- Institutional Controls (Establish a CEA).
- Long-Term Groundwater Monitoring.

The proposed remedy for OU7 addresses groundwater contamination (PCE portion of plume) and includes the following elements:

- Land Use Controls (Base Master Plan access restrictions; CEA establishment)
- Long-Term Groundwater Monitoring

Because waste constituents remain at the site, Five-Year Reviews as outlined under CERCLA are also required.

The leaching system and associated sludge/soil immediately northwest of Building GB-1 were removed in 1998, as described in the Site 26 Close-Out Report (FWEC, 1998a). This part of the remedial action was completed in accordance with the OU3 ROD and was approved by EPA and NJDEP. Following the excavation activities the area was backfilled with clean soil to surrounding grade. Construction of the AS/SVE system was completed in December 2000; operation of the system began in early January 2001. The system continued operating until December 2004 at which time it was shut down due to reduced groundwater contaminant concentrations.

The Navy completed four quarters of post-operational groundwater sampling in 2005. Significant rebound of TCE and 1, 2-DCE concentrations were not observed during this year-long monitoring period. An additional four rounds of groundwater monitoring are being conducted by the Navy over the next five years. To date, three rounds of post-operational groundwater samples have been collected from Site 26. Based on review of these results, there has been a slight increase in TCE concentrations at two locations, 26MW01 and 26AS-1 since the November 2005 fourth quarter shutdown sampling event. However, the detected concentrations are significantly below the concentrations observed prior to the AS/SVE operation. In addition, the contaminant plume is not expanding or migrating beyond the boundaries of the proposed CEA and there is no risk of exposure to TCE or PCE associated with the current site use.

The ROD remedy includes establishment of a CEA immediately adjacent to Site 26 to bar the use of groundwater during the remediation period and long-term periodic groundwater monitoring. A decision on the need for a CEA will be made after the fourth round of post operation groundwater sampling which will be conducted in 2011.

The first Five-Year Review was completed in February 2003. No major deficiencies were identified during the initial five-year review. The second Five-Year Review for Site 26 was completed in July 2008 and included the following recommendations for OU3 and OU7:

OU3

- Review the recent (August 2010) round of groundwater monitoring data and evaluate if the cleanup goals for the groundwater remedy are being achieved. Based on the remedy evaluation, review the long-term monitoring program and make changes as necessary.
- Obtain NJDEP concurrence of the revised CEA documentation submitted in October 2005 and November 2006.
- A review of the NWS Master Plan should be performed to verify that information regarding Site 26 reflects current site conditions and the final CEA.

OU7

- Obtain NJDEP concurrence of the revised CEA documentation submitted in October 2005 and November 2006.
- Develop a long-term monitoring work plan and implement monitoring in accordance with the CEA.
- A review of the NWS Master Plan should be performed to verify that information regarding Site 26 reflects current site conditions and the revised CEA.

4.1.15 Site 27 - Projectile Refurbishing Area (OU4)

Table 4-15 presents completed activities and schedule of deliverables anticipated for Site 27 during 2010 through 2014. The Navy completed interim remedial actions at Site 27 in 1997. The OU-4 ROD outlined institutional controls and five-year reviews as the selected remedy. Site 27 was not included in the 2003 First Five-Year Review for NWS Earle, but was included in the Second Five-Year Review which was completed in July 2008. Because contaminants remain at the site at levels that do not allow for unlimited use and unrestricted exposure, future five-year reviews will be required.

REFERENCES

Applied Research Associates, Inc., 1996. CPT Characterization with Fuel Fluorescence and Water Sample Collection. November.

Bionetics Corporation, 1991. Site Analysis, Earle Ammunition Depot: Main Base Area, Colts Neck, New Jersey, Warrenton, Virginia, for Environmental Photographic Interpretation Center (EPIC) of U. S. Environmental Protection Agency. October.

B&RE (Brown & Root Environmental), 1996. Remedial Investigation Report for Naval Weapons Station Earle, Colts Neck, New Jersey. Wayne, Pennsylvania. July.

B&RE, 1997. Feasibility Study for Sites 4, 5, 19, and 26, Naval Weapons Station Earle, Colts Neck, New Jersey. King of Prussia, Pennsylvania. July.

B&RE, 1998. Remedial Investigation Addendum Report for Naval Weapons Station Earle, Colts Neck, New Jersey. King of Prussia, Pennsylvania. January.

EA (EA Engineering, Science, and Technology, Inc.), 2004. Preliminary Assessment/Site Investigation Report for Sites 47 and 48, Naval Weapons Station Earle, Colts Neck, New Jersey. Iselin, New Jersey. January.

ECOR (ECOR Solutions, Inc.), 2005. Groundwater Sampling Report, July 2004 Sampling Event for Sites 3 and 10, Operable Unit 6. West Chester, Pennsylvania. February.

ECOR, 2006. Annual Long Term Monitoring Report for the 2005 Sampling Event at Landfills 3, 4, 5, and 10, and Site 19. West Chester, Pennsylvania. August.

ECOR, 2007. Annual Maintenance and Monitoring Report – Annual 2006 Event. West Chester, Pennsylvania. July.

ECOR, 2008. Annual Maintenance and Monitoring Report for the Landfill Caps Sites 3 & 10, Sites 4 & 5, Site 13, and Long-Term Monitoring for Site 19, Annual 2007 Event. West Chester, Pennsylvania. July.

ECOR, 2009. Landfills 3, 4, 5, 10, 13 and Site 19, Annual 2008 Monitoring Report. West Chester, Pennsylvania. May.

REFERENCES (Continued)

Environmental Branch NWS Earle, 1994. Study of Ambient Ground Water and Surface Water Conditions at NWS Earle. Fall.

EPA (United States Environmental Protection Agency), 1988. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Interim Final, OSWER Directive 9355.3-01. October.

EPA, 1991. Federal Facility Agreement Under CERCLA 120, In the Matter of The US Department of the Navy, Naval Weapons Station Earle, Colt's Neck, New Jersey. February.

EPA, 1991. Guidance for Performing Preliminary Assessments under CERCLA (EPA/540/G-91/013). September.

EPA, 1992. Guidance for Performing Site Inspections under CERCLA (EPA540-R-92-021), Interim Final. September.

EPA, 1994. Status Site 8, Naval Weapons Station (NWS) Earle, Colts Neck, New Jersey. October.

EPA, 1995. Guidance for Scoping the Remedial Design (EPA/540/R-95/025). March.

EPA, 2001a. Operation and Maintenance in the Superfund Program (.EPA 540-F-01-004). May.

EPA, 2001b. Comprehensive Five-Year Review Guidance (EPA 540-R-01-007). June.

EPA, 2002. Review of the Navy's Preliminary Assessment/Site Investigation Report for Sites 47 and 48, NWS Earle, Colts Neck, New Jersey. July.

EPA, 2002. Site 47-Former Pesticide Shop, Naval Weapons Station Earle. October.

EPIC (Environmental Photographic Interpretation Center), 1991. Site Analysis of Aerial Photography at NWS Earle. October.

FWEC (Foster Wheeler Environmental Corporation), 1996. Evaluation Report for the Bioslurping Pilot Study, Naval Weapons Station Earle, Colts Neck, New Jersey, Langhorne, Pennsylvania. December.

FWEC, 1997. Close-Out Report, Removal Actions at Sites 22, 23, and 27, Naval Weapons Station Earle, Colts Neck, New Jersey, Langhorne, Pennsylvania. February.

REFERENCES (Continued)

FWEC, 1998a. Site 26 Close-Out Report, Naval Weapons Station Earle, Colts Neck, New Jersey, Langhorne, Pennsylvania. July.

FWEC, 1998b. Work Plan for Pesticide Investigation at Naval Weapons Station-Earle, Colts Neck, New Jersey. Langhorne, Pennsylvania. November.

FWEC, 1999. Coastal Zone Management Consistency Determination for Slope Stabilization at Site 6, Former Landfill Area, Naval Weapons Station - Earle, Langhorne, Pennsylvania. August.

FWEC, 2000a. Final Closure Report for Soil Excavation at Site 12, Former Battery Storage Area, Naval Weapons Station - Earle, Langhorne, Pennsylvania. May.

FWEC, 2000b. Closure Report for Slope Stabilization at Site 6, Former Landfill Area, Naval Weapons Station - Earle, Langhorne, Pennsylvania. September.

FWEC, 2001. Closeout Report for the Cleanup of the Scrap Metal Yard and Closure of 3 Aboveground Storage Tanks (ASTs), Naval Weapons Station Earle, Colts Neck, New Jersey. Langhorne, Pennsylvania. January.

FWEC, 2001. Operation and Maintenance Manual for Air Sparge/Soil Vapor Extraction System Site 26, Building GB-1. Naval Weapons Station Earle, Colts Neck, New Jersey. Langhorne, Pennsylvania. June.

FWEC, 2003. Operation and Maintenance User Manual for Operable Unit 6 (Sites 3 and 10), Naval Weapons Station Earle, Colts Neck, New Jersey. Langhorne, Pennsylvania. June.

Halliburton NUS, 1992. Wayside Area Naval Weapons Station Earle, Site Inspection Report. July.

Hart (Fred C. Hart Associates, Inc.), 1983. Initial Assessment Study, Naval Weapons Station Earle, Colts Neck, New Jersey. UIC N60478. New York, New York, for Naval Energy and Environmental Support Activity. February.

H&S (H&S Environmental), 2010. Annual Maintenance and Monitoring Report for the Landfill Caps 3 & 10, Sites 4 & 5, Site 13, and Long-Term Monitoring for Site 19. Westborough, Massachusetts. May.

JACA Corp, 1989. Transmittal of Soil Sampling Plan for 2,000 Gallon Waste Oil Tank. September.

REFERENCES (Continued)

Metcalf & Eddy, Inc., 1996a. Soil Washing Treatability Study, Naval Weapons Station Earle, Pistol Range Sand Berm, for Foster Wheeler Environmental Corporation. August.

Metcalf & Eddy, Inc., 1996b. Pistol Range Remediation, Naval Weapons Station Earle, Colts Neck, New Jersey. October.

Naval Weapons Station Earle. 1997. Installation Restoration Program Sites 24 & 25 Closed Pistol Ranges Remedial Action Report. March.

Navy (U.S. Department of the Navy), 1991. Site Inspection Report for Site 8, Naval Weapons Station (NWS) Earle, Colts Neck, New Jersey. Northern Division, Naval Facilities Engineering Command. December.

Navy, 1992. Transmittal of Waste Oil Tank Closure Certifications to NJDEP. June.

Navy, 1995. Interim Remedial Action Report for "Site 20", Naval Weapons Station Earle, Colts Neck, New Jersey. February.

Navy, 1997a. Remedial Action Report, Installation Restoration Program, Sites 24 and 25, Closed Pistol Ranges, Naval Weapons Station Earle, Colts Neck, New Jersey. March.

Navy, 1997b. Proposed Plan Operable Unit 1 (OU-1) Sites 4 and 5, Naval Weapons Station Earle, Colts Neck, New Jersey. Northern Division, Naval Facilities Engineering Command. March.

Navy, 1997c. Record of Decision Operable Unit 1 (OU-1) Sites 4 and 5, Naval Weapons Station Earle, Colts Neck, New Jersey. Northern Division, Naval Facilities Engineering Command. August.

Navy, 1997d. Proposed Plan Operable Unit 3 (OU-3) Site 26, Naval Weapons Station Earle, Colts Neck, New Jersey. Northern Division, Naval Facilities Engineering Command. March.

Navy, 1997e. Record of Decision Operable Unit 2 (OU-2) Site 19, Naval Weapons Station Earle, Colts Neck, New Jersey. Northern Division, Naval Facilities Engineering Command. August.

REFERENCES (Continued)

Navy, 1998a. Proposed Plan Operable Unit 4 (OU-4) Sites 14, 20, 22, 23, 24, 25, 27, and 29, Naval Weapons Station Earle, Colts Neck, New Jersey. Northern Division, Naval Facilities Engineering Command. April.

Navy, 1998b. Record of Decision Operable Unit 3 (OU-3) Site 26, Naval Weapons Station Earle, Colts Neck, New Jersey. Northern Division, Naval Facilities Engineering Command. August.

Navy, 1998c. Re: Naval Weapons Station Earle, Colts Neck, NJ; Installation Restoration Program for, Letter from T. G. Sheckels, Head, Restoration Management Section, Northern Division, Naval Facilities Engineering Command. November.

Navy, 1999. Record of Decision Operable Unit 4 (OU-4) Sites 14, 20, 22, 23, 24, 25, 27, and 29, Naval Weapons Station Earle, Colts Neck, New Jersey. Northern Division, Naval Facilities Engineering Command. August.

Navy, 2001. Proposed Plan for Sites 3 and 10 (OU-6), Naval Weapons Station Earle, Colts Neck, New Jersey. Northern Division, Naval Facilities Engineering Command. May.

Navy, 2002. Preliminary Assessment/Site Inspection Results Site 47 Naval Weapons Station Earle, Colts Neck, New Jersey. August.

Navy, 2004a. Record of Decision Defense Property Disposal Office Yard Landfill (Site 13) Operable Unit 5 (OU 5), Naval Weapons Station Earle, Colts Neck, New Jersey. Engineering Field Activity Northeast, Naval Facilities Engineering Command. July.

Navy, 2004b. Final Closeout Report for Removal of Mine Actuators at Naval Weapons Station Earle, Colts Neck, New Jersey. Engineering Field Activity Northeast, Naval Facilities Engineering Command. July.

Navy, 2004c. Record of Decision Sites 1 and 11 Operable Unit 8 (OU 8), Naval Weapons Station Earle, Colts Neck, New Jersey. Engineering Field Activity Northeast, Naval Facilities Engineering Command. September.

REFERENCES (Continued)

Navy, 2004d. Final Proposed Plan for Sites 6, 12, 15, and 17 (OU 9), Naval Weapons Station Earle, Colts Neck, New Jersey. Engineering Field Activity Northeast, Naval Facilities Engineering Command. September.

Navy, 2004e. Final Proposed Plan for Site 26 PCE Plume (OU 7), Naval Weapons Station Earle, Colts Neck, New Jersey. Engineering Field Activity Northeast, Naval Facilities Engineering Command. September.

Navy, 2005. NWS Earle Installation Restoration Program, Site Summary - January 2005, Engineering Field Activity Northeast. January.

Navy, 2006. Record of Decision Operable Unit 6 (OU 6) Sites 3 and 10, Naval Weapons Station Earle, Colts Neck, New Jersey. Naval Facilities Engineering Command Mid-Atlantic. August.

Navy, 2007a. Record of Decision Site 26 PCE Plume Operable Unit 7 (OU 7), Naval Weapons Station Earle, Colts Neck, New Jersey. Naval Facilities Engineering Command Mid-Atlantic. January.

Navy, 2007b. Record of Decision Site 6, 12, 15, and 17 Operable Unit 9 (OU 9), Naval Weapons Station Earle, Colts Neck, New Jersey. Naval Facilities Engineering Command Mid-Atlantic. September.

Navy, 2010. Record of Decision Site 7 Operable Unit 10 (OU 10), Naval Weapons Station Earle, Colts Neck, New Jersey. Naval Facilities Engineering Command. September.

NEESA (Naval Energy and Environmental Support Activity), 1992. Addendum to the Preliminary Assessment (Initial Assessment Study) of Naval Weapons Station Earle, Colts Neck, New Jersey. NEESA 13-020A. Port Hueneme, California. July.

NFESC (Naval Facilities Engineering Service Center), 1996. Site Characterization and Analysis Penetrometer System, Site Characterization at Naval Weapons Station Earle, Colts Neck, New Jersey, Site 16/F (SSR-2187-ENV). Port Hueneme, California. May.

NJDEP (New Jersey Department of Environmental Protection), 1992. June 17, 1992 Closure Certifications for the Two Thousand (2,000) Gallon Waste Oil Storage Tank Located West of Building C-14, Naval Weapons Station Earle, Federal Enclave Located in Monmouth County. July.

REFERENCES (Continued)

NJDEP, 2003. Preliminary Assessment/Site Investigation Report for Sites 47 and 48, Naval Weapons Station Earle, Colts Neck Township, Monmouth County. June.

NJDEP, 2004. Final Closeout Report for Removal of Mine Actuators - Site 48, Naval Weapons Station Earle, Colts Neck, New Jersey. September.

Stewart, James M., 1995. Survey Report - Sampling Locations - NWS Earle - Colts Neck, New Jersey, November.

TtFW (Tetra Tech FW, Inc.), 2004. Final Closeout Report for Removal of Mine Actuators at Site 48 at Naval Weapons Station Earle, Colts Neck, New Jersey. Langhorne, Pennsylvania. July.

Tetra Tech (Tetra Tech NUS, Inc.), 2000a. Feasibility Study for Sites 3 and 10 (OU-6), Naval Weapons Station Earle, Colts Neck, New Jersey. September.

Tetra Tech 2000b. Naval Weapons Station Earle Wayside Area Work Plan. November.

Tetra Tech, 2000c. Feasibility Study for Site 13 (OU-5), Naval Weapons Station Earle, Colts Neck, New Jersey. King of Prussia, Pennsylvania. December.

Tetra Tech, 2003a. First Five-Year Review Report, Naval Weapons Station Earle, Colts Neck, New Jersey. King of Prussia, Pennsylvania. February.

Tetra Tech, 2003b. Feasibility Study for Sites 1 and 11 (OU 8), Naval Weapons Station Earle, Colts Neck, New Jersey. King of Prussia, Pennsylvania. March.

Tetra Tech, 2003c. Technical Memorandum: Extent of Groundwater Contamination at Site 26 Operable Unit 3 (OU 3), Naval Weapons Station Earle, Colts Neck, New Jersey. King of Prussia, Pennsylvania. March.

Tetra Tech, 2003d. Feasibility Study for Sites 6, 12, 15, and 17 (OU 9), Naval Weapons Station Earle, Colts Neck, New Jersey. King of Prussia, Pennsylvania. November.

Tetra Tech, 2004. Feasibility Study for Site 26 PCE Plume (OU 7), Naval Weapons Station Earle, Colts Neck, New Jersey. King of Prussia, Pennsylvania. February.

REFERENCES (Continued)

Tetra Tech, 2005. Operation and Maintenance User Manual for Site 13 – Defense Property Disposal Office Yard (OU 5). Naval Weapons Station Earle. King of Prussia, Pennsylvania. June.

Tetra Tech, 2006. Site Management Plan for Fiscal Years 2006 through 2010, Petroleum, Oil, and Lubricant Sites located within the Northeast Integrated Process Team (IPT) Area of Responsibility. King of Prussia, Pennsylvania. December.

Tetra Tech, 2007. Site Management Plan for Fiscal Years 2007 through 2011 (Draft), Naval Weapons Station Earle. King of Prussia, Pennsylvania. March.

Tetra Tech, 2008a. Sparge System Operation Evaluation, Operable Unit 3 (OU 3) Site 26, Naval Weapons Station Earle. King of Prussia, Pennsylvania. April.

Tetra Tech, 2008b. Second Five-Year Review Report, Naval Weapons Station Earle. King of Prussia, Pennsylvania. July.

Tetra Tech, 2008c. Feasibility Study for Site 7 Landfill South of “P” Barricades (OU 10). King of Prussia, Pennsylvania. July.

Tetra Tech, 2008d. Submission of Responses to EPA Comments on the Final Second Five-Year Review Report. King of Prussia, Pennsylvania. July.

Tetra Tech, 2009a. Technical Memorandum: Evaluation of Long Term Groundwater Monitoring at Site 19, Paint Chip and Sludge Disposal Area, Operable Unit 2 (OU 2).

Tetra Tech, 2009b. Site 1 Groundwater Sampling Report (Draft). King of Prussia, Pennsylvania. September.

Tetra Tech, 2009c. Groundwater Sampling Report, Site 7 Landfill South of “P” Barricades. King of Prussia, Pennsylvania. September.

Tetra Tech, 2009d. Bioslurper Optimization Report for LNAPL Recovery at Site 16/F – Buildings C-17/20/16/50. King of Prussia, Pennsylvania. September.

REFERENCES (Continued)

Tetra Tech, 2010a. Technical Memorandum: Site 7-Landfill South of "P" Barricades (OU 10) and Evaluation of Soil Cover. King of Prussia, Pennsylvania. May.

Tetra Tech, 2010b. Sampling and Analysis Plan for Groundwater Sampling at Site 6-Landfill West of Normandy Road and Site 17-Disposal Site Behind Training Barge. King of Prussia, Pennsylvania. September.

Weston (Roy F. Weston, Inc.), 1986. Confirmation Study to Determine Existence and Possible Migration of Specific Chemicals in Situ, Naval Weapons Station Earle, Colts Neck, New Jersey. December.

Weston, 1991. SI Report, Site 8, Naval Weapons Station Earle, Colts Neck, New Jersey. West Chester, Pennsylvania. October.

Weston, 1993. Installation Restoration Program, Remedial Investigation/Feasibility Study for 11 Sites at Naval Weapons Station Earle, Colts Neck, NJ. West Chester, Pennsylvania. September.

Weston, 1994. Installation Restoration Program, Site Investigation for 16 Sites at Naval Weapons Station Earle, Colts Neck, New Jersey. West Chester, Pennsylvania. January.

TABLES

TABLE 2-1
ENVIRONMENTAL RESTORATION PROGRAM SITES
NAVAL WEAPONS STATION EARLE
2010-2014 SITE MANAGEMENT PLAN
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SITE NUMBER	SITE NAME	LOCATION	OPERABLE UNIT	CURRENT STATUS
1	Former Ordnance Demilitarization Site	Mainside	8	ROD signed 2005; Five-Year Review completed 2008; LUCs to be implemented. Replacement monitoring wells installed August 2010.
2	Active Ordnance Demilitarization Site	Mainside	-	Currently addressed under RCRA Program Subpart X. Ongoing monitoring.
3	Landfill Southwest of "F" Group	Mainside	6	LUCs implemented 2004; ROD signed 2006; Five-Year Review completed 2008; Ongoing monitoring.
4	Landfill West of "D" Group	Mainside	1	ROD signed 1997; Cap completed 1998; Five-Year Review completed 2008; Ongoing monitoring.
5	Landfill West of Army Barricades	Mainside	1	ROD signed 1997; Cap completed 1998; Five-Year Review completed 2008; Ongoing monitoring.
6	Landfill West of Normandy Road	Waterfront	9	ROD signed 2007; Soil Cover and Slope Stabilization completed 1999; Five-Year Review completed 2008; LUCs and groundwater monitoring to be implemented.
7	Landfill South of "P" Barricades	Waterfront	10	FS completed 2008; PRAP finalized August 2010. ROD Pending
9	Landfill Southeast of "P" Barricades	Waterfront	Not Assigned	FS to be prepared.
10	Scrap Metal Landfill (Near Building 589)	Mainside	6	Cap completed 2003; LUCs implemented 2004; ROD signed 2006; Five-Year Review completed 2008; Ongoing monitoring.
11	Contract Ordnance Disposal Area	Mainside	8	No Further Action Site. ROD signed 2005.
12	Battery Acid Spill Site (i.e., Battery Storage Area)	Waterfront	9	Soil excavation completed 1999; CERCLA Close-Out Report 1999; ROD (No Further Action) signed 2007.
13	Defense Property Disposal Office Yard	Mainside	5	ROD signed 2004; Cap completed 2005; Five-Year Review completed 2008; LUCs to be implemented; Ongoing monitoring.
14	Defense Property Disposal Office Warehouse (Mercury Spill Area)	Mainside	4	ROD (No Further Action) signed 1999.
15	Sludge Disposal Area (Near Waterfront South Gate)	Waterfront	9	ROD signed 2007; Five-Year Review completed 2008; LUCs to be implemented.

TABLE 2-1
ENVIRONMENTAL RESTORATION PROGRAM SITES
NAVAL WEAPONS STATION EARLE
2010-2014 SITE MANAGEMENT PLAN
PAGE 2 of 2

SITE NUMBER	SITE NAME	LOCATION	OPERABLE UNIT	CURRENT STATUS
16/F	Building C-50 Diesel Fuel Line/EPIC Site F	Mainside	-	Currently addressed under NJDEP UST Program.
17	Disposal Site Behind Training Barge	Waterfront	9	ROD signed 2007; Five-Year Review completed 2008; LUCs to be implemented.
19	Paint Chip and Sludge Disposal Site	Mainside	2	ROD signed 1997; Remedial Action completed 1998; Five-Year Review completed 2008; Ongoing monitoring.
20	Grit Blast Disposal Site (Near Building 544)	Mainside	4	ROD signed 1999; LUCs implemented 1999; Five-Year Review completed 2008.
22	Paint Sludge Disposal (Building D-2)	Mainside	4	ROD (No Further Action) signed 1999.
23	Paint Sludge Disposal (Building D-5)	Mainside	4	ROD signed 1999; LUCs implemented 1999; Five-Year Review completed 2008.
24	Closed Pistol Range	Mainside	4	ROD (No Further Action) signed 1999.
25	Closed Pistol Range	Mainside	4	ROD (No Further Action) signed 1999.
26	Explosive "D" Washout Area	Mainside	3 and 7	OU3 ROD signed 1998; Remedial Action ongoing. OU7 ROD signed 2007; LUCs to be implemented.
27	Projectiles Refurbishing Area	Mainside	4	ROD signed 1999; LUCs implemented 1999; Five-Year Review completed 2008.
29	PCB Spill Site	Mainside	4	ROD (No Further Action) signed 1999.
L (Site 41)	MSC Van Parking Area (EPIC Site L)	Mainside	Not Assigned	FS to be prepared.
Q (Site 46)	Fire Fighting School (EPIC Site Q)	Mainside	Not Assigned	FS to be prepared.

NOTES:

- Site No. 8, Landfill East of Building S-186, required no further investigation/action (1994).
Site No. 18, Demilitarization Furnace, closed under RCRA (1995).
Site No. 21, Baghouse & Cyclone Dust Storage, closed under RCRA (1995).
Site No. 28, Waste Oil Tank West of Building C-14, closed under RCRA (1992).
Site No. 47, Pesticide Shop, Building S-86, was remediated and building demolished in 2000; no further action warranted (EPA, 2002; NJDEP, 2003).
Site No. 48, Mine Battery Site at West Pond Area, required no further action (2004).

TABLE 4-1

**SCHEDULE OF ACTIVITIES
2010 THROUGH 2014
FORMER ORDNANCE DEMILITARIZATION SITE, SITE 1 (OU8)
NAVAL WEAPONS STATION EARLE
SITE MANAGEMENT PLAN
PAGE 1 OF 1**

TASK	DATE	COMMENT
Record of Decision September 2004 (Signed 01/19/2005)		
Implement Institutional Controls		
<ul style="list-style-type: none"> Establish Groundwater CEA 	No Longer Required	Draft CEA Documentation submitted to NJDEP and EPA 09/26/05; received comments June 2008. In November 2009 NJDEP determined that a CEA is not required.
Long-Term Monitoring		
<ul style="list-style-type: none"> Groundwater Sampling 	July 2009	<u>Site 1 Groundwater Sampling Report (Draft)</u> (Tetra Tech, September 2009)
<ul style="list-style-type: none"> Installation of replacement monitoring wells 	August 2010	
<ul style="list-style-type: none"> Round 1 Groundwater Sampling and Reporting 	September 2010	
<ul style="list-style-type: none"> Round 2 Groundwater Sampling and Reporting 	Spring 2011	
<ul style="list-style-type: none"> Round 3 Groundwater Sampling 	TBD	
<ul style="list-style-type: none"> Round 4 Groundwater Sampling 	TBD	
Conduct Five-Year Reviews		
<ul style="list-style-type: none"> Site 1 was included in the Second Five-Year Review conducted by the Navy 	July 2008	<u>Second Five-Year Review Report (Tetra Tech, May 2008)</u> and <u>Submission of Responses to EPA Comments (Tetra Tech, July 2008)</u>
<ul style="list-style-type: none"> Five-Year Site Inspection 	2012	
<ul style="list-style-type: none"> Five-Year Review Report 	2013	

Dates in **bold** indicate task completion/report submittal date.

FY=Fiscal Year

*Base Master Plan or Similar Document in use at NWS Earle.

TABLE 4-2

**SCHEDULE OF ACTIVITIES
2010 THROUGH 2014
LANDFILL SOUTHWEST OF "F" GROUP, SITE 3 (OU 6)
NAVAL WEAPONS STATION EARLE
SITE MANAGEMENT PLAN
PAGE 1 OF 1**

TASK	DATE	COMMENT
Record of Decision August 2006 (Signed 08/15/2006)		
Construction of Landfill Cap	June 2003	
Implement Institutional Controls		
• Establish Groundwater CEA	TBD	
• Amend Base Master Plan*	2010	
Long-Term Monitoring		
• Operations & Maintenance Manual	June 2003	Long-term monitoring requirements were outlined in the <u>Operations & Maintenance Manual For OU6 (FWEC, June 2003)</u>
• Year 1 through 4 Groundwater Sampling and Reporting	2003 - 2006	
• Year 5 Groundwater Sampling and Reporting	October 2007	<u>Annual Maintenance and Monitoring Report for the Landfill Caps 3 & 10, Sites 4 & 5, Site 13, and Long-Term Monitoring for Site 19 (ECOR, July 2008)</u>
• Year 6 Groundwater Sampling and Reporting	October 2008	<u>Landfills 3, 4, 5, 10, 13 and Site 19, Annual 2008 Monitoring Report (ECOR, May 2009)</u>
• Year 7 Groundwater Sampling and Reporting	November 2009	<u>Annual Maintenance and Monitoring Report for the Landfill Caps 3 & 10, Sites 4 & 5, Site 13, and Long-Term Monitoring for Site 19, November 2009 (H&S Environmental, May 2010)</u>
• Year 8 Groundwater Sampling and Reporting	2010	
• Year 9 Groundwater Sampling and Reporting	2011	
• Year 10 Groundwater Sampling and Reporting	2012	
• Year 11 Groundwater Sampling and Reporting	2013	
• Year 12 Groundwater Sampling and Reporting	2014	
Interim Remedial Action Completion Report	TBD	
Conduct Five-Year Reviews		
• Site 3 was included in the First Five-Year Review conducted by the Navy	September 2004	<u>First Five-Year Review Report (Tetra Tech, September 2004)</u>
• Site 3 was included in the Second Five-Year Review conducted by the Navy	July 2008	<u>Second Five-Year Review Report (Tetra Tech, May 2008) and Submission of Responses to EPA Comments (Tetra Tech, July 2008)</u>
• Five-Year Site Inspection	2012	
• Five-Year Review Report	2013	

Dates in **bold** indicate task completion/report submittal date.

FY=Fiscal Year

*Base Master Plan or Similar Document in use at NWS Earle.

TABLE 4-3

**SCHEDULE OF ACTIVITIES
2010 THROUGH 2014
LANDFILL WEST OF "D" GROUP, SITE 4 (OU 1)
NAVAL WEAPONS STATION EARLE
SITE MANAGEMENT PLAN
PAGE 1 OF 1**

TASK	DATE	COMMENT
Record of Decision August 1997 (Signed 9/25/97)		
Construction of Landfill Cap	September 1999	<u>Final Report for the Closure of Site 4 and 5 Landfills (FWEC, 1999).</u>
Implement Institutional Controls		
• Establish Groundwater CEA	TBD	
• Amend Base Master Plan*	2010	
Long-Term Monitoring		
• Operations & Maintenance Manual	March 1999	<u>Operations & Maintenance Manual for the Site 4 and 5 Landfills (FWEC, March 1999).</u>
• Years 1 through 8 Groundwater Sampling and Reporting	July 1999 – July 2006	
• Year 9 Groundwater Sampling and Reporting	October 2007	<u>Annual Maintenance and Monitoring Report for the Landfill Caps 3 & 10, Sites 4 & 5, Site 13, and Long-Term Monitoring for Site 19 (ECOR, July 2008)</u>
• Year 10 Groundwater Sampling and Reporting	October 2008	<u>Landfills 3, 4, 5, 10, 13 and Site 19, Annual 2008 Monitoring Report (ECOR, May 2009)</u>
• Year 11 Groundwater Sampling and Reporting	November 2009	<u>Annual Maintenance and Monitoring Report for the Landfill Caps 3 & 10, Sites 4 & 5, Site 13, and Long-Term Monitoring for Site 19, November 2009 (H&S Environmental, May 2010)</u>
• Year 12 Groundwater Sampling and Reporting	2010	
• Year 13 Groundwater Sampling and Reporting	2011	
• Year 14 Groundwater Sampling and Reporting	2012	
• Year 15 Groundwater Sampling and Reporting	2013	
• Year 16 Groundwater Sampling and Reporting	2014	
Conduct Five-Year Reviews		
• Site 4 was included in the First Five-Year Review conducted by the Navy	September 2004	<u>First Five-Year Review Report (Tetra Tech, September 2004)</u>
• Site 4 was included in the Second Five-Year Review conducted by the Navy	July 2008	<u>Second Five-Year Review Report (Tetra Tech, May 2008) and Submission of Responses to EPA Comments (Tetra Tech, July 2008)</u>
• Five-Year Site Inspection	2012	
• Five-Year Review Report	2013	

Dates in **bold** indicate task completion/report submittal date.

FY=Fiscal Year

*Base Master Plan or Similar Document in use at NWS Earle.

TABLE 4-4

**SCHEDULE OF ACTIVITIES
2010 THROUGH 2014
LANDFILL WEST OF ARMY BARRICADES, SITE 5 (OU 1)
NAVAL WEAPONS STATION EARLE
SITE MANAGEMENT PLAN
PAGE 1 OF 1**

TASK	DATE	COMMENT
Record of Decision August 1997 (Signed 9/25/97)		
Construction of Landfill Cap	September 1999	<u>Final Report for the Closure of Site 4 and 5 Landfills (FWEC, 1999).</u>
Implement Institutional Controls		
• Establish Groundwater CEA	TBD	
• Amend Base Master Plan*	2010	
Long-Term Monitoring		
• Operations & Maintenance Manual	March 1999	<u>Operations & Maintenance Manual for the Site 4 and 5 Landfills (FWEC, March 1999).</u>
• Years 1 through 8 Groundwater Sampling and Reporting	July 1999 – July 2006	
• Year 9 Groundwater Sampling and Reporting	October 2007	<u>Annual Maintenance and Monitoring Report for the Landfill Caps 3 & 10, Sites 4 & 5, Site 13, and Long-Term Monitoring for Site 19 (ECOR, July 2008)</u>
• Year 10 Groundwater Sampling and Reporting	October 2008	<u>Landfills 3, 4, 5, 10, 13 and Site 19, Annual 2008 Monitoring Report (ECOR, May 2009)</u>
• Year 11 Groundwater Sampling and Reporting	November 2009	<u>Annual Maintenance and Monitoring Report for the Landfill Caps 3 & 10, Sites 4 & 5, Site 13, and Long-Term Monitoring for Site 19, November 2009 (H&S Environmental, May 2010)</u>
• Year 12 Groundwater Sampling and Reporting	2010	
• Year 13 Groundwater Sampling and Reporting	2011	
• Year 14 Groundwater Sampling and Reporting	2012	
• Year 15 Groundwater Sampling and Reporting	2013	
• Year 16 Groundwater Sampling and Reporting	2014	
Conduct Five-Year Reviews		
• Site 5 was included in the First Five-Year Review conducted by the Navy	September 2004	<u>First Five-Year Review Report (Tetra Tech, September 2004)</u>
• Site 5 was included in the Second Five-Year Review conducted by the Navy	July 2008	<u>Second Five-Year Review Report (Tetra Tech, May 2008) and Submission of Responses to EPA Comments (Tetra Tech, July 2008)</u>
• Five-Year Site Inspection	2012	
• Five-Year Review Report	2013	

Dates in **bold** indicate task completion/report submittal date.

*Base Master Plan or Similar Document in use at NWS Earle.

TABLE 4-5

**SCHEDULE OF ACTIVITIES
FISCAL YEARS 2010 THROUGH 2014
LANDFILL WEST OF NORMANDY ROAD, SITE 6 (OU 9)
NAVAL WEAPONS STATION EARLE
SITE MANAGEMENT PLAN
PAGE 1 OF 1**

TASK	DATE	COMMENT
Record of Decision September 2007		
Slope and Cover Stabilization	1999	
Feasibility Study	November 2003	
Proposed Plan	September 2004	
Implement Land Use Controls		
<ul style="list-style-type: none"> • Establish Groundwater CEA 	TBD	Draft CEA Documentation submitted to NJDEP and EPA 07/24/06; NJDEP comments received June 2008. Need for a CEA to be determined based on results from groundwater sampling to be conducted in 2010 and 2011
<ul style="list-style-type: none"> • Amend Base Master Plan* 	2010	
<ul style="list-style-type: none"> • Fencing and Signage 	2010-2011	
Long-Term Monitoring		
<ul style="list-style-type: none"> • Groundwater Sampling and Analysis Plan 	September 2010	<u>Sampling and Analysis Plan for Groundwater Sampling at Site 6-Landfill West of Normandy Road and Site 17-Disposal Site Behind Training Barge (Tetra Tech, 2010)</u>
<ul style="list-style-type: none"> • Round 1 Groundwater Sampling and Reporting 	2010 (Pending Approval)	
<ul style="list-style-type: none"> • Round 2 Groundwater Sampling and Reporting 	2011	
Interim Remedial Action Completion Report	TBD	
Conduct Five-Year Reviews		
<ul style="list-style-type: none"> • Site 6 was included in the Second Five-Year Review conducted by the Navy 	July 2008	<u>Second Five-Year Review Report (Tetra Tech, May 2008) and Submission of Responses to EPA Comments (Tetra Tech, July 2008)</u>
<ul style="list-style-type: none"> • Five-Year Review Inspection 	2012	
<ul style="list-style-type: none"> • Five-Year Review Report 	2013	

Dates in **bold** indicate task completion/report submittal date.

FY=Fiscal Year

*Base Master Plan or Similar Document in use at NWS Earle.

TABLE 4-6

SCHEDULE OF ACTIVITIES
FISCAL YEARS 2010 THROUGH 2014
LANDFILL SOUTH OF "P" BARRICADES, SITE 7 (OU 10)
NAVAL WEAPONS STATION EARLE
SITE MANAGEMENT PLAN
PAGE 1 OF 1

TASK	DATE	COMMENT
Final IAS Study	February 1983	
Phase I Site Inspection/IRP Phase II Confirmation Study		
Phase II Site Inspection		
RI Completed	July 1996	
Groundwater Sampling	April 2005	Email – Tetra Tech to NJDEP dated August 10, 2005
Feasibility Study		
<ul style="list-style-type: none"> • Final FS Report 	July 2008	<u>Feasibility Study for Site 7 Landfill South of "P" Barricades (OU 10) (Tetra Tech, 2008)</u>
Groundwater Sampling	July 2009	<u>Groundwater Sampling Report, Site 7 Landfill South of "P" Barricades (Tetra Tech, September 2009)</u>
Proposed Remedial Action Plan	August 2010	
Public Meeting	September 14, 2010	
Public Review Period	August 20, 2010 - September 19, 2010	
ROD	September 2010	Signature Pending

Dates in **bold** indicate task completion/report submittal date.

TABLE 4-7

**SCHEDULE OF ACTIVITIES
2010 THROUGH 2014
SCRAP METAL LANDFILL (NEAR BLDG. 589), SITE 10 (OU6)
NAVAL WEAPONS STATION EARLE
SITE MANAGEMENT PLAN
PAGE 1 OF 1**

TASK	DATE	COMMENT
OU6 Record of Decision August 2006 (Signed 08/15/2006)		
Construction of Landfill Cap	June 2003	
Implement Institutional Controls		
• Establish Groundwater CEA	TBD	
• Amend Base Master Plan*	2010	
Long-Term Monitoring		
• Operations & Maintenance Manual	2003	<u>Operations & Maintenance Manual For OU6 (FWEC, June 2003)</u>
• Year 1 Groundwater Sampling and Reporting	2004	<u>Groundwater Sampling Report, July 2004</u> <u>Sampling Event for Sites 3 and 10, Operable Unit 6 (ECOR, February 2005)</u>
• Year 2 Groundwater Sampling and Reporting	2005	<u>Annual Long Term Monitoring Report for the 2005 Sampling Event at Landfills 3, 4, 5, and 10, and Site 19 (ECOR, August 2006)</u>
• Year 3 Groundwater Sampling and Reporting	2006	<u>Annual Maintenance and Monitoring Report – Annual 2006 Event (ECOR, July 2007)</u>
• Year 4 Groundwater Sampling and Reporting	2007	<u>Annual Maintenance and Monitoring Report for the Landfill Caps 3 & 10, Sites 4 & 5, Site 13, and Long-Term Monitoring for Site 19 (ECOR, July 2008)</u>
• Year 5 Groundwater Sampling and Reporting	2008	<u>Landfills 3, 4, 5, 10, 13 and Site 19, Annual 2008 Monitoring Report (ECOR, May 2009)</u>
• Year 6 Groundwater Sampling and Reporting	2009	<u>Annual Maintenance and Monitoring Report for the Landfill Caps 3 & 10, Sites 4 & 5, Site 13, and Long-Term Monitoring for Site 19, November 2009 (H&S Environmental, May 2010)</u>
• Year 7 Groundwater Sampling and Reporting	2010	
• Year 8 Groundwater Sampling and Reporting	2011	
• Year 9 Groundwater Sampling and Reporting	2012	
• Year 10 Groundwater Sampling and Reporting	2013	
• Year 11 Groundwater Sampling and Reporting	2014	
Conduct Five-Year Reviews		
• Site 10 was included in the Second Five-Year Review conducted by the Navy	July 2008	<u>Second Five-Year Review Report (Tetra Tech, May 2008) and Submission of Responses to EPA Comments (Tetra Tech, July 2008)</u>
• Five-Year Site Inspection	2012	
• Five-Year Review Report	2013	

Dates in **bold** indicate task completion/report submittal date.

FY=Fiscal Year.

*Base Master Plan or Similar Document in use at NWS Earle.

TABLE 4-8

**SCHEDULE OF ACTIVITIES
2010 THROUGH 2014
DEFENSE PROPERTY DISPOSAL OFFICE YARD, SITE 13 (OU5)
NAVAL WEAPONS STATION EARLE
SITE MANAGEMENT PLAN
PAGE 1 OF 1**

TASK	DATE	COMMENT
OU5 Record of Decision July 2004 (Signed 9/22/04)		
Construction of Landfill Cap System	2005	
Implement Institutional Controls		
<ul style="list-style-type: none"> • Establish Groundwater CEA 	TBD	Draft CEA Documentation submitted to NJDEP and EPA 08/24/05; NJDEP comments received June 2008.
<ul style="list-style-type: none"> • Amend Base Master Plan* 	2010	
Long-Term Monitoring		
<ul style="list-style-type: none"> • Operation and Maintenance Manual 	2008	<u>Operation and Maintenance User Manual, Site 13- Defense Property Disposal Office Yard (Tetra Tech, October 2008)</u>
<ul style="list-style-type: none"> • Year 1 Groundwater Sampling and Reporting 	November 2006	<u>Annual Maintenance and Monitoring Report – Annual 2006 Event (ECOR, July 2007)</u>
<ul style="list-style-type: none"> • Year 2 Groundwater Sampling and Reporting 	October 2007	<u>Annual Maintenance and Monitoring Report for the Landfill Caps 3 & 10, Sites 4 & 5, Site 13, and Long-Term Monitoring for Site 19, Annual 2007 Event (ECOR, July 2008)</u>
<ul style="list-style-type: none"> • Year 3 Groundwater Sampling and Reporting 	October 2008	<u>Landfills 3, 4, 5, 10, 13 and Site 19, Annual 2008 Monitoring Report (ECOR, May 2009)</u>
<ul style="list-style-type: none"> • Year 4 Groundwater Sampling and Reporting 	November 2009	<u>Annual Maintenance and Monitoring Report for the Landfill Caps 3 & 10, Sites 4 & 5, site 13, and Long-Term Monitoring for Site 19, November 2009 (H&S Environmental, May 2010)</u>
<ul style="list-style-type: none"> • Year 5 Groundwater Sampling and Reporting 	2010	
<ul style="list-style-type: none"> • Year 6 Groundwater Sampling and Reporting 	2011	
<ul style="list-style-type: none"> • Year 7 Groundwater Sampling and Reporting 	2012	
<ul style="list-style-type: none"> • Year 8 Groundwater Sampling and Reporting 	2013	
<ul style="list-style-type: none"> • Year 9 Groundwater Sampling and Reporting 	2014	
Conduct Five-Year Reviews		
<ul style="list-style-type: none"> • Site 13 was included in the Second Five-Year Review conducted by the Navy 	July 2008	<u>Second Five-Year Review Report (Tetra Tech, May 2008) and Submission of Responses to EPA Comments (Tetra Tech, July 2008)</u>
<ul style="list-style-type: none"> • Five-Year Site Inspection 	2012	
<ul style="list-style-type: none"> • Five-Year Review Report 	2013	

Dates in **bold** indicate task completion/report submittal date.

*Base Master Plan or Similar Document in use at NWS Earle.

TABLE 4-9

SCHEDULE OF ACTIVITIES
2010 THROUGH 2014
SLUDGE DISPOSAL AREA, SITE 15 (OU9)
NAVAL WEAPONS STATION EARLE
SITE MANAGEMENT PLAN
PAGE 1 OF 1

TASK	DATE	COMMENT
OU9 Record of Decision September 2007		
Feasibility Study	November 2003	
Proposed Plan	September 2004	
Implement Institutional Controls		
• Prepare Survey Plat	2012	
• Amend Base Master Plan*	2010	
• Fencing and Signage	2010	
Long-Term Monitoring		
• Operation and Maintenance Manual	2010	
• First Soil Sampling Event and Reporting	2012	
Interim Remedial Action Completion Report	TBD	
Conduct Five-Year Reviews		
• Site 15 was included in the Second Five-Year Review conducted by the Navy	July 2008	<u>Second Five-Year Review Report (Tetra Tech, May 2008) and Submission of Responses to EPA Comments (Tetra Tech, July 2008)</u>
• Five-Year Site Inspection	2012	
• Five-Year Review Report	2013	

Dates in **bold** indicate task completion/report submittal date.

FY=Fiscal Year

*Base Master Plan or Similar Document in use at NWS Earle.

TABLE 4-10

**SCHEDULE OF ACTIVITIES
2010 THROUGH 2014
DISPOSAL SITE BEHIND TRAINING BARGE, SITE 17 (OU9)
NAVAL WEAPONS STATION EARLE
SITE MANAGEMENT PLAN
PAGE 1 OF 1**

TASK	DATE	COMMENT
OU9 Record of Decision September 2007		
Grading and Topsoil Placement	1999	
Implement Land Use Controls		
<ul style="list-style-type: none"> • Establish Groundwater CEA 	TBD	Need for a CEA to be determined based on results of groundwater sampling to be conducted in 2010 and 2011.
<ul style="list-style-type: none"> • Amend Base Master Plan* 	2010	
<ul style="list-style-type: none"> • Fencing and Signage 	TBD	
Long-Term Monitoring		
Groundwater Sampling and Analysis Plan	September 2010	<u>Sampling and Analysis Plan for Groundwater Sampling at Site 6-Landfill West of Normandy Road and Site 17-Disposal Site Behind Training Barge (Tetra Tech, 2010)</u>
<ul style="list-style-type: none"> • Round 1 Groundwater Sampling and Reporting 	2010 (Pending Approval)	
<ul style="list-style-type: none"> • Round 2 Groundwater Sampling and Reporting 	2011	
Interim Remedial Action Completion Report	TBD	
Conduct Five-Year Reviews		
<ul style="list-style-type: none"> • Site 17 was included in the Second Five-Year Review conducted by the Navy 	July 2008	<u>Second Five-Year Review Report (Tetra Tech, May 2008) and Submission of Responses to EPA Comments (Tetra Tech, July 2008)</u>
<ul style="list-style-type: none"> • Five-Year Site Inspection 	2012	
<ul style="list-style-type: none"> • Five-Year Review Report 	2013	

Dates in **bold** indicate task completion/report submittal date.

FY=Fiscal Year

*Base Master Plan or Similar Document in use at NWS Earle.

TABLE 4-11

**SCHEDULE OF ACTIVITIES
2010 THROUGH 2014
PAINT CHIP AND SLUDGE DISPOSAL SITE, SITE 19 (OU2)
NAVAL WEAPONS STATION EARLE
SITE MANAGEMENT PLAN
PAGE 1 OF 1**

TASK	DATE	COMMENT
OU2 Record of Decision August 1997 (Signed 9/25/97)		
Excavation and Off-Site Disposal Completed	July 1998	<u>Site 19 Close-Out Report (FWEC 1998).</u>
Implement Institutional Controls		
• Establish Groundwater CEA	Ongoing	<u>Technical Memorandum: Evaluation of Long Term Groundwater Monitoring at Site 19 (Tetra Tech, 2009)</u>
• Amend Base Master Plan*	2010	
Long-Term Monitoring		
• Long-Term Monitoring Work Plan for Site 19	2001	<u>Final Long-Term Monitoring Work Plan for Ground Water, Surface Water, and Sediment at Site 19, NWS Earle (EA, 2001).</u>
• Year 1 Groundwater Sampling and Reporting	May 2001 –February 2002	Quarterly sampling conducted.
• Years 2 through 6 Groundwater Sampling and Reporting	October 2002 through October 2006	Sampling frequency reduced to annual (Reference: EPA Letter dated 10/24/2002).
• Year 7 Groundwater Sampling and Reporting	October 2007/February 2008	<u>Annual Maintenance and Monitoring Report for the Landfill Caps 3 & 10, Sites 4 & 5, Site 13, and Long-Term Monitoring for Site 19, Annual 2007 Event (ECOR, July 2008)</u>
• Year 8 Groundwater Sampling and Reporting	October 2008	<u>Landfills 3, 4, 5, 10, 13, and Site 19, Annual 2008 Monitoring Report (ECOR, May 2009)</u>
• Year 9 Groundwater Sampling and Reporting	November 2009	<u>Annual Maintenance and Monitoring Report for the Landfill Caps 3 & 10, Sites 4 & 5, Site 13, and Long-Term Monitoring for Site 19, November 2009 (H&S Environmental, May 2010)</u>
• Year 10 Groundwater Sampling and Reporting	2010	
• Year 11 Groundwater Sampling and Reporting	2011	
• Year 12 Groundwater Sampling and Reporting	2012	
• Year 13 Groundwater Sampling and Reporting	2013	
• Year 14 Groundwater Sampling and Reporting	2014	
Conduct Five-Year Reviews		
• Site 19 was included in the First Five-Year Review conducted by the Navy	September 2004	<u>First Five-Year Review Report (Tetra Tech, September 2004)</u>
• Site 19 was included in the Second Five-Year Review conducted by the Navy	July 2008	<u>Second Five-Year Review Report (Tetra Tech, May 2008) and Submission of Responses to EPA Comments (Tetra Tech, July 2008)</u>
• Five-Year Site Inspection	2012	
• Five-Year Review Report	2013	

Dates in **bold** indicate task completion/report submittal date.

*Base Master Plan or Similar Document in use at NWS Earle.

TABLE 4-12

SCHEDULE OF ACTIVITIES
2010 THROUGH 2014
GRIT BLASTING AREA AT BUILDING 544, SITE 20 (OU 4)
NAVAL WEAPONS STATION EARLE
SITE MANAGEMENT PLAN
PAGE 1 OF 1

TASK	DATE	COMMENT
Record of Decision September 1999		
Implement Institutional controls		
• Amend Base Master Plan	August 1999	
Conduct Five-Year Reviews		
• Site 20 was included in the Second Five-Year Review conducted by the Navy	July 2008	<u>Second Five-Year Review Report (Tetra Tech, May 2008) and Submission of Responses to EPA Comments (Tetra Tech, July 2008)</u>
• Five-Year Site Inspection	2012	
• Five-Year Review Report	2013	

Dates in **bold** indicate task completion/report submittal date.

TABLE 4-13

SCHEDULE OF ACTIVITIES
2010 THROUGH 2014
PAINT DISPOSAL AREA, SITE 23 (OU 4)
NAVAL WEAPONS STATION EARLE
SITE MANAGEMENT PLAN
PAGE 1 OF 1

TASK	DATE	COMMENT
Record of Decision September 1999		
Implement Institutional controls		
• Amend Base Master Plan	August 1999	
Conduct Five-Year Reviews		
• Site 23 was included in the Second Five-Year Review conducted by the Navy	July 2008	<u>Second Five-Year Review Report (Tetra Tech, May 2008) and Submission of Responses to EPA Comments (Tetra Tech, July 2008)</u>
• Groundwater Sampling and Analysis	November 2010	<u>Sampling and Analysis Plan for Site 23 Groundwater Sampling (Tetra Tech, July 2010)</u>
• Five-Year Site Inspection	2012	
• Five-Year Review Report	2013	

Dates in **bold** indicate task completion/report submittal date.

TABLE 4-14

**SCHEDULE OF ACTIVITIES
2010 THROUGH 2014
EXPLOSIVE "D" WASHOUT AREA, SITE 26 (OU3 and OU7)
NAVAL WEAPONS STATION EARLE
SITE MANAGEMENT PLAN
PAGE 1 OF 1**

TASK	DATE	COMMENT
OU3 Record of Decision August 1998 (Signed September 1998) OU7 Record of Decision January 2007 (Signed August 2007)		
Leach Tank & Soil Removal	1998	<u>Site 26 Close-Out Report (FWEC, 1998)</u>
AS/SVE Construction, Operation, and Monitoring	2000 – Present Post-Operation Monitoring 2007, 2008, 2010, 2011	<u>Operation & Maintenance Manual for AS/SVE, Operable Unit 3: Site 26 (FWEC, 2001)</u>
Implement Institutional Controls		
<ul style="list-style-type: none"> • Establish Groundwater CEA 	TBD	Draft CEA Documentation submitted to NJDEP and EPA 10/06/05; NJDEP comments received June 2008. A decision on the need for a CEA will be made after the 2011 round of post-operation groundwater sampling.
<ul style="list-style-type: none"> • Amend Base Master Plan* 	2010	
AS/SVE System Evaluation	April 2008	<u>Sparge System Operation Evaluation, Operable Unit 3: Site 26 (Tetra Tech, April 2008)</u>
Long-Term Monitoring		
<ul style="list-style-type: none"> • Groundwater Monitoring Work Plan 	TBD	
<ul style="list-style-type: none"> • Year 1 Groundwater Sampling and Reporting 	To be conducted following finalization of Work Plan.	
<ul style="list-style-type: none"> • Year 2 Groundwater Sampling and Reporting 	Within 12 months of Year 1.	
<ul style="list-style-type: none"> • Year 3 Groundwater Sampling and Reporting 	Within 12 months of Year 2.	
<ul style="list-style-type: none"> • Year 4 Groundwater Sampling and Reporting 	Within 12 months of Year 3.	
<ul style="list-style-type: none"> • Year 5 Groundwater Sampling and Reporting 	Within 12 months of Year 4.	
Interim Remedial Action Completion Report	TBD	
Conduct Five-Year Reviews		
<ul style="list-style-type: none"> • Site 26 (OU3) was included in the First Five-Year Review conducted by the Navy 	September 2004	<u>First Five-Year Review Report (Tetra Tech, 2004)</u>
<ul style="list-style-type: none"> • Site 26 (OU3 & OU7) was included in the Second Five-Year Review conducted by the Navy 	July 2008	<u>Second Five-Year Review Report (Tetra Tech, May 2008) and Submission of Responses to EPA Comments (Tetra Tech, 2008)</u>
<ul style="list-style-type: none"> • Five-Year Site Inspection 	2012	
<ul style="list-style-type: none"> • Five-Year Review Report 	2013	

Dates in **bold** indicate task completion/report submittal date.

*Base Master Plan or Similar Document in use at NWS Earle.

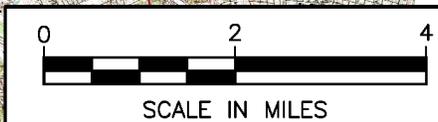
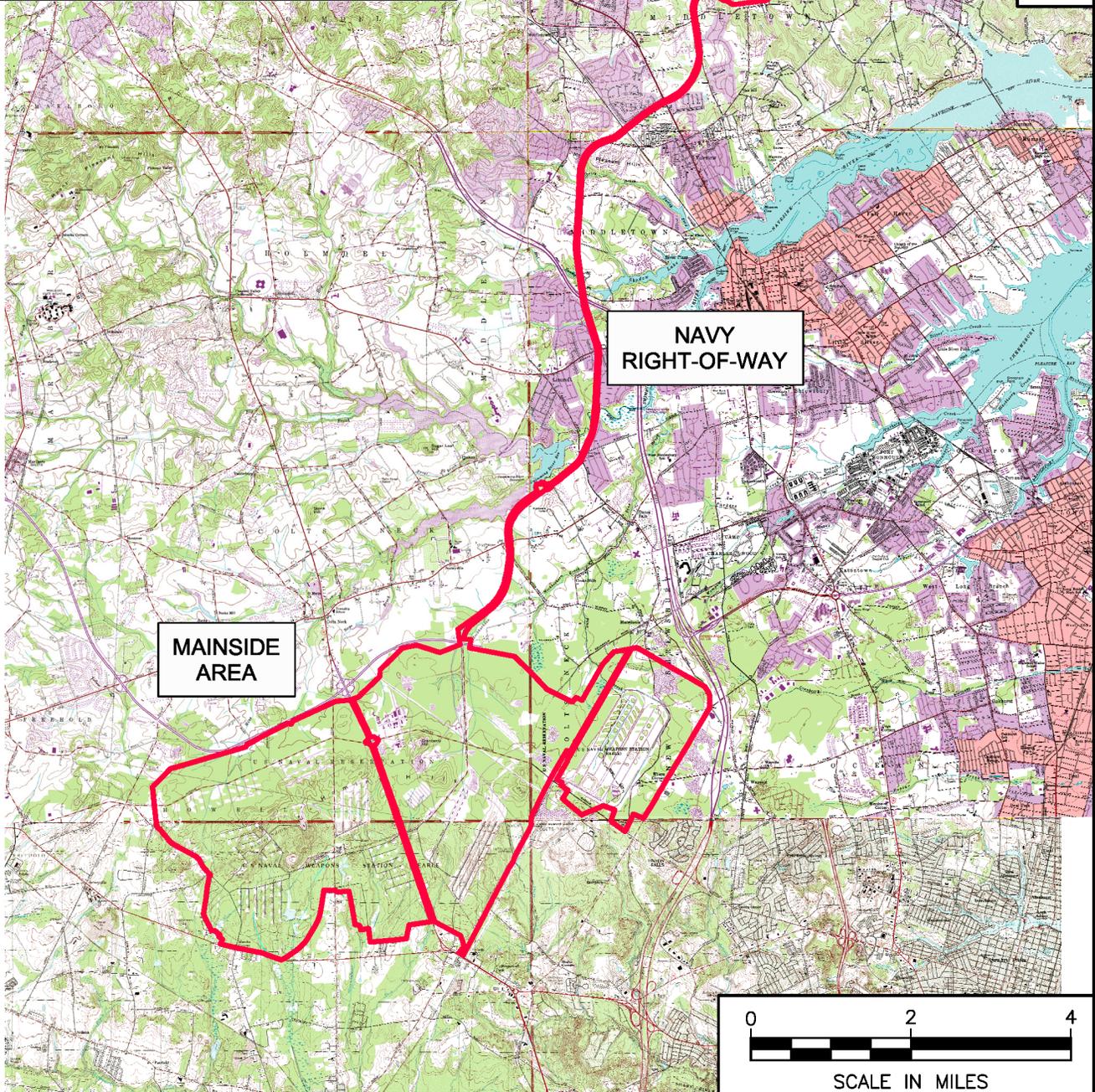
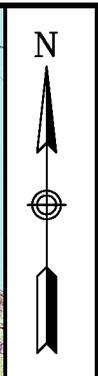
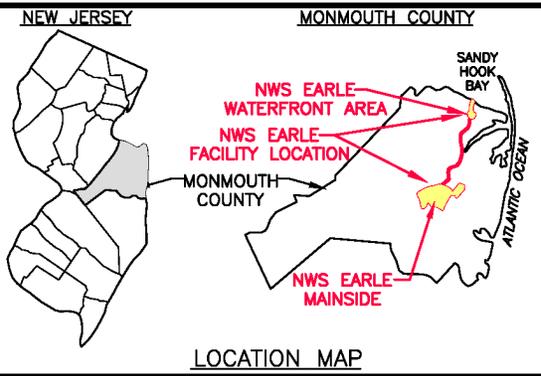
TABLE 4-15

SCHEDULE OF ACTIVITIES
2010 THROUGH 2014
PROJECTILE REFURBISHING AREA, SITE 27 (OU 4)
NAVAL WEAPONS STATION EARLE
SITE MANAGEMENT PLAN
PAGE 1 OF 1

TASK	DATE	COMMENT
Record of Decision September 1999		
Implement Institutional controls		
• Amend Base Master Plan	August 1999	
Conduct Five-Year Reviews		
• Site 27 was included in the Second Five-Year Review conducted by the Navy	July 2008	<u>Second Five-Year Review Report (Tetra Tech, May 2008) and Submission of Responses to EPA Comments (Tetra Tech, July 2008)</u>
• Five-Year Site Inspection	2012	
• Five-Year Review Report	2013	

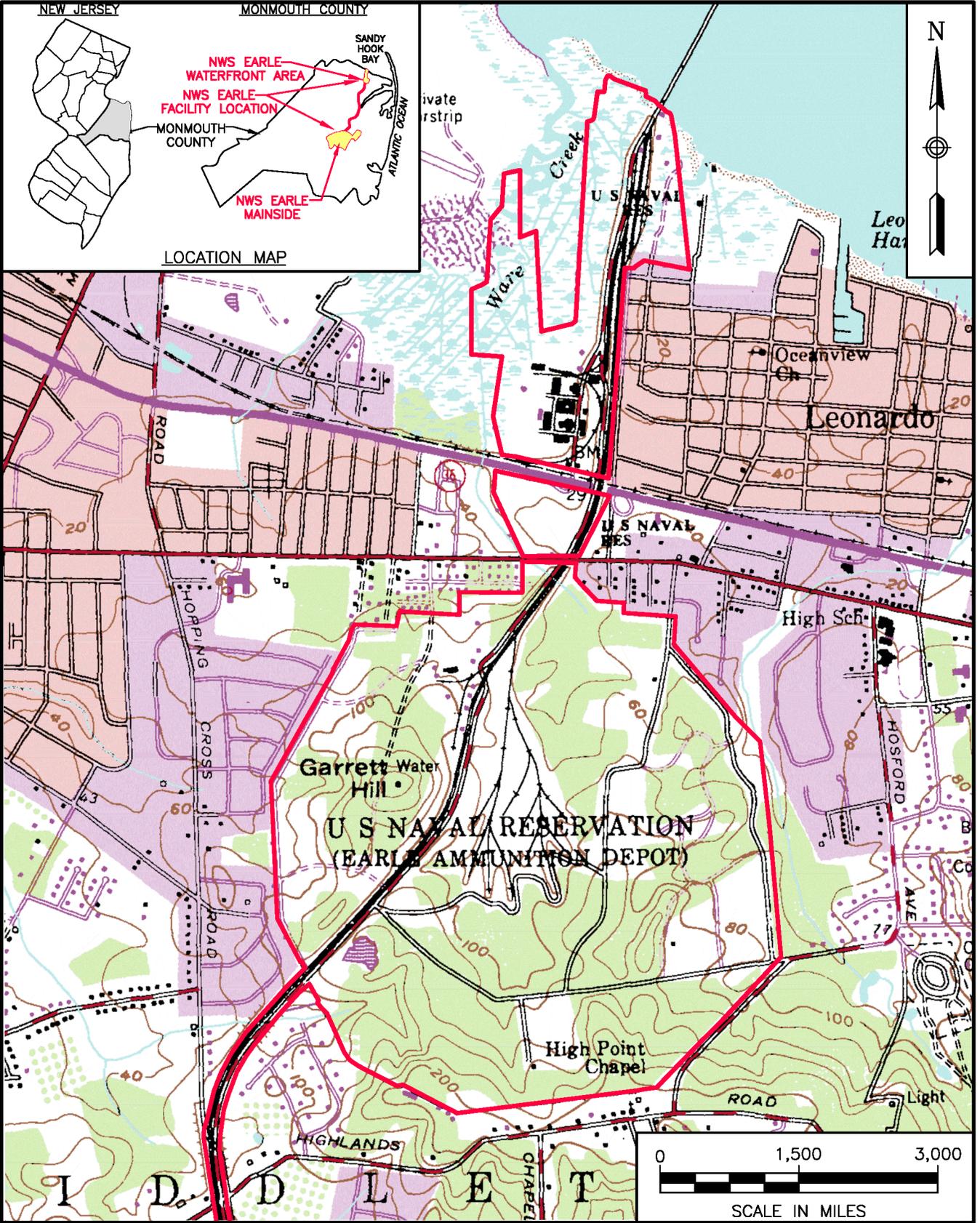
Dates in **bold** indicate task completion/report submittal date.

FIGURES



FACILITY LOCATION MAP
2010-2014 SITE MANAGEMENT PLAN
NAVAL WEAPONS STATION EARLE
COLTS NECK, NEW JERSEY

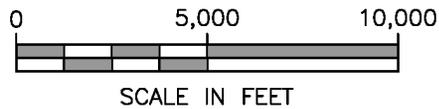
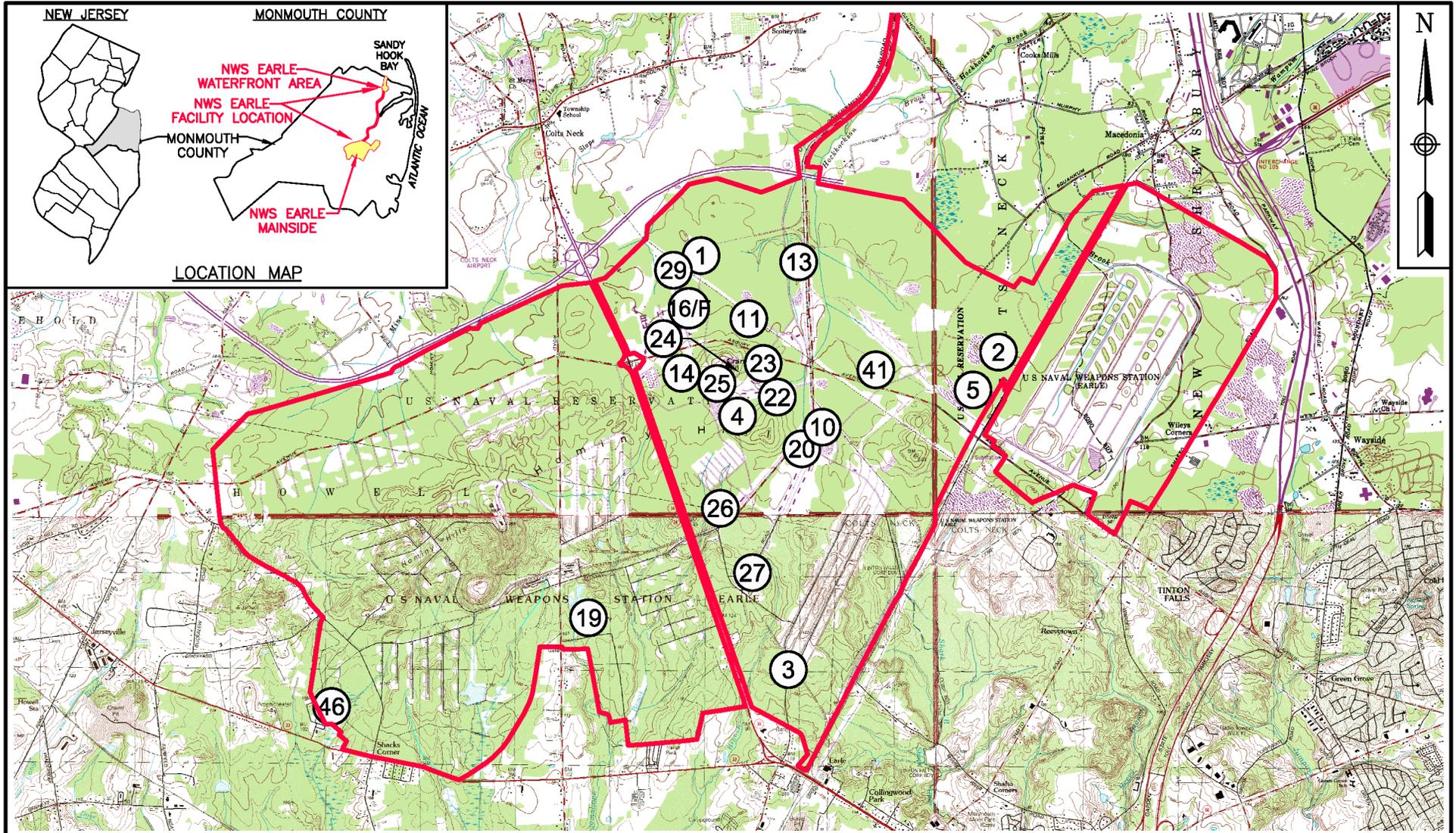
SCALE AS NOTED	
FILE 112G01475GM02-1	
REV 0	DATE 07/21/10
FIGURE NUMBER FIGURE 2-1	



TETRA TECHNUS, INC.

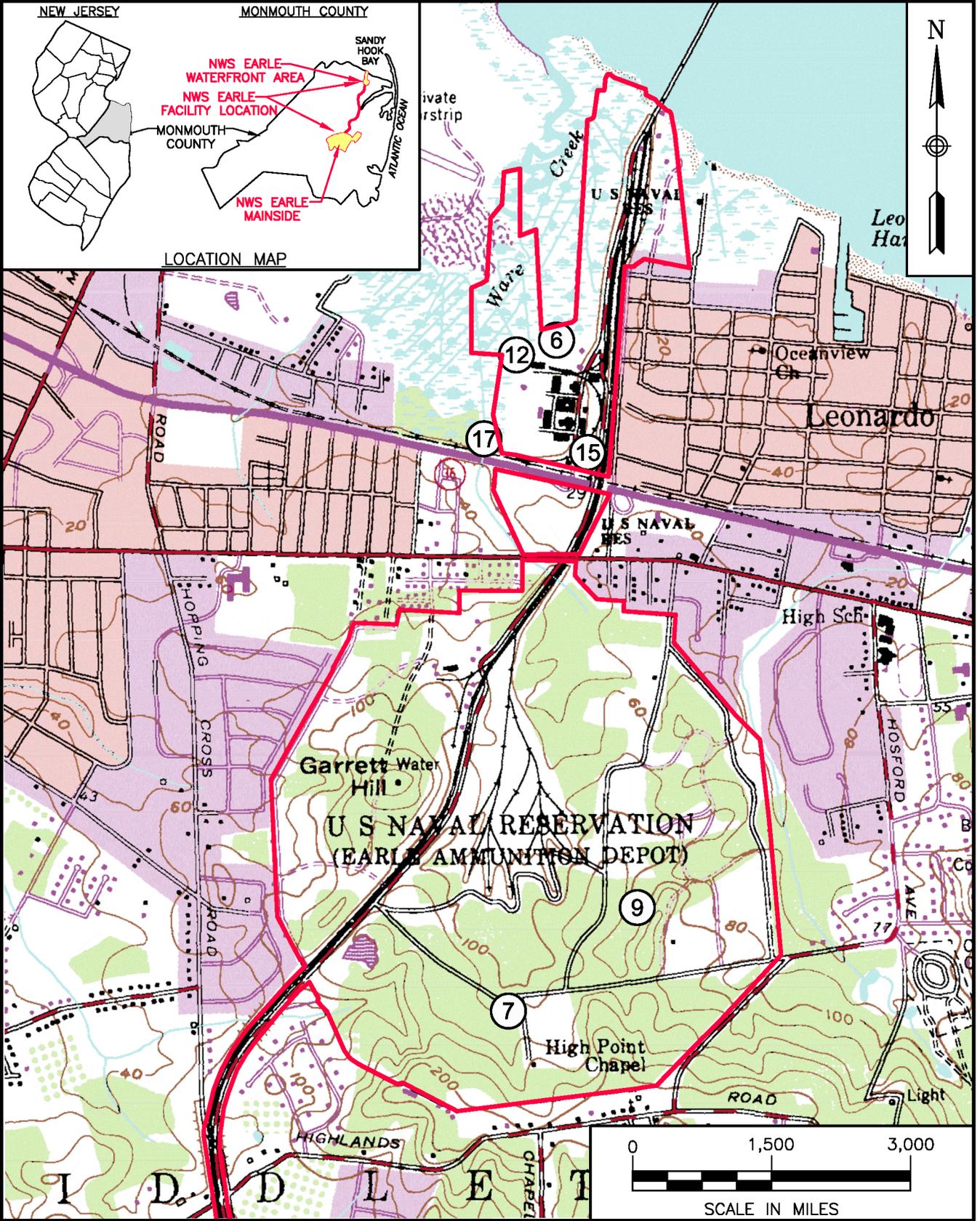
WATERFRONT LOCATION MAP
2010-2014 SITE MANAGEMENT PLAN
NAVAL WEAPONS STATION EARLE
COLTS NECK, NEW JERSEY

SCALE AS NOTED	
FILE 112G01475GM02-3	
REV 0	DATE 07/21/10
FIGURE NUMBER FIGURE 2-3	



**MAINSIDE AREA
ENVIRONMENTAL RESTORATION PROGRAM SITES
2010-2014 SITE MANAGEMENT PLAN
NAVAL WEAPONS STATION EARLE
COLTS NECK, NEW JERSEY**

SCALE AS NOTED	
FILE 112G01475GM02-3	
REV 0	DATE 10/28/10
FIGURE NUMBER FIGURE 2-4	



TETRA TECHNUS, INC.

**WATERFRONT AREA
ENVIRONMENTAL RESTORATION PROGRAM SITES
2010-2014 SITE MANAGEMENT PLAN
NAVAL WEAPONS STATION EARLE
COLTS NECK, NEW JERSEY**

SCALE AS NOTED	
FILE 112G01475GM02-5	
REV 0	DATE 10/28/10
FIGURE NUMBER FIGURE 2-5	