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PHIL-19438

Project Number 2128

September 2, ~~2004~~ 2005

Engineering Field Activity Northeast
Naval Facilities Engineering Command
10 Industrial Highway Mail Stop No. 82
Lester, Pennsylvania 19113-2090

Attn: Mr. Robert Lewandowski, Code EV21/RL

Reference: Contract No. N62467-94-D-0888
Contract Task Order (CTO) No. 843

Subject: Submission of Final Record of Decision and Final Remedial Design for Land Use Controls for Site 13, (OU 5)
NWS Earle - Colts Neck, New Jersey

Dear Mr. Lewandowski:

Tetra Tech NUS, Incorporated (TtNUS) is pleased to provide copies of the subject documents. Three copies have been sent to Jessica Mollin at EPA, Region II, three copies have been sent to Bob Marcolina at NJDEP, one copy has been sent to Eric Helms at NWS Earle and three copies are enclosed for your use. Each copy consists of the set; paper-bound Record of Decision, paper-bound Remedial Design for Land Use Controls; and a compact disk (CD) containing both reports. One copy (without the corresponding copy on CD) has been sent to Mary Jane Kehoe at the Monmouth County Library Eastern Branch for the Administrative Record file.

Thank you for this opportunity to submit the documents. Do not hesitate to contact me if you have any questions or require revisions.

Sincerely,

Russell E. Turner
Project Manager

RET/vh

Enclosures

c: Eric Helms (NWS Earle)
Jessica Mollin (EPA, Region II)
Bob Marcolina (NJDEP)
Garth Glenn (TtNUS) (without enclosures)
Mary Jane Kehoe (Monmouth County Library, Eastern Branch)
File

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
Contract No. N62467-94-D-0888
Contract Task Order 843

July 2004

RECORD OF DECISION
NAVAL WEAPONS STATION EARLE
OPERABLE UNIT 5

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RECORD OF DECISION
NAVAL WEAPONS STATION EARLE
OPERABLE UNIT 5

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RECORD OF DECISION
NAVAL WEAPONS STATION EARLE
OPERABLE UNIT 5 (SITE 13)

PART I - DECLARATION

I. SITE NAME AND LOCATION

Naval Weapons Station Earle
Colts Neck, Monmouth County, New Jersey
ID Number: NJ0170022172
Operable Unit 5 - Defense Property Disposal Office (DPDO) Yard (Site 13)

II. STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) presents the remedial action alternative selected for Operable Unit 5 (OU 5) to address soil and groundwater contamination at the Naval Weapons Station (NWS) Earle Site, located in Colts Neck, New Jersey (Site). OU 5 includes the Defense Property Disposal Office (DPDO) Yard (Site 13). Site 13 is a former landfill extending into a marsh near the rail classification yards.

This remedial action decision is in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision document explains the factual and legal basis for selecting the remedial action and is based on the Administrative Record for OU 5. Reports and other information used in the remedy selection process are part of the Administrative Record file for OU 5, which is available at the Monmouth County Library, Eastern Branch, Route 35, Shrewsbury, New Jersey.

The New Jersey Department of Environmental Protection (NJDEP) has commented on the selected remedy and concurs. NJDEP comments have been incorporated into this ROD. A review of the public response to the Proposed Plan is included in the Responsiveness Summary (Part III) of this decision document.

III. ASSESSMENT OF THE SITE

Pursuant to duly delegated authority, I hereby determine, pursuant to Section 106 of CERCLA, 42 U.S.C. § 9606, that actual or threatened releases of hazardous substances from OU 5, as discussed in

Section VI (Summary of Site Risks) of this ROD, if not addressed by implementing the remedial action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

IV. DESCRIPTION OF THE SELECTED REMEDY

The Department of the Navy (Navy) and the United States Environmental Protection Agency (USEPA), in consultation with NJDEP, have selected the following remedy for OU 5, Site 13. The remedy addresses containment of landfill contents that will be covered in place, excavation of sediments from landfill erosion areas that will be placed under the cap, and contaminated groundwater in the area north of the former landfill. The selected remedy for Site 13 includes the following major components:

1. Clearing and grubbing of vegetative growth, grading, compaction of the soils and landfill materials would be performed as necessary over the former landfill. Soils and sediments located in landfill erosion areas that may have been impacted by the landfill will be excavated and placed in an area to be capped. A low permeability cover system that complies with federal and state regulatory requirements will be installed to reduce infiltration, promote drainage, limit erosion, and preclude potential contact with the landfill contents. The cover system will be installed over all former landfill areas of the site. An initial one year period of cap operation and maintenance (O&M) and annual status reporting by the contractor installing the cover system will be extended for 30 years at the responsibility of the Navy.

2. Land use controls (LUCs) will be implemented by the Navy according to Department of Defense (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 USEPA and the DoD. A Remedial Design (RD) for LUCs 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 will 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 (GQS). A Classification Exception Area (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 GQS. The Navy is responsible for implementing, maintaining,

reporting on, and enforcing the land use controls described in the ROD in accordance with the RD for LUC. Land use controls will be maintained until the concentration of hazardous substances in the soil and groundwater are at such levels to allow for unrestricted use and exposure.

The LUC objectives are:

a) Maintain the integrity of any current or future remedial or monitoring system such as monitoring wells, fencing, signage and the landfill cap.

b) Except for environmental monitoring, prevent access or use of untreated groundwater until cleanup levels are met.

c) Prohibit the development and use of property for residential housing, elementary and secondary schools, child care facilities and playgrounds.

d) Prohibit digging into or disturbing the landfill cover or contents of the landfill.

These 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 O&M and annual status reporting for the cap, establishment of the NJDEP-compliant CEA and conduct of a site review every five years.

3. A chain-link-type fence with appropriate warning signs will be erected around the landfill cap to limit access to the site, to restrict potential human contact with contaminated landfill materials, and to protect the integrity of the cover.

4. Long-term periodic groundwater monitoring will be conducted to assess contaminant status and potential threats to human health and the environment. Since wastes will be left in place, site conditions and risks will be reviewed every 5 years.

The remedial action objective (RAO) for restoration of groundwater at Site 13 will not be immediately achieved. Groundwater use restrictions will prevent potential human exposure to metals and organic compounds in groundwater until groundwater restoration is achieved. Risks will be reduced in relation to background by the reduction of infiltration and continued monitoring to evaluate contaminant trends. Implementation of the CEA according to New Jersey regulatory guidelines and long-term periodic monitoring will determine when the RAO for groundwater at Site 13 is achieved. All other RAOs for protection of human health and the environment will be achieved upon implementation of the remedy selected for Site 13.

V. STATUTORY DETERMINATION

The selected remedy is protective of human health and the environment and is cost effective. The Navy and USEPA believe that the selected remedy will comply with all federal and state requirements that are legally applicable or relevant and appropriate to the remedial action. The selected remedy utilizes a permanent solution to the maximum extent practicable.

Because this remedy will result in hazardous substances remaining on site above health-based levels, a review by the Navy, USEPA, and NJDEP will be conducted within 5 years after initiation of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

George Pavlou
Director ERRD
U.S. Environmental Protection Agency, Region II

9/22/04
Date

Bobbie L. Scholley
Captain, U.S. Navy
Commanding Officer
Naval Weapons Station Earle

11 Aug 04
Date

RECORD OF DECISION
NAVAL WEAPONS STATION EARLE
OPERABLE UNIT 5
SITE 13

PART II - DECISION SUMMARY

I. SITE NAME, LOCATION, AND DESCRIPTION

A. General

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 (Figure 1). The two areas are connected by a Navy-controlled right-of-way. The facility was commissioned in 1943, and its primary mission is to supply ammunition to the naval fleet. An estimated 2,500 people either work or live at the NWS Earle station.

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, production, and storage; this portion is encumbered by explosive safety quantity distance arcs. Other land use in the Mainside area consists of residences, offices, workshops, warehouses, recreational space, open space, and undeveloped land. The Waterfront area is located adjacent to Sandy Hook Bay in Middletown Township, which has a population of approximately 68,200 people. The Mainside and Waterfront areas are connected by a narrow strip of land that serves as a government-controlled right-of-way containing a road and railroad.

OU 5 consists of a former landfill north of the DPDO yard located in the Mainside area (Figure 2). Site 13 is an area of fill material extending into a marsh near the rail classification yards. A brief description of the site follows.

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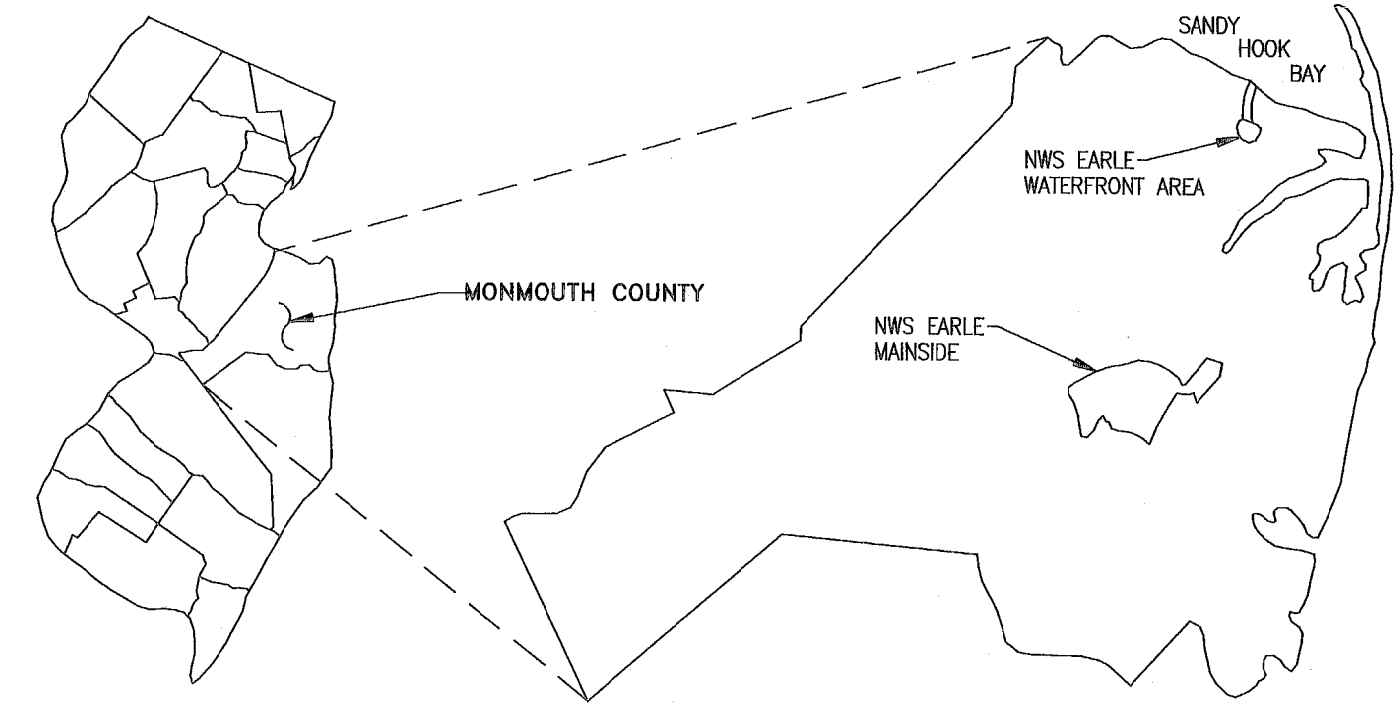

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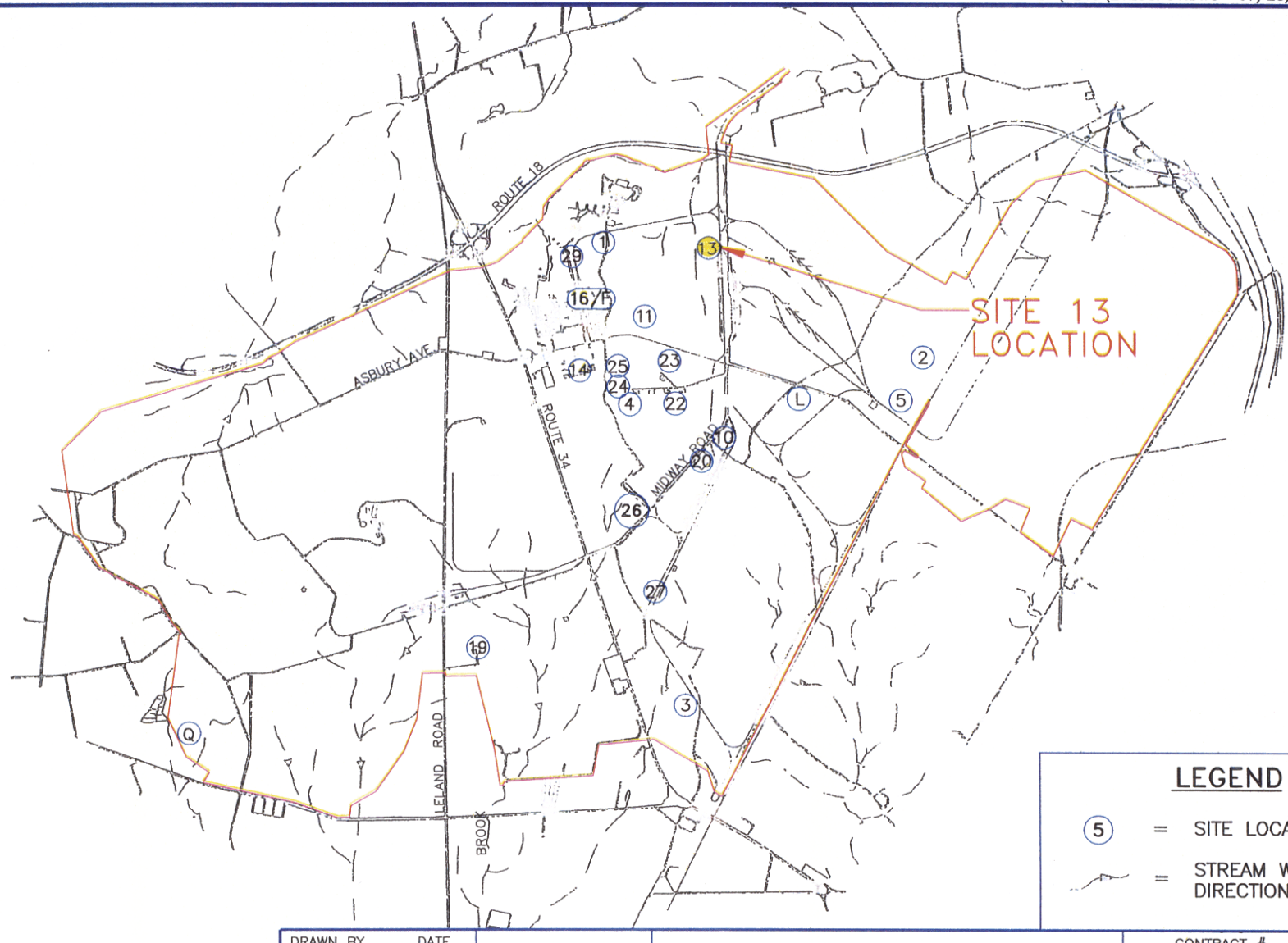

LEGEND

(5) = SITE LOCATION

= STREAM WITH FLOW DIRECTION

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Tetra Tech NUS, Inc.

MAINSIDE AREA
SITE 13 LOCATION
NAVAL WEAPONS STATION EARLE
COLTS NECK, NEW JERSEY

CONTRACT # – CTO #	2128 843
FILE NUMBER:	2128CP01 MKB PHL
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B. Site 13: Defense Property Disposal Office Yard

The DPDO yard landfill is an area of fill material extending into the marsh north of the DPDO yard west of the rail classification yards (Figure 3). The approximate former landfill covered 1.7 acres, with total landfill volume estimated at 4,000 cubic yards. There is an existing fence on the former landfill that encloses the northern portion of the Navy DPDO yard operating over part of the former landfill. Activities at the former landfill 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 acid was drained onto the ground. Obvious fill material is 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 is flat, and there is little topographic relief. Runoff from the site drains to the marsh to the north and west to a perennial drainage that flows to Hockhockson Brook. A fence surrounds the DPDO yard, although this fence is not located at the edge of the landfill. The toe of the landfill extends into the marsh area and is clearly defined by an abrupt decrease in elevation of several feet between the top of the landfill slope and the marsh.

II. SITE HISTORY AND ENFORCEMENT ACTIVITY

Potential hazardous substance releases at NWS Earle were addressed in an Initial Assessment Study (IAS) in 1982, a Site Inspection Study (SI) in 1986, and a Phase I Remedial Investigation (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. The Phase I RI at Site 13 included collection of surface water, sediment and subsurface soil samples.

In 1990, NWS Earle was placed 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. The sites at NWS Earle were then addressed by Phase II RI activities to determine the nature and extent of contamination at these sites. Activities included installation and sampling of groundwater monitoring wells, surface water and sediment sampling, and excavation of test pits to observe wastes and define the southern limit of fill materials.

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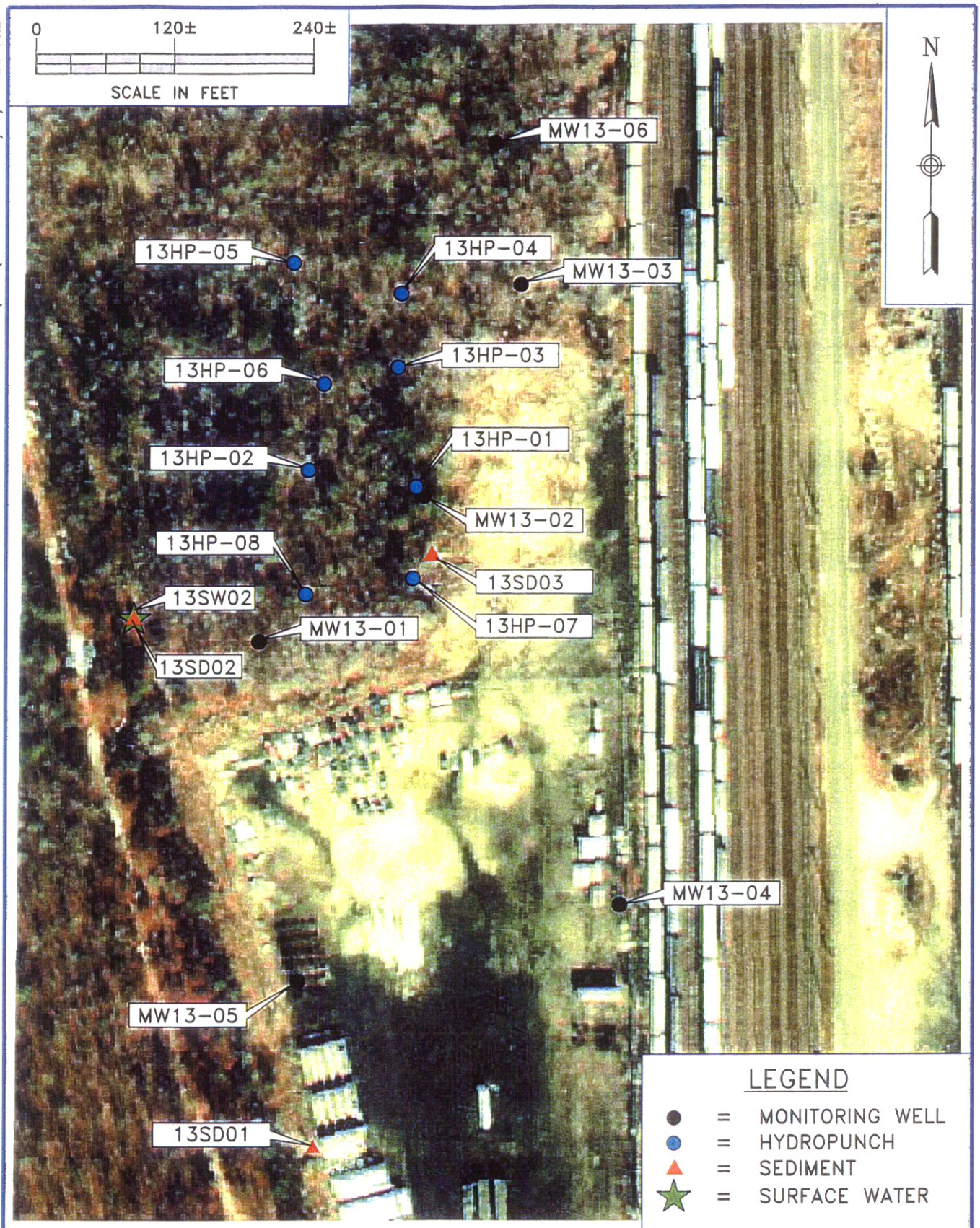

DRAWN BY MKB DATE 04/28/04	Tetra Tech NUS, Inc.	SAMPLE LOCATIONS SITE 13 – DPDO YARD NAVAL WEAPONS STATION EARLE COLTS NECK, NEW JERSEY	CONTRACT # – CTO # 2128 843
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The Phase II RI was initiated in 1995 and completed in July 1996, when the final RI Report was released. An addendum remedial investigation, consisting of additional hydrogeological investigations and groundwater sampling and analysis was performed between October 1996 and January 1997 to further characterize the nature and extent of compounds in groundwater downgradient of Site 13.

Results from the final RI and Addendum RI report, including human health and ecological risk assessment, were used as the basis for performing a feasibility study (FS) of potential remedial alternatives. Based on the alternatives development from the feasibility study, the Navy and USEPA, in consultation with NJDEP, prepared the Proposed Remedial Action Plan (Proposed Plan). The Proposed Plan is the basis for the selected remedial alternatives presented in this ROD. The RI, FS, Proposed Plan, and community input are discussed in this ROD.

III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

The documents that the Navy and USEPA used to develop, evaluate, and select a remedial alternative for OU 5 have been maintained in the official Administrative Record repository at the Monmouth County Library (Eastern Branch), Route 35, Shrewsbury, New Jersey.

The Feasibility Study Report, Proposed Plan, and other documents related to OU 5 were released to the public in January 2003. The notice of availability of these documents was published in the Asbury Park Press on April 22, 23, and 24, 2003. A public comment period was held from April 22, 2003 to May 23, 2003.

A public meeting was held during the public comment period on May 6, 2003. At this meeting, representatives from the Navy, USEPA and NJDEP were available to answer questions about OU 5 and the remedial alternatives under consideration. The results of the public comment period are included in the Responsiveness Summary, which is included in Part III of this ROD.

IV. SCOPE AND ROLE OF RESPONSE ACTION FOR OPERABLE UNIT 5

The Navy completed an RI, FS, and Proposed Plan for OU 5, addressing contamination associated with Site 13 at NWS Earle. These studies showed that groundwater and soils in the area of the former landfill had been contaminated with metals and some organic compounds such as semivolatile compounds and pesticides. The selected remedial action to address site contamination at the landfill is described in this document.

V. SUMMARY OF SITE CHARACTERISTICS

A. General

NWS Earle is located in the coastal lowlands of Monmouth County, New Jersey, within the Atlantic Coastal Plain Physiographic Province. The Mainside area, which includes OU 5, lies in the outer Coastal Plain, approximately 10 miles inland from the Atlantic Ocean. The Mainside area is relatively flat, with elevations ranging from approximately 100 to 300 feet above mean sea level. The most significant topographic relief within the Mainside area is Hominy Hills, a northeast-southwest-trending group of low hills located near the center of the station. The New Jersey Coastal Plain is a seaward-dipping wedge of unconsolidated Cretaceous to Quaternary sediments that were deposited on a pre-Cretaceous basement-bedrock complex. The Coastal Plain sediments are primarily composed of clay, silt, sand, and gravel and were deposited in continental, coastal, and marine environments. The sediments generally strike northeast-southwest and dip to the southeast at a rate of 10 to 60 feet per mile. The approximate thickness of these sediments beneath NWS Earle is 900 feet. The pre-Cretaceous complex consists mainly of PreCambrian and lower Paleozoic crystalline rocks and metamorphic schists and gneisses. The Cretaceous to Miocene Coastal Plain Formations are either exposed at the surface or subcrop in a banded pattern that roughly parallels the shoreline. The outcrop pattern is caused by the erosion truncation of the dipping sedimentary wedge. Where these formations are not exposed, they are covered by essentially flat-lying post-Miocene surficial deposits.

The rivers and streams draining NWS Earle ultimately discharge to the Atlantic Ocean, which is approximately 9 or 10 miles east of the Mainside area. The headwaters and drainage basins of three major Coastal Plain rivers (Swimming, Manasquan, and Shark) originate on the Mainside area. The northern half of the Mainside is in the drainage basin of the Swimming River, and tributaries include Mine Brook, Hockhockson Brook, and Pine Brook. The southwestern portion of the Mainside drains to the Manasquan River via either Marsh Bog Brook or Mingamahone Brook. The southeastern corner of the Mainside drains to the Shark River. Both the Swimming River and the Shark River supply water to reservoirs used for public water supplies.

Groundwater classification areas were established in New Jersey under NJDEP Water Technical Programs Groundwater Quality Standards in New Jersey Administrative Code N.J.A.C. 7:9-6. The Mainside area is located in the Class II-A: Groundwater Supporting Potable Water Supply area. Class II-A includes those areas where groundwater is an existing source of potable water with conventional water supply treatment or is a potential source of potable water. In this part of New Jersey, in general, the deeper aquifers are often used for public water supplies and the shallower aquifers may be used for private home owner well domestic supplies.

OU 5 is situated in the recharge area of the Kirkwood-Cohansey aquifer system. The Kirkwood-Cohansey aquifer system is a source of water in Monmouth County and is composed of the generally unconfined sediments of the Cohansey Sand and Kirkwood Formation. The Kirkwood-Cohansey aquifer system has been reported in previous investigations as being used for residential wells in the Mainside area. Along the coast, this aquifer system is underlain by thick diatomaceous clay beds of the Kirkwood Formation.

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 supply from the New Jersey American Water Company serves businesses and residences in areas surrounding the Mainside facilities. There are a number of private wells located within a 1-mile radius of NWS Earle and several within the NWS Earle boundaries. The majority of these wells are used for potable supplies; previous testing for drinking water parameters indicates these wells have not been adversely impacted.

There is a rich diversity of ecological systems and habitats at NWS Earle. Knieskern's beaked-rush (Rynchospora knieskernii), a sedge species on the federal endangered list, has been seen on the station, and some species on the New Jersey endangered list, such as the swamp pink (Helonias bullata), may be present. An osprey has visited Mainside and may nest in another area at NWS Earle. The Mingamahone Brook supports bog turtles downstream of the Mainside area and provides an appropriate habitat for them at the Mainside area.

B. Surface Water Hydrology

Most of Site 13 is covered by gravel and bare areas with some grasses and a small amount of exposed landfill debris. The top of the site is flat, and there is little topographic relief. Runoff from the site drains to the marsh to the north and west to a perennial drainage that flows to Hockhockson Brook. A fence surrounds the DPDO yard, although this fence is not located at the edge of the landfill. The southern extent of fill material was clearly defined by the remedial investigation test pits. The toe of the landfill extends north into the marsh area and is clearly defined by an abrupt decrease in elevation of several feet between the top of the landfill slope and the marsh. Groundwater flow is generally to the north-northwest, based on groundwater-level measurements.

C. Geology

Regional mapping indicates that Site 13 is within the outcrop area of the Vincentown Formation. The Vincentown Formation ranges between 10 and 130 feet in thickness; the soil borings are no more than 19 feet deep. The lithology of the sediments encountered in the on-site borings and test pits generally agree with the published description of the Vincentown Formation. In general, the borings encountered alternating beds of yellowish-brown to brown, micaceous, silty, fine- to medium-grained sand and olive, glauconitic, silty sand and sand.

D. Hydrogeology

Groundwater in the Vincentown aquifer beneath the site occurs under unconfined conditions. Static-water-level measurements and water-table elevations were recorded in August and October 1995. Groundwater contour maps are presented in Figures 4 and 5. The direction of shallow groundwater flow in the aquifer, as indicated by both the August and October 1995 groundwater contour maps is north-northwest. There does not appear to be a significant seasonal variation in groundwater flow direction. The hydraulic conductivity calculated for MW13-04 is 2.64×10^{-5} cm/sec (0.75 ft/day) based on RI data.

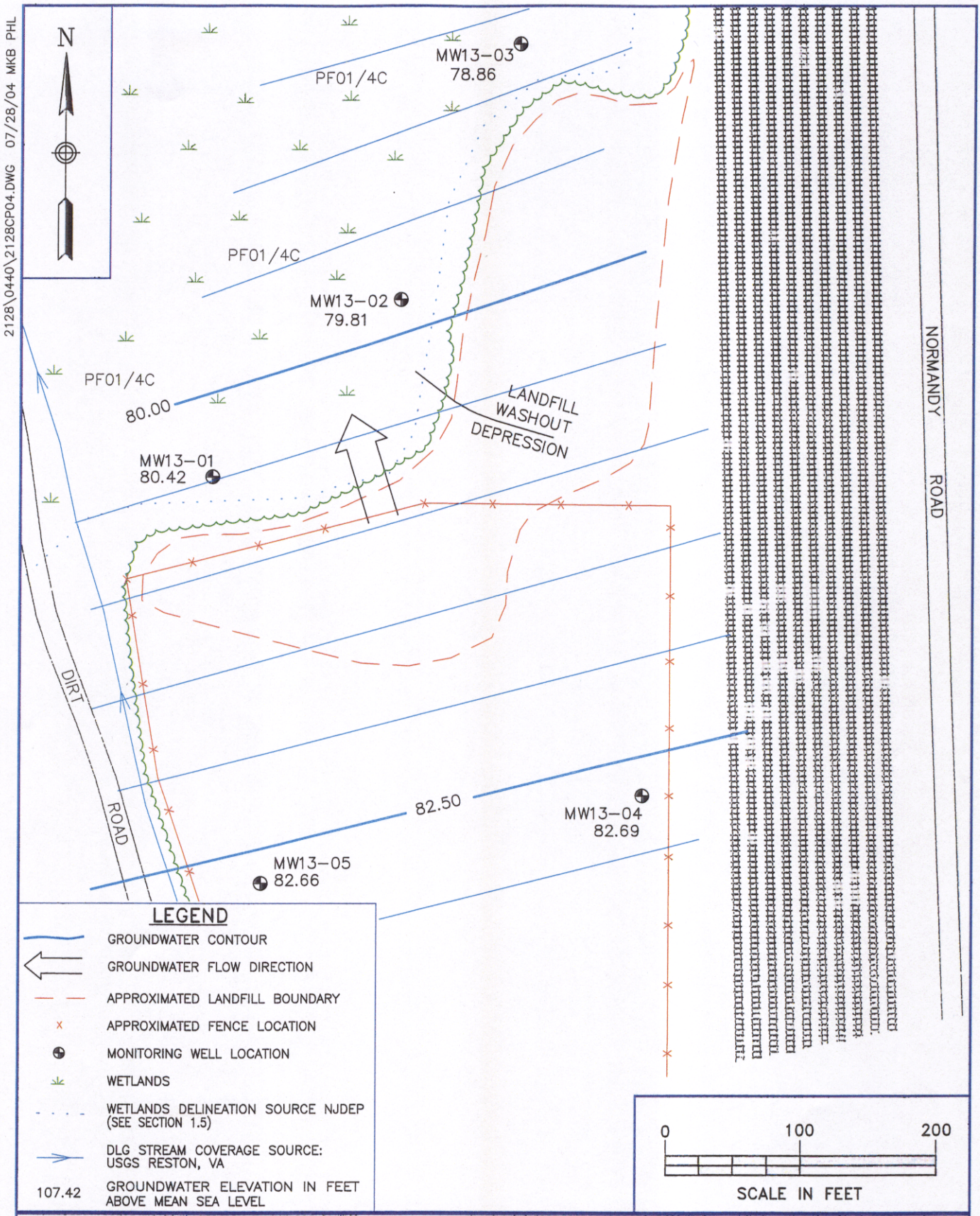
E. Nature and Extent of Contamination

1. IAS Results

The 1983 IAS, which consisted of file searches and interviews, concluded minimal impact from Site 13 based on site use as a storage area. No sampling was performed under the IAS investigation. The site was not recommended for a confirmation study of actual site environmental media sampling because IAS findings indicated low probability of contamination.

2. Phase I Site Investigation (SI)

The Navy conducted Phase I RI Site Investigation activities in 1993 at NWS Earle. During the 1993 Site Investigation, six soil, three sediment, and three surface water samples were collected from Site 13. Low levels of pesticides, polychlorinated biphenyls (PCBs), and semivolatile organic compounds (SVOCs) were detected. Surface water samples were analyzed for SVOCs, PCBs, pesticides, metals, and cyanide.



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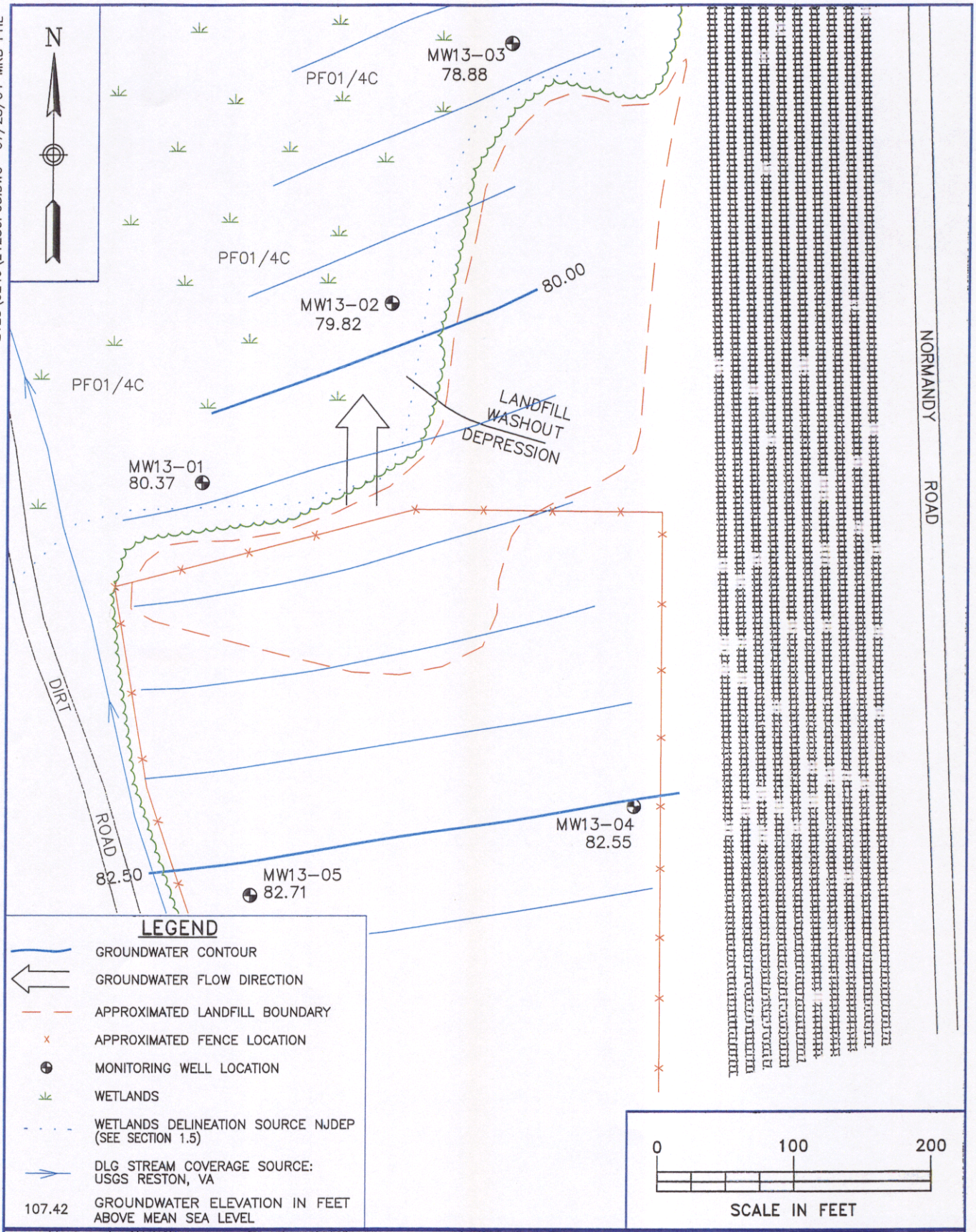

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Elevated levels of several metals were present in the samples. No SVOCs, pesticides, or PCBs were detected in surface water. Low levels of metals, pesticides, PCBs, and SVOCs were detected in soil samples. Elevated levels of two semivolatiles were also detected. Sediment samples were analyzed for SVOCs, pesticides, and PCBs. Low levels of pesticides, PCBs, and SVOCs were detected in sediments. Due to questions about data integrity of Phase I RI Site Investigation analytical results, these data were used for qualitative and planning purposes only. The exhaustive sampling and analysis performed in the Phase II RI and the RI Addendum investigation followed. Only data from the Phase II RI, including RI Addendum investigation results, were used for risk assessment calculations.

3. Phase II Remedial Investigation (Including RI Addendum Investigation)

Between June and October 1995, the Navy conducted the following RI Phase II field investigation activities at Site 13:

- Excavation of 12 test pits.
- Sampling and analysis of surface water.
- Sampling and analysis of sediment.
- Drilling and installation of five shallow permanent monitoring wells.
- Sampling and analysis of groundwater from the wells.
- Measurement of static water levels in the wells.
- Performance of slug tests in two of the wells.

Between October 1996 and January 1997, the Navy performed the following RI Phase II addendum remedial investigations to further characterize the nature and extent of volatile organic compounds (VOCs) in groundwater downgradient of the former landfill:

- Collection and analysis of groundwater samples (several sample depths per location) from eight locations downgradient of the landfill at Site 13 using direct-push technology.

- Installation of one permanent monitoring well in the marsh area north (downgradient) of Site 13, groundwater sampling and analysis.

A wide variety of metals and volatile, semivolatile, and pesticide compounds were detected in Site 13 groundwater. VOC's, particularly tetracholorethene (PCE) and trichloroethene (TCE), and their degradation products were encountered in groundwater samples. PCBs, metals, semivolatiles, and pesticides were found in sediment, and limited metals were detected in surface water. Results from the final RI report were used in conjunction with information from the RI Addendum report to develop the FS.

Tables 1 through 5 compare the results of background sample analyses to concentrations of compounds found in RI Phase II (including RI Phase II Addendum investigation) samples collected at Site 13. Figure 6 shows sample locations and the concentrations of compounds found above screening levels.

Sediment Results Summary

Concentrations of most metals in site-related sediment samples were similar to background ranges. Antimony, cadmium, and silver were detected at low levels in site-related sediment samples but were not found in background sediments. The highest concentrations of metals were encountered in 13 SD 03. Lead was detected in 13 SD 03 at 94.3 mg/kg, a level slightly greater than the ranges found in background samples. Antimony was found at a concentration of 2.5 mg/kg, mercury at 0.19 mg/kg, and silver at 22.7 mg/kg.

Polycyclic aromatic hydrocarbons (PAHs), phthalates, and pesticides were detected in site-related sediment samples at levels generally within background concentration range: benzo(b)fluoranthene (48 ug/kg), chrysene (56 ug/kg), fluoranthene (81 ug/kg), pyrene (67.5 ug/kg), and diethyl phthalate (51 ug/kg) were each detected in one site- related sediment sample. Gamma-chlordane (0.16 ug/kg), 4,4'-DDE (2.45 ug/kg), and 4,4'-DDT (6.4 ug/kg) were each detected in one site-related sediment sample.

Several compounds were detected in site-related sediment samples that were not found in background sediment samples. Aroclor 1254 (58 ug/kg to 3,900 ug/kg) was detected in all three site-related sediment samples and Aroclor 1260 (33 ug/kg to 1,200 ug/kg) was detected in two sediment samples. Alpha- chlordane (11 ug/kg to 20 ug/kg) and endrin aldehyde (31 ug/kg to 90 ug/kg) were each detected in two site-related sediment samples, and endosulfan sulfate (0.3 ug/kg) was detected in one site-related sediment sample.

Based on the findings of the metals and organic compounds in site sediments, the selected remedial action will include excavation of the impacted sediments, verification sampling, and placement of the contaminated sediments within an area to be capped.

Groundwater Results Summary

Five groundwater samples were collected at Site 13 (13 GW 01 through 13 GW 05) during the 1995 RI. An additional monitoring well (13 GW 06) was installed and sampled during the 1996 RI Addendum field work. Also, as part of the RI Addendum activities, groundwater at eight locations at Site 13 (13 HP 01 through 13 HP 08) were sampled using direct-push techniques. A total of 20 samples, plus two duplicates, were obtained at various depths from these eight locations. Explosives (1,3,5-trinitrobenzene,

TABLE 1

OCCURRENCE AND DISTRIBUTION OF INORGANICS IN SEDIMENT AT SITE 13
OU-5 FEASIBILITY STUDY
NWS EARLE, COLTS NECK, NEW JERSEY
(mg/kg)

	BACKGROUND***				SITE-RELATED					
SUBSTANCE	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTION	UTL**	2 X AVERAGE CONCENTRATION	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTION	AVERAGE CONCENTRATION	MEAN > 2 X BKGD	MEAN > ACK UTL	REPRESENTATIVE CONCENTRATION
ALUMINUM	6 / 6	839 - 3940	8.1E+07	5459.67	3 / 3	1150 - 2170	1728.33	NO	NO	2170.00
ANTIMONY *	0 / 6	-	1.4E+01	-	2 / 3	0.56 - 2.5	2.12	YES	-	2.50
ARSENIC *	5 / 6	2.4 - 9.9	2.9E+02	11.23	3 / 3	2.3 - 4.2	3.53	NO	NO	4.20
BARIUM	6 / 6	3.2 - 15.8	2.9E+02	16.80	3 / 3	5.6 - 9.3	7.27	NO	NO	9.30
BERYLLIUM	4 / 6	0.34 0.57	3.3E-01	0.72	2 / 3	0.12 - 0.32	0.18	NO	NO	0.32
CADMIUM	2 6	0.44 - 0.46	1.1E+00	0.93	2 / 3	0.35 - 0.47	0.40	NO	NO	0.47
CALCIUM	6 / 6	179 - 518	6.7E+05	690.83	3 / 3	81.1 - 347.25	201.45	NO	NO	347.25
CHROMIUM	6 / 6	4.3 - 56	2.6E+03	40.42	3 / 3	23.2 - 72.5	42.97	YES	NO	72.50
COBALT	4 / 6	0.51 2.1	6.4E+00	2.85	2 / 3	0.43 - 0.57	0.58	NO	NO	0.57
COPPER	6 / 6	1 - 13	1.9E+01	9.08	3 / 3	2.9 - 32.7	14.40	YES	NO	32.70
IRON	6 / 6	228 - 21400	7.2E+09	23589.33	3 / 3	4355 - 9180	6921.67	NO	NO	9180.00
LEAD	6 / 6	4 - 34.3	4.8E+01	21.07	3 / 3	10.1 - 94.3	45.57	YES	NO	94.30
MAGNESIUM	6 / 6	60.7 - 880	2.0E+06	809.90	3 / 3	156 - 441	253.00	NO	NO	441.00
MANGANESE	6 / 6	3.9 - 63.1	8.9E+01	36.22	3 / 3	10.9 - 21.9	14.76	NO	NO	21.90
MERCURY *	1 / 6	0.068 0.068	8.5E-03	0.09	3 / 3	0.0295 - 0.19	0.10	YES	YES	0.19
NICKEL	5 / 6	1.6 - 6	3.4E+01	6.90	2 / 3	2.4 - 3	2.22	NO	NO	3.00
POTASSIUM	5 / 6	86.1 - 2900	1.4E+07	1892.03	3 / 3	306 - 1530	763.00	NO	NO	1530.00
SILVER *	2 / 6	0.1125 0.15	2.8E+00	1.13	2 / 3	2.4 - 22.7	8.58	YES	YES	22.70
SODIUM	4 / 6	26.6 - 2280	2.9E+03	876.80	3 / 3	18.1 - 39.45	27.02	NO	NO	39.45
VANADIUM	6 / 6	5.9 - 42.7	2.1E+03	39.42	3 / 3	19.1 - 37.9	25.67	NO	NO	37.90
ZINC	6 / 6	12.5 - 34.7	1.5E+03	41.23	3 / 3	8.75 - 54.7	31.32	NO	NO	54.70

* - Selected as a COPC.

** - Upper Tolerance Limit = UTL is the concentration that is estimated to contain a designated portion (95%) of all possible sample measurements.

*** - Background samples are as follows: BGSD01, BGSD02, BGSD04 through BGSD07.

Data from the RI Phase II, including the RI Phase II Addendum investigation are included.

TABLE 2

OCCURRENCE AND DISTRIBUTION OF ORGANICS IN SEDIMENT AT SITE 13
OU-5 FEASIBILITY STUDY
NWS EARLE, COLTS NECK, NEW JERSEY
(ug/kg)

SUBSTANCE	BACKGROUND**			SITE-RELATED		
	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTION	REPRESENTATIVE CONCENTRATION	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTION	REPRESENTATIVE CONCENTRATION
4,4'-DDE *	1 / 6	1.7 - 1.7	1.7	1 / 3	2.45 - 2.45	2.45
4,4'-DDT *	1 / 6	19 - 19	10.63992	1 / 3	6.4 - 6.4	6.4
ALPHA-CHLORDANE *	NOT DETECTED	-	-	2 / 3	11 - 20	20
AROCLOR-1254 *	NOT DETECTED	-	-	3 / 3	58 - 3900	3900
AROCLOR-1260 *	NOT DETECTED	-	-	2 / 3	33 - 1200	1200
BENZO(B)FLUORANTHENE	3 / 6	150 - 490	346.54105	1 / 1	48 - 48	48
CHRYSENE *	3 / 6	130 - 940	577.8735	1 / 1	56 - 56	56
DIETHYLPHTHALATE *	1 / 3	44 - 44	44	1 / 1	51 - 51	51
ENDOSULFAN SULFATE *	NOT DETECTED	-	-	1 / 3	0.3 - 0.3	0.3
ENDRIN ALDEHYDE *	NOT DETECTED	-	-	2 / 3	31 - 90	90
FLUORANTHENE *	3 / 6	240 - 1600	1024.31285	1 / 1	81 - 81	81
GAMMA-CHLORDANE *	1 / 6	0.095 - 0.095	0.095	1 / 3	0.16 - 0.16	0.16
PYRENE *	3 / 6	200 - 1900	1076.74355	1 / 1	67.5 - 67.5	67.5

*** - Selected as a COPC.**
**** - Background samples are as follows: BGSD01, BGSD02, BGSD04 through BGSD07.**

Data from the RI Phase II, including the RI Phase II Addendum investigation are included.

TABLE 3

OCCURRENCE AND DISTRIBUTION OF INORGANICS IN GROUNDWATER AT SITE 13
OU-5 FEASIBILITY STUDY
NWS EARLE, COLTS NECK, NEW JERSEY
(ug/L)

	BACKGROUND***				SITE-RELATED					
SUBSTANCE	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTION	UTL**	2 X AVERAGE CONCENTRATION	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTION	AVERAGE CONCENTRATION	MEAN > 2 X BKGD	MEAN > ACK UTL	REPRESENTATIVE CONCENTRATION
ALUMINUM	11 / 11	287 - 7870	9.6E+06	5097.82	5 / 5	1420 - 15800	8682.00	YES	NO	15800.00
ANTIMONY *	NOT DETECTED	-	-	-	1 / 5	9.7 9.7	3.02	YES	-	9.70
ARSENIC *	1 / 11	5.8 - 5.8	6.6E+00	4.05	3 / 5	15.2 - 39.2	15.14	YES	YES	39.20
BARIUM	11 / 11	2.6 - 518	5.8E+02	229.60	5 / 5	10 - 285	102.84	NO	NO	285.00
BERYLLIUM	4 / 11	0.21 - 1.6	1.3E+00	0.49	4 / 5	0.67 - 1.6	0.87	YES	NO	1.60
CADMIUM *	5 / 11	0.6 - 1.9	2.3E+00	1.21	5 / 5	1 - 63.9	14.50	YES	YES	40.87
CALCIUM	11 / 11	506 - 17200	1.7E+04	8306.55	5 / 5	3170 - 11900	6570.00	NO	NO	11900.00
CHROMIUM*	9 11	1.3 - 43.5	6.0E+01	29.36	5 / 5	26.3 - 296	176.34	YES	YES	296.00
COBALT	6 / 11	0.7 - 10.1	9.6E+00	4.06	5 / 5	2.1 - 8.4	4.96	YES	NO	8.40
COPPER	9 / 11	0.79 - 13.5	1.4E+01	6.53	5 / 5	2.6 - 14.2	8.32	NO	NO	14.20
IRON *	11 / 11	153 - 7690	8.5E+03	4197.09	5 / 5	866 - 57900	33033.20	YES	YES	57900.00
LEAD *	3 / 11	2.1 - 3	3.1E+00	2.44	5 / 5	3.4 - 18.8	10.56	YES	YES	18.80
MAGNESIUM	11 / 11	273 - 27400	2.3E+04	8449.64	5 / 5	2120 - 4040	2888.00	NO	NO	3950.12
MANGANESE	11 / 11	3.3 - 65	1.2E+03	46.18	5 / 5	58.3 - 138	102.50	YES	NO	138.00
MERCURY	11 / 11	0.005 - 0.12	2.0E-01	0.12	5 / 5	0.047 - 0.11	0.06	NO	NO	0.09
NICKEL	10 / 11	0.81 - 25.5	2.6E+01	11.96	4 / 5	11.5 - 35.7	14.90	YES	NO	35.70
POTASSIUM	11 / 11	350 - 3245	2.5E+06	2810.55	5 / 5	2620 - 9330	6288.00	YES	NO	9330.00
SILVER *	1 11	5.3 - 5.3	8.6E+00	4.96	3 / 5	4.6 39.9	10.84	YES	YES	26.39
SODIUM	NOT DETECTED	-	-	-	1 / 5	1 - 1	0.58	YES	-	0.88
THALLIUM	11 / 11	1850 - 11650	1.3E+04	8449.09	5 / 5	3520 - 9780	6966.00	NO	NO	9780.00
VANADIUM	3 / 11	4 - 5.1	1.1E+01	5.15	2 / 5	10.4 - 23.8	7.92	YES	NO	17.10
ZINC *	10 / 11	0.69 - 42.25	4.0E+01	16.48	5 / 5	2.6 - 152	89.44	YES	YES	152.00

* - Selected as a COPC.

** - Upper Tolerance Limit = UTL is the concentration that is estimated to contain a designated portion (95%) of all possible sample measurements.

*** - Background samples are as follows: MW4-04, BGMW-02, BGMW-01, MW26-03, MW3-06, MW5-02, MW5-03, MW19-01, MW1-03, MW5-08, MW11-03.

Data from the RI Phase II, including the RI Phase II Addendum investigation are included.

TABLE 4

OCCURRENCE AND DISTRIBUTION OF ORGANICS IN GROUNDWATER AT SITE 13
OU-5 FEASIBILITY STUDY
NWS EARLE, COLTS NECK, NEW JERSEY
(ug/L)

	BACKGROUND**			SITE-RELATED		
SUBSTANCE	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTION	REPRESENTATIVE CONCENTRATION	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTION	REPRESENTATIVE CONCENTRATION
4,4'-DDT *	NOT DETECTED	-	-	2 / 5	0.029 - 0.051	0.051
DIELDRIN *	NOT DETECTED	-	-	1 / 5	0.022 - 0.022	0.02
ENDOSULFAN I *	NOT DETECTED	-	-	1 / 5	0.028 - 0.028	0.03
HEPTACHLOR *	NOT DETECTED	-	-	2 / 5	0.0052 - 0.011	0.01
4-METHYLPHENOL *	NOT DETECTED	-	-	1 / 5	2 - 2	2.00
VOLATILE HYDROCARBONS *	NOT DETECTED	-	-	16 20	2 1300	210.46
1,1,1-TRICHLOROETHANE *	NOT DETECTED	-	-	4 / 28	0.02 - 5	2.68
1,1-DICHLOROETHENE *	NOT DETECTED	-	-	6 / 28	0.01 - 2	2.00
1,2-DICHLOROETHENE (TOTAL)	NOT DETECTED	-	-	6 / 28	0.1 - 120	14.4758
CARBON DISULFIDE *	NOT DETECTED	-	-	1 / 14	1 - 1	1
CARBON TETRACHLORIDE *	NOT DETECTED	-	-	1 / 28	0.001 - 0.001	0.001
CHLOROFORM *	1 / 11	2 - 2	2	11 / 28	0.01 - 9	2.73609
METHYLENE CHLORIDE *	1 / 11	1 - 1	1	9 / 28	0.5 - 35	8.54
TETRACHLOROETHENE *	NOT DETECTED	-	-	17 / 28	0.004 - 70	9.51804
TRICHLOROETHENE *	NOT DETECTED	-	-	7 / 28	0.2 - 180	23.13233
VINYL CHLORIDE *	NOT DETECTED	-	-	2 / 14	10 - 11	6.63

*** - Selected as a COPC.**

**** - Background samples are as follows: MW4-04, BGMW-02, BGMW-01, MW26-03, MW3-06, MW5-02, MW5-03, MW19-01, MW1-03, MW5-08, MW11-03.**

Data from the RI Phase II, including the RI Phase II Addendum investigation are included.

TABLE 5

OCCURRENCE AND DISTRIBUTION OF INORGANICS IN SURFACE WATER AT SITE 13
OU-5 FEASIBILITY STUDY
NWS EARLE, COLTS NECK, NEW JERSEY
(ug/L)

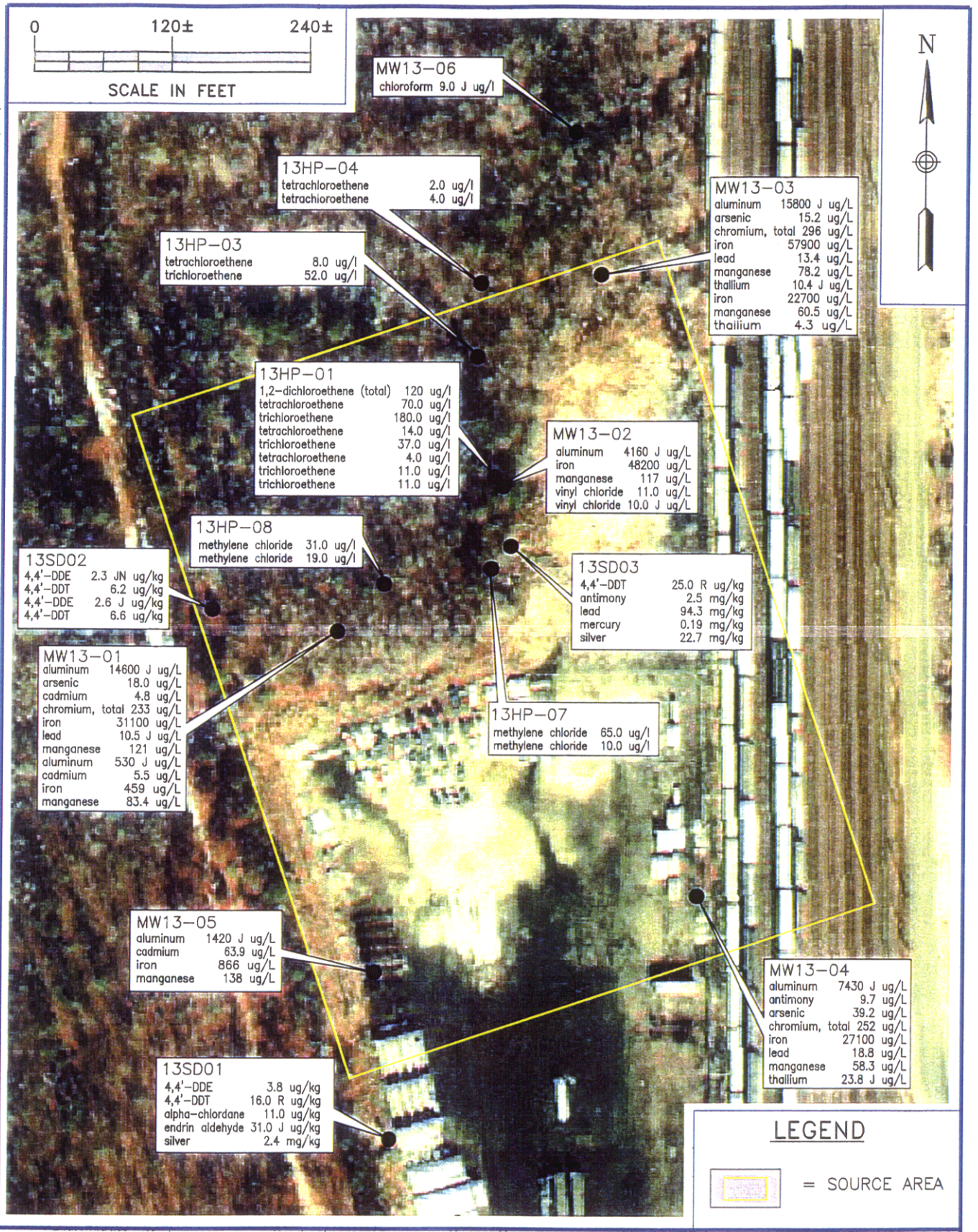
	BACKGROUND***				SITE-RELATED					
SUBSTANCE	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTION	UTL **	2 X AVERAGE CONCENTRATION	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTION	AVERAGE CONCENTRATION	MEAN > 2 X BKGD	MEAN > ACK UTL	REPRESENTATIVE CONCENTRATION
ALUMINUM	5 / 6	102 - 1540	2.2E+03	904.20	1 / 1	932 - 932	932.00	YES	NO	932.00
BARIUM	6 / 6	16.3 - 36.4	2.4E+03	55.05	1 / 1	28.45 - 28.45	28.45	NO	NO	28.45
BERYLLIUM	3 / 6	0.22 - 1.2	1.7E+00	0.70	1 / 1	0.28 - 0.28	0.28	NO	NO	0.28
CADMIUM *	1 / 6	0.18 0.18	3.2E-01	0.23	1 / 1	0.555 - 0.555	0.56	YES	YES	0.56
CALCIUM	6 / 6	462 - 177000	2.3E+05	71114.00	1 / 1	3010 - 3010	3010.00	NO	NO	3010.00
CHROMIUM *	3 / 5	0.72 - 2.6	4.4E+00	1.76	1 / 1	11 - 11	11.00	YES	YES	11.00
COBALT	6 / 6	0.81 - 2	5.2E+00	3.10	1 / 1	2.55 - 2.55	2.55	NO	NO	2.55
COPPER	5 / 6	1.1 - 17.8	3.0E+02	11.92	1 / 1	1.2 - 1.2	1.20	NO	NO	1.20
IRON	6 / 6	160 - 23100	3.0E+04	9576.67	1 / 1	1695 - 1695	1695.00	NO	NO	1695.00
LEAD	2 / 6	4.4 - 16	2.2E+01	7.31	1 / 1	1.85 - 1.85	1.85	NO	NO	1.85
MAGNESIUM	6 / 6	369 - 559000	7.0E+05	190702.67	1 / 1	1940 - 1940	1940.00	NO	NO	1940.00
MANGANESE	6 / 6	14 - 203	3.8E+02	172.43	1 / 1	41.3 - 41.3	41.30	NO	NO	41.30
NICKEL	6 / 6	2.1 - 7.9	8.2E+01	10.23	1 / 1	8.95 - 8.95	8.95	NO	NO	8.95
POTASSIUM	5 / 6	251 - 259000	3.2E+05	88922.83	1 / 1	1720 - 1720	1720.00	NO	NO	1720.00
SILVER *	1 / 6	0.86 - 0.86	1.3E+00	0.75	1 / 1	1.4 - 1.4	1.40	YES	YES	1.40
SODIUM	3 / 3	11150 - 4340000	1.3E+07	2912233.33	1 / 1	4405 - 4405	4405.00	NO	NO	4405.00
VANADIUM	4 / 6	0.225 - 9	1.2E+01	3.79	1 / 1	0.405 - 0.405	0.41	NO	NO	0.41

* - Selected as a COPC

** - Upper Tolerance Limit = UTL is the concentration that is estimated to contain a designated portion (95%) of all possible sample measurements.

*** - Background samples are as follows: BGSW01, BGSW02, BGSW04 through BGSW07.

Data from the RI Phase II, including the RI Phase II Addendum investigation are included.



2128\0240\2128CP06.DWG 07/28/04 MKB PHL

DRAWN BY MKB DATE 04/28/04	Tetra Tech NUS, Inc.	CONCENTRATIONS ABOVE SCREENING LEVELS SITE 13 – DPDO YARD NAVAL WEAPONS STATION EARLE COLTS NECK, NEW JERSEY	CONTRACT # 2128 – CTO # 843
CHECKED BY DATE			FILE NUMBER: 2128CP06 MKB PHL
REVISED BY DATE			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 6 REV.

D1977B044

1-3-dinitrobenzene, 1,4,6-trinitrotoluene, 2,4-dinitrotoluene, 2,6-dinitrotoluene, 2-amino-4,6-dinitrotoluene 2-nitrotoluene, 3-nitrotoluene, 4-amino-2,6-dinitrotoluene, 4-nitrotoluenr, HMX, RDX, nitrobenzene, nitrocellulose, nitroglycerin, picric acid, and Tetryl) were analyzed for but were not detected in Site 13 groundwater. Metals that significantly exceeded background levels were aluminum, antimony, arsenic, barium, beryllium, cadmium, total chromium, copper, iron, lead, nickel, silver, thallium, vanadium, and zinc.

Monitoring Well Samples

4,4'-DDT (0.029 ug/L to 0.051 ug/L) and heptachlor (0.0052 ug/L to 0.011 ug/L) were each detected in two groundwater samples (13 GW 01 and 13 GW 02). Compounds detected in only one groundwater sample at Site 13 include 4-methylphenol (2 ug/L in 13 GW 03), carbon disulfide (1 ug/L in 13 GW 04), chloroform (9 ug/L in 13 GW 06), dieldrin (0.022 ug/L in 13 GW 01), endosulfan I (0.028 ug/L in 13 GW 01), 1,1,1-trichloroethane (5 ug/L in 13 GW 01), and vinyl chloride (11 ug/L in 13 GW 02). None of these compounds were detected in background groundwater samples.

Direct-Push Samples

Groundwater samples obtained by direct-push and hydropunch sampling techniques showed elevated levels of VOCs, PCE (0.004 to 70 ug/L) in 16 samples, chloroform (0.01 to 0.4 ug/L) in 10 samples, methylene chloride (0.5 to 65 ug/L) in nine samples, TCE (0.2 to 180 ug/L) in seven samples, 1,1 dichloroethene (1,1-DCE) (0.02 to 2 ug/L) in six samples, 1,2-DCE (0.1 to 120 ug/L) in four samples, 1,1,1-trichlorethane (0.02 to 0.2 ug/L) in three samples, and carbon tetrachloride (0.001 ug/L) in one sample. The highest levels of VOCs were detected in location 13 HP 01-15. The concentrations of contaminants at this location decrease with depth. The significant VOCs detected at this location include PCE, TCE, and 1,2- DCE. Other locations where PCE and/or TCE were detected at significant levels are 13 HP 03-45, 13 HP 04-17, and 13 HP 04-48. Methylene chloride was detected at elevated levels at locations 13 HP 07 and 13 HP 08.

Surface Water Results Summary

One surface water sample, 13 SW 02, was collected. No organic compounds were detected in the surface water sample. Explosives were analyzed for but were not detected in surface water. Concentrations of most metals in the sample were similar to background ranges. Cadmium was detected at levels near the detection limit and slightly greater than the range of background samples.

Summary of Findings

PCB's and metals (mostly silver) were encountered in site-related sediment samples but were not found in background sediment samples.

Only cadmium, at levels near the detection limit, was found in site-related surface water at concentrations slightly greater than the range of background samples.

A range of metals and sporadic concentrations of organics, including TCE-related compounds were found in site-related groundwater

VI. SUMMARY OF SITE RISKS

As part of the Phase II RI, a human health risk assessment and an ecological risk assessment were performed for OU 5. A four-step process was used for assessing site-related human health risks for a reasonable maximum exposure scenario: Hazard Identification identifies the contaminants of concern at the site based on several factors such as toxicity, frequency of occurrence, and concentration. Exposure Assessment estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways (e.g., ingesting contaminated well water) by which humans are potentially exposed. Toxicity Assessment determines the types of adverse health affects associated with chemical exposures and the relationship between the magnitude of exposure (dose) and severity of adverse effects (response). Risk Characterization summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site-related risks.

A. Human Health Risks

The human health risk assessment estimated the potential risks to human health posed by exposure to contaminated groundwater, surface water and sediment, and surface and subsurface soils at the sites. To assess these risks, the exposure scenarios listed below were assumed:

- Ingestion of groundwater as a drinking water source.
- Inhalation of contaminants in groundwater (i.e., volatile compounds emitted during showering).
- Dermal exposure to contaminants in groundwater (i.e., showering, hand washing, bathing).
- Dermal contact from contaminated soils.
- Inhalation or incidental ingestion of contaminants in soil (e.g., fugitive dusts).
- Incidental ingestion of surface water and sediment.
- Dermal contact with contaminated surface water or sediment.

Following USEPA risk assessment guidance, these scenarios were applied to various site use categories, including future industrial, residential, and recreational receptors although reasonably anticipated land use would be limited to the future maintenance worker to periodically cut the grass and inspect the fencing and landfill cap integrity. NWS Earle is not expected to be included in Base closure or realignment in the foreseeable future, so the only anticipated land use at this time will be maintenance of the cap and fencing to protect the landfill cap.

Potential human health risks were categorized as carcinogenic or noncarcinogenic. A hypothetical carcinogenic risk increase from exposure should ideally fall below a risk range of 1×10^{-6} (an increase of one case of cancer for one million people exposed) to 1×10^{-4} (an increase of one case of cancer per 10,000 people exposed).

Noncarcinogenic risks were estimated using Hazard Indices (HI), where an HI exceeding one is considered an unacceptable health risk.

In addition, results were compared to applicable federal and/or state standards such as federal Maximum Contaminant Levels (MCLs) for drinking water, NJDEP GWQS, or other published lists of reference values.

A baseline human health risk assessment was conducted for the OU 5 site. Results of this assessment are discussed in the following paragraphs.

The estimated theoretical reasonable maximum exposure (RME) cancer risks associated with the future hypothetical residential scenario (1.1E-03) and the future hypothetical industrial scenario (2.5E-04) exceeded 1E-04, the upper end of the target risk range. Arsenic (via ingestion of and dermal contact with groundwater) and vinyl chloride (via ingestion and inhalation) were the principal chemicals of potential concern (COPCs) that contributed to the cancer risks for these exposure scenarios.

RME estimates for noncarcinogenic HIs, associated with hypothetical future industrial (groundwater) exposure scenarios exceeded 1.0, the cutoff point below which adverse noncarcinogenic effects are not expected to occur. Arsenic (1.3 - skin) and iron (1.9 - liver and digestive system) were the COPCs that exceeded 1.0 for these exposure scenarios.

RME estimates for noncarcinogenic HIs, associated with hypothetical future residential (groundwater) exposure scenarios exceeded 1.0, the cutoff point below which adverse noncarcinogenic effects are not expected to occur. Antimony (1.6 - cardiovascular system), arsenic (8.4 - skin), cadmium (5.2 - kidney), and iron (1.2 - liver and digestive system) were the COPCs that exceeded 1.0 for these exposure scenarios.

For all other media and all other pathways there are no unacceptable cancer or non-cancer risks.

B. Ecological Risks

The ecological risk assessment estimates the risk posed to ecological receptors, such as aquatic and terrestrial biota, from Site 13 contamination. A summary of the results of the ecological risk assessment for the OU 5 site is presented below.

Grass and bare areas, with a minor amount of exposed landfill debris cover most of the former landfill. Formerly, abandoned automobiles and various other equipment and machinery were stored on the southern portion of the landfill, inside the fenced area. A large railroad bed and Normandy Road are located east of the site. A channelized stream runs along the western boundary of the fenced area between the road and the fence, and drainage flows to the north. This drainageway eventually empties into Hockhockson Brook approximately 2,500 feet north of the site.

Forested wetland areas are located north and west of the landfill. The forested wetlands are several feet lower in elevation than the landfill; the edge of the landfill slopes down into the forested area, and runoff from the landfill flows into the forested area and stream.

Although habitat on the landfill is limited, the forested wetland areas north and west of the landfill provide excellent habitat, primarily for terrestrial receptors. The channelized stream contains marginal aquatic habitat, although it connects with Hockhockson Brook several hundred feet north of the site. Runoff from the landfill drains to the wetlands and stream, and groundwater at the site flows toward the stream and wetlands, indicating potential groundwater to surface water contaminant migration.

The RI concluded that Hazard Quotient (HQ) values for metals in both surface water and sediment were indicative of low potential risk, with the exception of silver in both media. No organics were detected in surface waters, and HQs for organics in sediments were indicative of low potential risk, except for PCBs. Overland runoff appears to be the dominant migration pathway from Site 13 to the wetlands and stream; however, it does not appear that silver is migrating or that PCBs have the potential to migrate to better habitats downstream in Hockhockson Brook.

VII. REMEDIAL ACTION OBJECTIVES (RAOs)

The overall objective for the Site 13 remedy is to protect human health and the environment.

The RAO at Site 13 to protect human health is to prevent contact with landfilled material and to prevent exposure to metals and VOC contamination in groundwater until groundwater is restored. The Remedial Design for Land Use Controls includes restrictions to prohibit digging into or disturbing the cover system or contents of the landfill, residential development at the site, or use of groundwater from beneath the site, other than for environmental monitoring and testing, without Navy approval. The RAO for protection of the environment is to prevent potential contact with landfill contents and minimize contaminant migration into the adjacent wetlands.

VIII. DESCRIPTION OF REMEDIAL ACTION ALTERNATIVES

The purpose of the alternative development and screening process is to assemble an appropriate range of possible remedial options to achieve the RAOs identified for the sites. In this process, technically feasible technologies are combined to form remedial alternatives that provide varying levels of risk reduction that comply with federal (USEPA) and state (NJDEP) guidelines for site remediation.

Engineering technologies capable of eliminating the unacceptable risks associated with exposure to landfill contents or to groundwater were identified, and those alternatives determined to best meet RAOs after screening were evaluated in detail. Table 6 presents the considered alternatives and the results of preliminary screening.

A. Detailed Summary of Alternatives

Summaries of the remedial alternatives developed for Site 13 are presented in the following sections.

1. Alternative 1: No Action

The no-action alternative is required by the NCP to be used as a baseline to which other alternatives may be compared. No remedial actions would be taken to protect human health or the environment. The purpose of this alternative is to evaluate the overall human health and environmental protection provided by the site in its present state. No measures would be implemented to remove or contain the suspected contaminant source (the landfill), to prevent potential human exposure to site groundwater, or to mitigate contaminant migration in the environment. Three new monitoring wells would be installed and sampled to monitor groundwater quality downgradient of the former landfill. Annual

TABLE 6

SITE 13 - SCREENING OF REMEDIAL ALTERNATIVES
OU-5 FEASIBILITY STUDY
NWS EARLE, COLTS NECK, NEW JERSEY

	ALTERNATIVE	EFFECTIVENESS	IMPLEMENTABILITY	COST	COMMENTS
1	No Action: (long-term monitoring, 5 year reviews)	Provides no additional protection of human health or the environment. Does not reduce potential for human exposure to landfill or groundwater contaminants. Does not reduce contaminant migration in the environment. No reduction in toxicity, mobility, or volume of contaminants.	Readily implementable. No technical or administrative difficulties.	Capital: none O&M: low	Retained as baseline alternative in accordance with NCP. Retained.
2	Limited Action (Institutional controls, access restrictions, long-term monitoring, 5-year reviews)	Provides added protection of human health through fencing and institutional controls. Groundwater use would be restricted. Does not reduce contaminant migration to the environment. No reduction in toxicity, mobility, or volume of contaminants.	Readily implementable. No technical or administrative difficulties.	Capital: low O&M: low	Relative to Alt. 1, provides significant additional protectiveness for little additional cost. Retained.
3	Capping, Institutional Controls, and Long-Term Monitoring	Protects human health and the environment. Capping landfill materials prevents direct contact exposure and minimizes contaminant migration to the environment. Groundwater use would be restricted. Groundwater contaminants will gradually decrease over time. No reduction of toxicity or volume of contaminants.	Readily implementable. No technical or administrative difficulties. Personnel and materials necessary to implement alternative are widely available.	Capital: moderate O&M: moderate	Retained.

sampling and analysis of groundwater would be initiated in the six existing monitoring wells and the three new wells. Periodic review of site conditions, typically every 5 years, would include evaluation of the long-term sampling and analysis program.

2. Alternative 2: Institutional Controls and Long-Term Monitoring

Alternative 2 relies on land use controls to limit exposures to site-related contaminants. This alternative does not employ engineered treatment or containment to address groundwater contamination; however, the groundwater contaminant concentrations are expected to decline naturally over time.

Land use controls would be enacted to limit potential contact to the former landfill. Restricted activities would include excavation, excessive vehicular traffic, and use of untreated groundwater for drinking water.

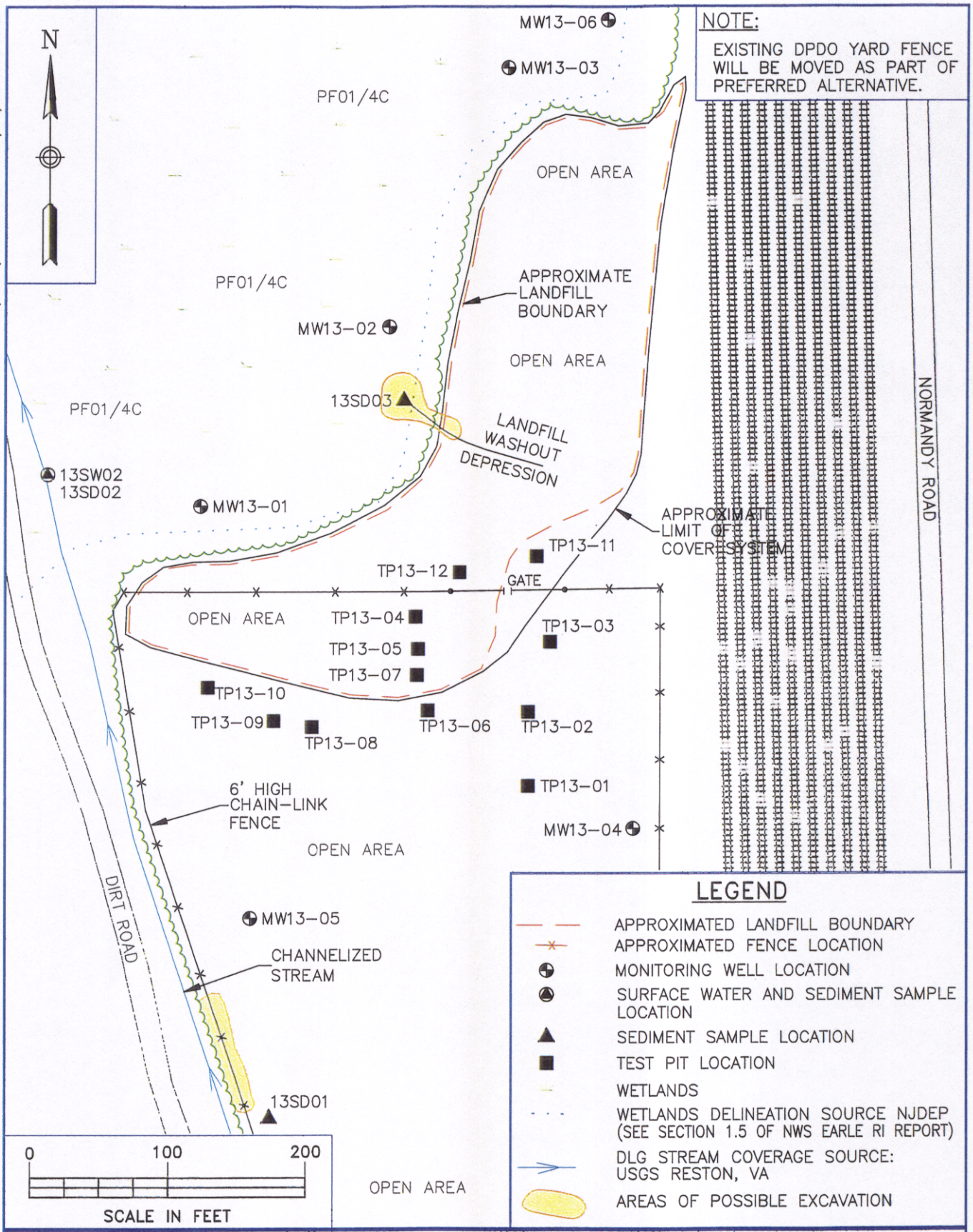
The existing fence (of the DPDO area) over Site 13 landfill areas would be removed and replaced at a new location further to the south to deter human and vehicular entry onto the landfill area beyond the current hard-packed surface of the DPDO yard (see Figure 7). A locking gate would be installed to allow controlled access to the site north of the fenced DPDO yard.

Land use restrictions would be incorporated into the Base Master Plan to restrict the future use of Site 13 groundwater until natural processes have reduced contaminant concentrations to acceptable levels. Use of untreated Site 13 groundwater for drinking water would be prohibited. Because site groundwater does not meet New Jersey groundwater quality standards (GWQS), a CEA pursuant to N.J.A.C. 7:9-6 would be established. The CEA would provide the state official notice that the constituent standards will not be met for a specified duration and ensure that use of groundwater in the affected area is suspended until standards are achieved.

Long-term, periodic monitoring would be conducted to assess the ongoing effectiveness of institutional controls to contain potential threats to human health and the environment. Since wastes would be left in place, site conditions and risks would be reviewed every 5 years.

3. Alternative 3: Capping, Institutional Controls, and Long-Term Monitoring

Alternative 3 relies on containment and institutional controls to limit exposures to hazardous substances and minimize migration of contaminants to groundwater and surface water. Active treatment is not employed to address site contamination. Over time, the contaminants in groundwater will likely gradually decrease naturally through physical, biological, and chemical processes.



NOTE:

EXISTING DPDO YARD FENCE WILL BE MOVED AS PART OF PREFERRED ALTERNATIVE.

LEGEND

- APPROXIMATED LANDFILL BOUNDARY
- APPROXIMATED FENCE LOCATION
- MONITORING WELL LOCATION
- SURFACE WATER AND SEDIMENT SAMPLE LOCATION
- SEDIMENT SAMPLE LOCATION
- TEST PIT LOCATION
- WETLANDS
- WETLANDS DELINEATION SOURCE NJDEP (SEE SECTION 1.5 OF NWS EARLE RI REPORT)
- DLG STREAM COVERAGE SOURCE: USGS RESTON, VA
- AREAS OF POSSIBLE EXCAVATION

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Tetra Tech NUS, Inc.

ALTERNATIVE 3
SITE 13 – DPDO YARD
NAVAL WEAPONS STATION EARLE
COLTS NECK, NEW JERSEY

CONTRACT # – CTO #	2128 843
FILE NUMBER:	2128CP07
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Contaminant concentrations in groundwater will also decrease as a result of reduced infiltration of precipitation through contaminated landfill materials.

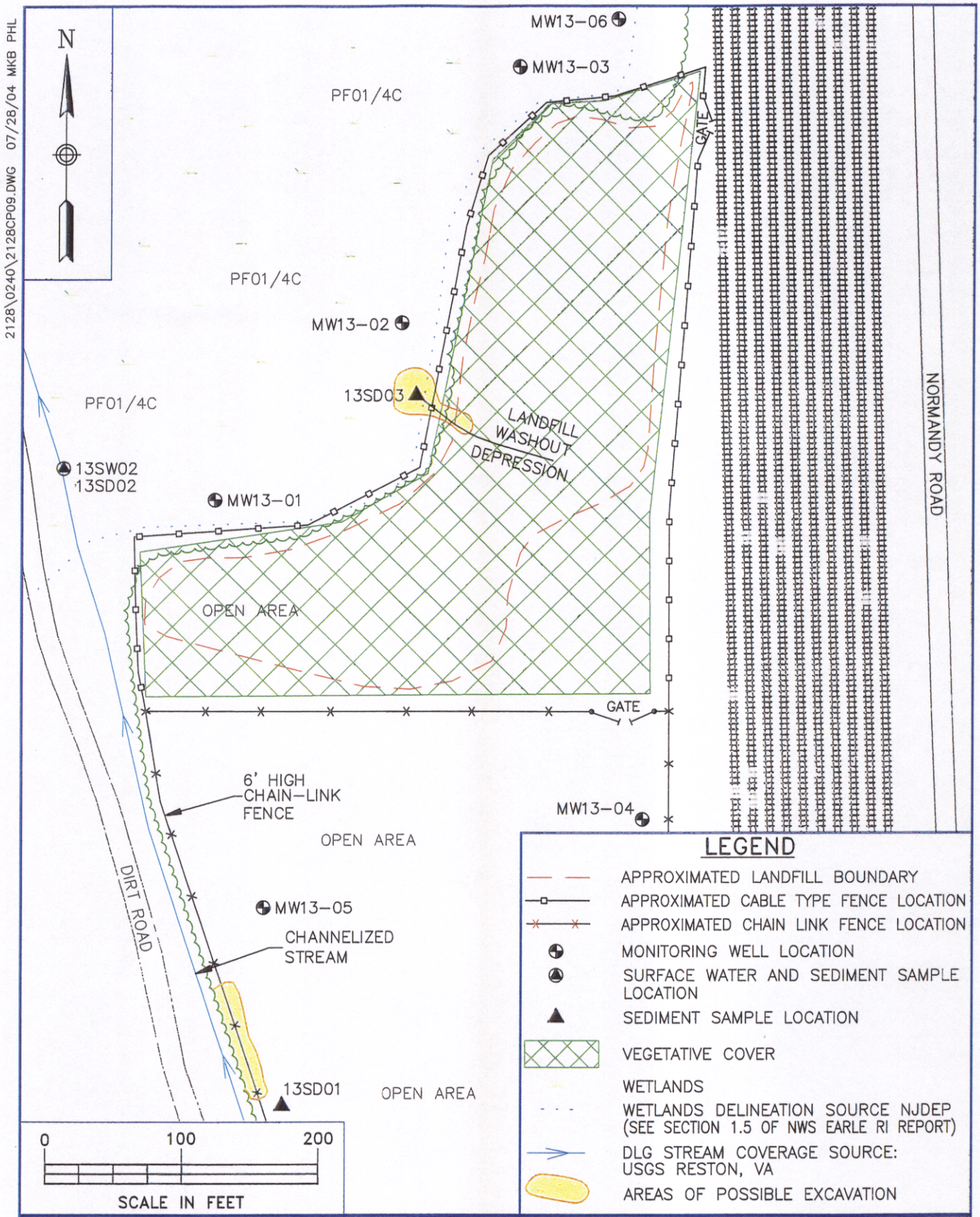
Under Alternative 3, an engineered low-permeability cover system that meets RCRA criteria for municipal solid waste landfills (40 CFR 258.60), the New Jersey regulations for closure of nonhazardous solid waste specified in N.J.A.C. 7:26-2A, and guidance provided in the NJDEP, Bureau of Landfill and Recycling Management, Division of Solid and Hazardous Waste's "Technical Manual for Sanitary Landfill Permits and Approvals" will be installed. The cover system, consisting of a base layer (to provide puncture protection for the barrier layer above), a low permeability membrane barrier layer (minimum 30 mil HDPE membrane or equivalent clay layer), a drainage layer to prevent the accumulation of water above the low permeability layer, and a vegetated top layer of soil to protect the underlying layers from mechanical damage would be installed to prevent potential human and animal contact with contaminants in landfill materials. Impacted soils and sediments near current erosion areas would be excavated and placed within the area to be capped. The cover system would limit contaminant leaching to groundwater and minimize contaminant migration via surface runoff and erosion. The cover system would be installed over the former landfill area of the site (see Figure 8). Drainage and top layers (see Figure 9) would have a minimum combined thickness of 24-inches. Access restrictions, including fencing, would be enacted to limit future uses of the site that may result in disturbance of the cover or direct contact with contaminated media.

Existing fence (of the DPDO area) over Site 13 landfill areas would be removed and replaced at a new location further to the south to deter human and vehicular entry onto the cap area north of the hard-packed surface of the DPDO yard. A locking gate and warning signs listing the restricted activities would be installed to allow controlled access to the fenced site north of the DPDO yard.

After construction of the cover and installation of the fencing elements of Alternative 3, access restrictions would significantly limit the future activities that could result in intrusion into and possible damage of the cover and accidental exposure to the landfill wastes. Restricted activities would include excavation, excessive vehicular traffic, and use of untreated groundwater for drinking water. An initial one year period of cap O&M and annual status reporting by the contractor installing the cover system will be extended for 30 years at the responsibility of the Navy.

Land use controls would be enacted to limit potential contact to the former landfill. Restricted activities would include residential development of the site, excavation, excessive vehicular traffic, and use of untreated groundwater for drinking water.

Land use restrictions and controls would be incorporated into the Base Master Plan to restrict the future use of Site 13 groundwater until natural processes have reduced contaminant



DRAWN BY MKB DATE 04/28/04	Tetra Tech NUS, Inc.	PREFERRED ALTERNATIVE SITE 13 – OU-5 NAVAL WEAPONS STATION EARLE COLTS NECK, NEW JERSEY	CONTRACT # – CTO # 2128 843
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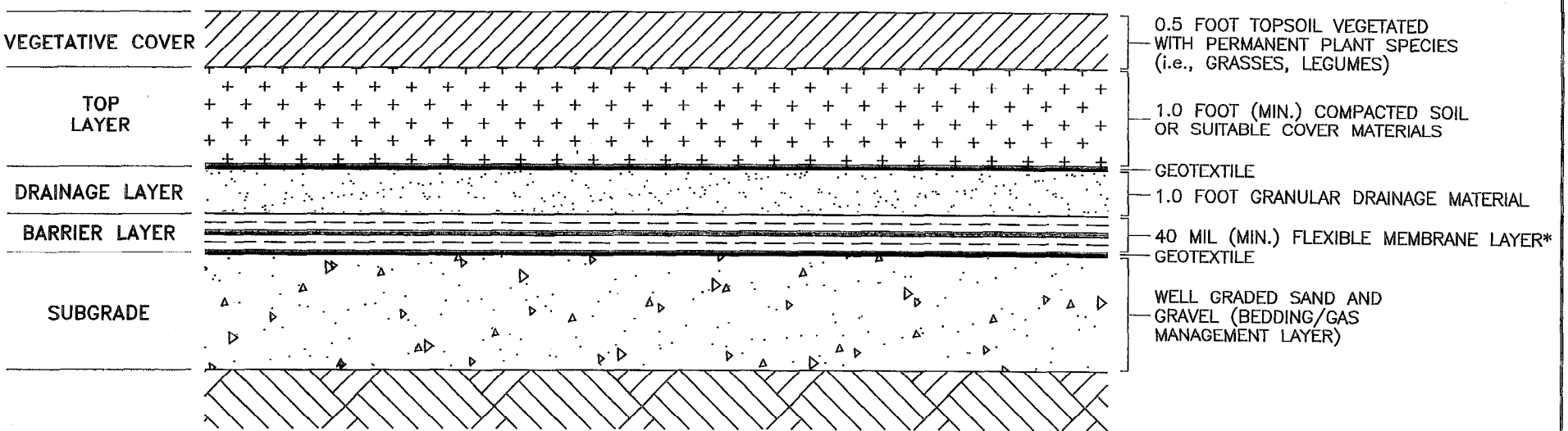

* MAY SUBSTITUTE ONE FOOT OF CLAY OR EQUAL WITH MAX. PERMEABILITY OF 1.0E-07 CM/SEC

CROSS-SECTIONAL VIEW

NOTE:
NOT FOR DESIGN.

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Tetra Tech NUS, Inc.

CONCEPTUAL COVER SYSTEM DESIGN
SITE 13 – ALTERNATIVE 3
FEASABILITY STUDY REPORT
NAVAL WEAPONS STATION EARLE
COLTS NECK, NEW JERSEY

CONTRACT # – CTO #	2128 843
FILE NUMBER:	2128CP07
	04/28/04 MKB PHL
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DRAWING NO.	FIGURE 9
REV.	

concentrations to acceptable levels. Use of untreated Site 13 groundwater for drinking water would be prohibited. Because site groundwater does not meet New Jersey groundwater quality standards (GQS), a CEA pursuant to N.J.A.C. 7:9-6 would be established. The CEA would provide the state official notice that the constituent standards will not be met for a specified duration and ensure that use of groundwater in the affected area is suspended until standards are achieved.

Long-term, periodic groundwater monitoring would be conducted to assess contaminant status and potential threats to human health and the environment. Since wastes would be left in place, site conditions and risks would be reviewed every 5 years.

IX. SUMMARY AND COMPARATIVE ANALYSIS OF ALTERNATIVES

The remedial action alternatives described in Section VIII were evaluated using the following criteria, established by the NCP:

Threshold Criteria: Statutory requirements that each alternative must satisfy in order to be eligible for selection.

1. Overall protection of human health and the environment - draws on the assessments conducted under other evaluation criteria and considers how the alternative addresses site risks through treatment, engineering, or institutional controls.

2. Compliance with ARARs - evaluates the ability of an alternative to meet ARARs established through federal and state statutes and/or provides the basis for invoking a waiver.

Primary Balancing Criteria: Technical criteria upon which the detailed analysis is primarily based.

3. Long-term effectiveness and permanence - evaluates the ability of an alternative to provide long-term protection of human health and the environment and the magnitude of residual risk posed by untreated wastes or treatment residuals.

4. Reduction of mobility, toxicity, or volume through treatment - evaluates an alternative's ability to reduce risks through treatment technology.

5. Short-term effectiveness - addresses the cleanup timeframe and any adverse impacts posed by the alternative during the construction and implementation phase, until cleanup goals are achieved.

6. Implementability - evaluates technical feasibility, administrative feasibility, and availability of services and the material required to implement the alternative.

7. Cost - includes an evaluation of capital costs and annual operation and maintenance (O&M) costs.

Modifying Criteria: Criteria considered throughout the development of the preferred remedial alternative and formally assessed after the public comment period, which may modify the preferred alternative.

8. Agency acceptance - indicates USEPA's and the state's response to the alternatives in terms of technical and administrative issues and concerns.

9. Community acceptance - evaluates the issues and concerns the public may have regarding the alternatives.

The remedial alternatives were compared to one another based on the nine selection criteria, to identify differences among the alternatives and discuss how site contaminant threats are addressed. A detailed review of Alternatives 1, 2, and 3 is included in this section and summarized in Table 7.

1. Overall Protection of Human Health and the Environment

Because no actions would be taken under Alternative 1 to contain contaminants or prevent deterioration of the landfill surface, health risks and adverse impacts to the environment are expected to remain the same or increase as existing landfill cover erodes over time.

Alternative 2 includes access restrictions and establishment of a groundwater CEA, which would reduce human health and ecological risks posed by contact with landfill contents. Institutional controls would provide assurance that untreated contaminated groundwater is not used as a potable water source in the future. This would significantly reduce the human health risks by eliminating potential exposure to contaminated groundwater (the driving concern in the human risk assessment).

Alternative 3 is most protective of human health and the environment. The cover system would reduce human health and ecological risks posed by contact with landfill contents and impacted sediments or surface soil. The cover system would reduce infiltration through landfill materials and leaching of contaminants to groundwater, thereby reducing contaminant migration into the environment. Routine maintenance of the landfill cover system would ensure its long-term protectiveness. Institutional controls would provide assurance that untreated contaminated groundwater is not used as a potable water source in the future.

TABLE 7
SITE 13 - COMPARATIVE ANALYSIS OF REMEDIAL ACTION ALTERNATIVES
OU-5 ROD
NWS EARLE, COLTS NECK, NEW JERSEY

CRITERION:	ALTERNATIVE 1: NO ACTION	ALTERNATIVE 2: INSTITUTIONAL CONTROLS AND LONG-TERM MONITORING	ALTERNATIVE 3: CAPPING, INSTITUTIONAL CONTROLS, NATURAL ATTENUATION, AND LONG-TERM MONITORING
OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT			
Prevent Human Exposure to Contaminated Soils and Landfilled Materials	No action taken to prevent human exposure to contaminated soils and landfilled materials. Existing risks would remain. Continued deterioration of the landfill surface would expose more contaminated soils and landfilled materials and result in increased direct exposure risks.	Fencing would reduce the potential for direct contact with contaminated soils and landfilled materials. Current direct contact risks were not quantified, but it is conservatively assumed that landfilled materials may pose excess health risks.	Cover system would prevent direct contact with contaminated soils and landfilled materials. Current direct contact risks were not quantified, but it is conservatively assumed that landfilled materials may pose excess health risks. Any excess risks would be reduced to acceptable levels by installing and maintaining the cap.
Prevent Human Exposure to VOC and Metal Contaminants in Groundwater	No action taken to prevent human exposure to contaminated groundwater. Carcinogenic and non-carcinogenic risks exceeding USEPA's target risk range would remain. No actions taken to reduce contaminant leaching to groundwater. No institutional controls implemented to prohibit use of untreated groundwater.	Institutional controls would minimize potential exposure to site groundwater by prohibiting its use. In time, contaminants would gradually decrease until reaching levels that would not pose excess risk.	Institutional controls would minimize potential exposure to site groundwater by prohibiting its use. The cover system would reduce leaching of contaminants to groundwater, facilitating gradual reduction of contaminants. In time, contaminant concentrations would reach levels that would not pose excess risk.
Minimize Contaminant Migration	No actions taken to reduce contaminant leaching to groundwater. Contaminants would continue to leach into groundwater and migrate, potentially affecting downgradient receptors.	No actions taken to reduce contaminant leaching to groundwater. Contaminants would continue to leach into groundwater and migrate, potentially affecting downgradient receptors.	A cover system would reduce leaching of contaminants to groundwater and would reduce migration of contaminants to the environment by surface water and wind erosion.

TABLE 7
SITE 13 - COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES
OU-5 ROD
NWS EARLE, COLTS NECK, NEW JERSEY
PAGE 2 OF 5

CRITERION:	ALTERNATIVE 1: NO ACTION	ALTERNATIVE 2: INSTITUTIONAL CONTROLS AND LONG-TERM MONITORING	ALTERNATIVE 3: CAPPING, INSTITUTIONAL CONTROLS, NATURAL ATTENUATION, AND LONG-TERM MONITORING
COMPLIANCE WITH ARARs			
Chemical-Specific ARARs	Would not comply with state groundwater quality standards.	Groundwater contaminant concentrations would initially exceed state GWQS and federal MCL's. A CEA would be established to provide the state official notification that standards would not be met immediately.	Groundwater contaminant concentrations would initially exceed state GWQS and federal MCL's. A CEA would be established to provide the state official notification that standards would not be met immediately.
Location-Specific ARARs	Not Applicable.	Would comply with federal and state ARARs for wetlands, floodplains, and other sensitive receptors.	Would comply with federal and state ARARs for wetlands, floodplains, and other sensitive receptors.
Action-Specific ARARs	Would not comply with federal or state ARARs for post-closure maintenance of municipal landfills.	Would not comply with federal or state ARARs for post-closure maintenance of municipal landfills.	Would comply with federal and state ARARs for closure and post-closure of municipal landfills.
LONG-TERM EFFECTIVENESS AND PERMANENCE			
Magnitude of Residual Risk	Existing risks would remain: approximately 1.1E-03 cancer risk and HI > 1 non-carcinogenic risks from exposure to site groundwater assuming future residential land use and consumption of contaminated groundwater. Increased risk anticipated over time as landfill surface deteriorates.	Existing risks would remain: approximately 1.1E-03 cancer risk and HI > 1 non-carcinogenic risks from exposure to site groundwater. Implementation and enforcement of institutional controls would block exposure to site groundwater. Fencing would reduce potential contact with wastes protruding from the landfill surface.	Existing risks would remain: approximately 1.1E-03 cancer risk and HI > 1 non-carcinogenic risks from exposure to site groundwater. Implementation and enforcement of institutional controls would block exposure to site groundwater. Installation and maintenance of the cap would block direct exposure risks from potential contact with protruding waste.

TABLE 7
SITE 13 - COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES
OU-5 ROD
NWS EARLE, COLTS NECK, NEW JERSEY
PAGE 3 OF 5

CRITERION:	ALTERNATIVE 1: NO ACTION	ALTERNATIVE 2: INSTITUTIONAL CONTROLS AND LONG-TERM MONITORING	ALTERNATIVE 3: CAPPING, INSTITUTIONAL CONTROLS, NATURAL ATTENUATION, AND LONG-TERM MONITORING
Adequacy and Reliability of Controls	No new controls implemented. Existing site features provide limited controls.	If implemented and enforced, institutional controls could prevent damage to the cover, intrusion into contaminated materials, and use of contaminated groundwater.	If properly maintained, the cap system would be reliable for preventing exposure and reducing contaminant migration to the environment. If implemented and enforced, institutional controls could prevent damage to the cap, intrusion into contaminated materials, and use of contaminated groundwater.
Need for 5-Year Review	Review would be required since soil and groundwater contaminants would be left in place.	Same as Alternative 1.	Same as Alternative 1.
REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT			
Reduction of Toxicity, Mobility, or Volume Through Treatment	No reduction, since no treatment would be employed.	No reduction, since no treatment would be employed.	No reduction, since no treatment would be employed.
SHORT-TERM EFFECTIVENESS			
Community Protection	No risk to community anticipated.	No significant risk to community anticipated. Engineering controls would be used during implementation to mitigate risks.	No significant risk to community anticipated. Engineering controls would be used during implementation to mitigate risks.
Worker Protection	No risk to workers anticipated if proper PPE is used during long-term monitoring.	No risk to workers anticipated if proper PPE is used during fence installation and long-term monitoring.	No significant risk to workers anticipated if proper PPE is used during remediation and long-term monitoring.
Environmental Impacts	No adverse impacts to the environment anticipated.	No adverse impacts to the environment anticipated.	No significant impacts to the environment anticipated. Engineering controls would be used during implementation to mitigate risks.

TABLE 7
SITE 13 - COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES
OU-5 ROD
NWS EARLE, COLTS NECK, NEW JERSEY
PAGE 4 OF 5

CRITERION:	ALTERNATIVE 1: NO ACTION	ALTERNATIVE 2: INSTITUTIONAL CONTROLS, AND LONG-TERM MONITORING	ALTERNATIVE 3: CAPPING, INSTITUTIONAL CONTROLS, NATURAL ATTENUATION, AND LONG-TERM MONITORING
Time Until Action is Complete	Not applicable.	Approximately 1 year to institute CEA.	Approximately a year to institute CEA and 1.5 years to design and install cap.
IMPLEMENTABILITY			
Ability to Construct and Operate	No construction or operation involved.	No difficulties anticipated. Fencing is a readily implementable technology.	No difficulties anticipated. Capping is a readily implementable technology.
Ease of Doing More Action if Needed	Additional actions would be easily implemented if required.	Additional actions would be easily implemented if required.	If additional actions are warranted, the cover system may need to be opened to access contaminated materials.
Ability to Monitor Effectiveness	Monitoring would provide assessment of potential exposures, contaminant presence, migration, or changes in site conditions.	Same as Alternative 1.	Same as Alternative 1.
Ability to Obtain Approvals and Coordinate with Other Agencies	Coordination for 5-year reviews may be required and would be obtainable.	Coordination for 5-year reviews may be required and would be obtainable. Coordination with the state would be required to establish a CEA and would be obtainable.	Coordination for 5-year reviews may be required and would be obtainable. Coordination with the state would be required to establish a CEA and would be obtainable.
Availability of Treatment, Storage Capacities, and Disposal Services	None required.	Same as Alternative 1.	Same as Alternative 1.
Availability of Equipment, Specialists, and Materials	Personnel and equipment available for implementation of long-term monitoring and 5-year reviews.	Ample availability of equipment and personnel to install fencing and perform long-term maintenance, monitoring, and 5-year reviews.	Ample availability of equipment and personnel to construct cap and perform long-term maintenance, monitoring, and 5-year reviews.
Availability of Technology	Not required.	Common construction techniques and materials required for construction.	Common construction techniques and materials required for cap construction.

TABLE 7
SITE 13 - COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES
OU-5 ROD
NWS EARLE, COLTS NECK, NEW JERSEY
PAGE 5 OF 5

CRITERION:	ALTERNATIVE 1: NO ACTION	ALTERNATIVE 2: INSTITUTIONAL CONTROLS AND LONG-TERM MONITORING	ALTERNATIVE 3: CAPPING, INSTITUTIONAL CONTROLS, AND LONG-TERM MONITORING
COST			
Capital Cost	$41,400	$88,900	$1,290,100
First-Year Annual O&M Cost	$23,900	$23,900	$26,800
FiveYear Reviews	$15,500	$15,500	$15,500
Present Worth Cost*	$371,000	$419,000	$1,657,000

* Present worth cost is based on discount rate of 7%.

2. Compliance with ARARs

Because Alternatives 1 and 2 do not include any remedial actions, they would not comply with state and federal ARARs pertaining to post-closure of municipal landfills [40 CFR 258.60 and 258.61 and N.J.A.C. 7:26-2A.9]. Alternative 3 would comply with these requirements since a cover system would be installed and a long-term maintenance and repair program would be implemented.

All three alternatives would comply with federal and state long-term monitoring requirements through periodic monitoring and evaluation of groundwater.

Alternative 1 would not comply with state ARARs for attainment of groundwater quality standards (N.J.A.C. 7:9-61). Alternatives 2 and 3 would comply by seeking a temporary exemption (CEA) from these requirements until the GWQS are achieved.

3. Long-Term Effectiveness and Permanence

Potential future users of site groundwater may be at risk under Alternative 1 because it lacks institutional controls that would prohibit use of untreated contaminated groundwater.

Alternatives 2 and 3 would mitigate long-term risks due to ingestion of site groundwater by implementing institutional controls to prohibit use of untreated, contaminated groundwater.

Alternative 3 would reduce human and ecological risks due to direct exposure to landfill contents or impacted sediments and surface soil by eliminating the potential for exposure and would reduce contaminant leaching into groundwater.

4. Reduction of Toxicity, Mobility, or Volume through Treatment

Because none of the alternatives includes treatment, they would not reduce the toxicity, mobility, or volume through treatment. Alternative 3 would reduce the mobility of landfill contaminants by reducing precipitation infiltration and by placing impacted surface soil and sediments beneath the cap.

5. Short-Term Effectiveness

Long-term monitoring, which would provide little opportunity for short-term impact, is the only on-site action proposed under Alternative 1.

Alternative 2 would present a greater opportunity for short-term impact due to site preparation and installation of the fencing. Alternative 3 would present the greatest opportunity for short-term impact due to site preparation, grading, soil/sediment removal and constructing the enhanced cover system.

Impacts to the environment are not anticipated under Alternatives 1 and 2 since minimal activities would be conducted. Impacts to the environment would be minimized under Alternative 3 by use of erosion and storm water control measures during site work.

6. Implementability

Alternative 1 is easily implemented since the only activities proposed are long-term monitoring and 5-year reviews. Alternative 2 is also easily implemented since the only on-site activities would be installation of the fencing, long-term monitoring, and 5-year reviews. Alternative 3 would be most difficult to implement since it involves soil/sediment removal and the construction of a cover system over the former landfill area estimated at 1.7 acres; however, no difficulties are anticipated, since common construction techniques are required and cover materials are available from several vendors.

CEA implementation issues under Alternatives 2 and 3, such as submission of CEA documentation and periodic CEA reporting to regulatory agencies are not expected to present any difficulty since the Navy has significant experience complying with these requirements at other NWS Earle IR and underground storage tank sites.

If additional actions are warranted, they could be easily implemented under Alternatives 1 and 2. Additional actions could be implemented under Alternative 3; however, opening the cover system to access contaminated materials may be required.

7. Cost

The present-worth cost associated with each alternative is provided below for comparison. Alternative 1, no action, would be the least expensive to implement and Alternative 3 would be the most expensive to implement.

Alternative 1	$371,000
Alternative 2	$419,000
Alternative 3	$ 1,657,000

8. Agency Acceptance

NJDEP has had the opportunity to review and comment on all the documents in the Administrative Record and has had the opportunity to comment on the draft ROD. Comments received from the NJDEP have been incorporated into the ROD.

9. Community Acceptance

The community has had the opportunity to review and comment on documents in the Administrative Record, to participate in regularly scheduled Restoration Advisory Board (RAB) meetings convened to encourage community involvement, and attend a public meeting held to provide the community an opportunity to learn about the Proposed Plan. The community has not indicated objections to the alternative selected in this ROD. Part III, Responsiveness Summary, of this ROD presents an overview of community involvement and input to the selected alternative.

X. THE SELECTED REMEDY

The Navy, with USEPA and NJDEP, has selected Alternative 3 as its selection of the preferred alternative. The range of technologies included in Alternative 3 offer the maximum of protection to human health and the environment of all the alternatives, and is appropriate for the protection of human health and the environment at this former landfill. A vegetative cover would be placed over an impermeable landfill cap over the entire former landfill area. Figure 8 shows a plan view of the preferred alternative landfill cap.

Under Alternative 3, an engineered low-permeability cover system that meets RCRA criteria for municipal solid waste landfills (40 CFR 258.60), the New Jersey regulations for closure of nonhazardous solid waste specified in N.J.A.C. 7:26-2A, and guidance provided in the NJDEP, Bureau of Landfill and Recycling Management, Division of Solid and Hazardous Waste's "Technical Manual for Sanitary Landfill Permits and Approvals" will be installed. The cover system, consisting of a base layer (to provide puncture protection for the barrier layer above), a low permeability membrane barrier layer (minimum 30 mil HDPE membrane or equivalent clay layer), a drainage layer to prevent the accumulation of water above the low permeability layer, and a vegetated top layer of soil to protect the underlying layers from mechanical damage would be installed to prevent potential human and animal contact with contaminants in landfill materials. Impacted soils and sediments near current erosion areas would be excavated and placed within the area to be capped. The cover system would limit contaminant leaching to groundwater and minimize contaminant migration via surface runoff and

erosion. The cover system would be installed over the former landfill area of the site (see Figure 8). Drainage and top layers (see Figure 9) would have a minimum combined thickness of 24-inches.

Access restrictions, including fencing, would be enacted to limit future uses of the site that may result in disturbance of the cover or direct contact with contaminated media such as landfill contents or groundwater. An initial one year period of cap operation and maintenance (O&M) and annual status reporting by the contractor installing the cover system will be extended to 30 years at the responsibility of the Navy.

Soils and sediments located in landfill erosion areas that may have been impacted by the landfill would be excavated and placed in an area to be capped. The proposed sediment remediation level for silver is 3.7 mg/kg. This remediation level is based on the effect range-medium (ER-M) levels as summarized in Screening Quick Reference Tables (NOAA, 1999). This ER-M level is based on marine sediment; however, it will be used as a surrogate for the freshwater sediment at Site 13 because freshwater screening levels for silver are not readily available. The proposed sediment remediation level for total PCBs is 1.0 mg/kg cited in USEPA Office of Solid Waste and Emergency Response (OSWER) Directive 9355.4-01 A Guide on Remedial Actions at Superfund Sites with PCB Contamination (1990). This level is based on the protection of human health under a residential scenario. Although this cleanup level is based on human health rather than ecological risks, it has been previously used for PCB remedial actions.

The existing fence (of the DPDO area) over Site 13 landfill areas would be removed and replaced to deter human and vehicular entry onto the proposed vegetative cap adjacent to the DPDO yard. Two locking gates and signs listing restricted activities would be installed to allow controlled access into the fenced enclosure over the vegetative cap north of the fenced DPDO yard.

The Navy will be responsible for preparation of a remedial design (RD) for land use controls (LUCs) that will be submitted to USEPA for review and concurrence. The Navy has prepared a RD for LUC for OU 5 that has been reviewed by USEPA. The final RD for LUC at OU 5 that includes incorporation of USEPA comments has been submitted to USEPA concurrently with the final ROD. After construction of the cover, land use control restrictions would prohibit digging into or disturbing the existing cover or contents of the landfill, prohibit residential development on the site, prohibit use of the aquifer groundwater beneath the site other than for environmental monitoring and testing until the groundwater meets New Jersey groundwater standards. Figure 8 shows the area of the proposed cap and fence. The area proposed for the LUCs will include the area within the fence protecting the cap as well as downgradient areas where the groundwater does not currently meet New Jersey groundwater quality standards. Restricted activities would include excavation, excessive vehicular traffic, and use of

untreated groundwater for drinking water. The RD for LUCs will be amended to the NWS Earle Master Plan. The Navy will be responsible for maintaining LUCs and monitoring site status.

The Navy is responsible for implementing, maintaining, reporting on, and enforcing the land use controls. Land use controls will be maintained until the concentration of hazardous substances in the soil and groundwater are at such levels to allow for unrestricted use and exposure.

The LUC objectives are:

a) Maintain the integrity of any current or future remedial or monitoring system such as monitoring wells, fencing, signage and the landfill cap.

b) Except for environmental monitoring, prevent access or use of untreated groundwater until cleanup levels are met.

c) Prohibit the development and use of property for residential housing, elementary and secondary schools, child care facilities and playgrounds.

d) Prohibit digging into or disturbing the landfill cover or contents of the landfill.

These 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 O&M and annual status reporting for the cap, establishment of the NJDEP-compliant CEA and conduct of a site review every five years.

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. The CEA would 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 suspended until standards are achieved.

Long-term periodic monitoring would be conducted to assess contaminant status and potential threats to human health and the environment. In addition to the existing wells, sentinel wells would be installed north of the site pursuant to CEA guidelines. Since wastes would be left in place, site conditions and risks would be reviewed every 5 years.

XI. STATUTORY DETERMINATIONS

The remedy selected for OU 5 satisfies the remedy selection requirements of CERCLA and the NCP. The remedy is expected to be protective of human health and the environment, complies with ARARs,

and is cost effective. The following sections discuss how the selected remedial action addresses these statutory requirements.

A. Protection of Human Health and the Environment

Alternative 3 will provide overall protection of human health and the environment by preventing direct exposure to contaminated landfill materials and associated soils/sediments, reducing contaminant migration from the landfill into the environment, and instituting restrictions on use of site groundwater.

Although the potential health risks from direct exposure to landfill contaminants were not quantified in the RI, it is conservatively assumed that direct exposure to landfilled materials may pose health risks to humans and animals. These risks will be reduced by installation of access restrictions and warning signs. The additional cover and vegetation will also limit contaminant migration to the environment by surface runoff and wind erosion.

Alternative 3 will reduce the risks posed by future use of site groundwater. The human health risk assessment concluded that site groundwater poses carcinogenic and non-carcinogenic risks exceeding USEPA's guideline risk limits under future residential and future industrial exposure to groundwater scenarios. Placing additional cover and grading to promote runoff will reduce infiltration of precipitation into the landfill, thereby reducing contaminant leaching from the landfill materials to the underlying groundwater and facilitating natural attenuation of groundwater contamination. Reducing leaching of contaminants from the landfill into the underlying groundwater will eventually result in a decrease of groundwater contaminant concentrations to acceptable levels (GWQS), reducing the long-term risk posed by future use of site groundwater. Implementation of access restrictions and establishment of the site as a groundwater CEA will provide interim protection by prohibiting use of the aquifer until GWQS are achieved.

Fencing/warning signs and access restrictions will provide additional long-term protection by limiting access to the covered area and restricting activities that could damage or intrude into the cover and contaminated media.

The long-term periodic monitoring program will allow the responsible agency to monitor the quality of groundwater leaving the site, assess potential impacts to downgradient receptors, and determine whether additional remedial actions are necessary.

Use of engineering controls to minimize generation of fugitive dusts and vapors and proper use of PPE by site workers will effectively minimize short-term risks to the local community and workers posed by implementation of this alternative.

A RD for LUCs has been prepared for the proposed remedial action at OU 5 and will be submitted concurrently with the final ROD for Site 13 for USEPA concurrence.

The Navy is responsible for implementing, inspecting, reporting, and enforcing the LUCs described in this ROD in accordance with the LUC Remedial Design. Although the Navy retains ultimate responsibility for the performance of these obligations, the Navy may arrange, by contract or otherwise, for another party(ies) to carry them out. Should any LUC remedy fail, the Navy will ensure that appropriate actions are taken to reestablish the remedy's protectiveness and may initiate legal action to either compel action by a third party(ies) and/or to recover the Navy's costs for remedying any discovered LUC violation(s).

B. Compliance With and Attainment of ARARs

The selected remedy for OU 5 will comply with all applicable or relevant and appropriate chemical-specific, location-specific, and action-specific ARARs. The following discussion provides a synopsis of the detailed evaluation of the remedial alternatives in the FS for Site 13 (OU 5) (Tetra Tech NUS, May 2000).

1. Chemical-Specific ARARs

Federal and state chemical specific ARARs presented in the FS included federal SDWA MCL's and NJDEP GWQS. Because Alternative 3 does not include active treatment of groundwater, initially the groundwater beneath Site 3 will not meet the constituent concentrations specified in the New Jersey GWQS [N.J.A.C. 7:9-6].

However, additional cover and grading of the landfill as proposed under Alternative 3 will reduce migration of contaminants into groundwater, facilitating natural attenuation of contaminants and ultimately resulting in attainment of MCL's and GWQS. Alternative 3 includes a provision to seek a temporary exemption (CEA) from these requirements until the GWQS are achieved through natural attenuation. The CEA will be established to provide the state official notice that the constituent standards will not be met for a limited duration and to ensure that consumption of the untreated groundwater is prohibited.

2. Location-Specific ARARs

The potential effects of the proposed remediation on wetlands, floodplains, water bodies, and other sensitive receptors will be identified during the design of Alternative 3, and all necessary measures will be

taken to comply with the location-specific federal and state ARARs identified in the FS. It is expected that Alternative 3 will easily comply with these ARARs.

3. Action-Specific ARARs

The single-barrier cover system and long-term monitoring and maintenance plan proposed under Alternative 3 will comply with federal and state municipal landfill closure and post-closure regulations [40 CFR 258.60 & 258.61and N.J.A.C. 7:26-2A.9].

4. To Be Considered (TBC) Standards

OSWER Directive 9355.0-62FS "Application of the CERCLA Municipal Landfill Presumptive Remedy to Military Landfills" (April 1996) and OSWER Directive 9355.0-49FS "Presumptive Remedy for CERCLA Municipal Landfill Sites" (September 1993) were considered during the development of remedial alternatives for OU 5.

C. Cost-Effectiveness

The Navy and USEPA have determined that the selected remedy for OU 5 is cost effective in that it mitigates the risks posed by the site-related contaminants, meets all other requirements of CERCLA, and affords overall effectiveness proportionate to the cost. The estimated costs for the selected remedy for OU 5 are summarized below.

The capital costs for Alternative 3 total $1,290,100. The average annual O&M costs are $26,800, and 5-year reviews cost $15,500 per event. Over a 30-year period, the net present-worth cost is $1,657,000 (at a seven percent discount rate).

D. Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

The Navy and USEPA have determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner at OU 5.

E. Preference for Treatment as a Principal Element

The Navy and USEPA have determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner at OU 5.

XII. DOCUMENTATION OF SIGNIFICANT CHANGES

No significant changes from the Proposed Plan appear in this ROD.

RECORD OF DECISION
NAVAL WEAPONS STATION EARLE
OPERABLE UNIT 5

PART III - RESPONSIVENESS SUMMARY

The purpose of this Responsiveness Summary is to review public response to the Proposed Plan for OU 5. It also documents the consideration of comments during the decision-making process and provides answers to any comments raised during the public comment period.

The Responsiveness Summary for OU 5 is divided into the following sections:

- **Overview** - This section briefly describes the remedial alternative recommended in the Proposed Plan and any impacts on the Proposed Plan due to public comment.

- **Background on Community Involvement** - This section describes community relations activities conducted with respect to the area of concern.

- **Summary of Major Questions and Comments** - This section summarizes verbal and written comments received during the public meeting and the public comment period.

I. OVERVIEW

This Responsiveness Summary addresses public response to the Proposed Plan. The Proposed Plan and other supporting information are maintained for public review in the Administrative Record file for OU 5, which is maintained at the Monmouth County Library (Eastern Branch) in Shrewsbury, New Jersey.

II. BACKGROUND ON COMMUNITY INVOLVEMENT

This section provides a brief history of community participation in the investigation and interim remedial planning activities conducted for OU 5. Throughout the investigation period, USEPA and NJDEP reviewed work plans and reports and provided comments and recommendations, which were incorporated into appropriate documents. A Technical Review Committee (TRC), consisting of representatives from the Navy, USEPA, the NJDEP, the Monmouth County Health Department, and other agencies and local groups surrounding NWS Earle, was formed. The TRC later was transformed into the Restoration Advisory Board (RAB) to include community members, as well as the original officials from the TRC. The RAB has been holding periodic meetings to maintain open lines of communication with the community and to inform all parties of current activities.

On April 22, 23, and 24, 2003, a newspaper notification inviting public comment on the Proposed Plan appeared in the Asbury Park Press. The public notice summarized the Proposed Plan and the preferred alternative. The announcement also identified the time and location of the public meeting and specified a public comment period as well as the address to which written comments could be sent. Public comments were accepted from April 22, 2003 to May 23, 2003. The newspaper notification identified the Monmouth County Library - Eastern Branch, Route 35, Shrewsbury, New Jersey as the location of the Administrative Record.

The public meeting was held on May 6, 2003 at 7:00 PM at the Wall Township Municipal Building Public Meeting Room, 2700 Allaire Road, Wall, New Jersey. At this meeting, representatives from the Navy, USEPA and NJDEP were available to answer questions concerning OU 5 and the preferred alternative. Prior to the formal public meeting held on May 6, 2003, the Proposed Plan for OU 5 was also presented to the RAB meeting held on January 15, 2003. Attendance lists for the January 15, 2003 RAB meeting and the May 2, 2003 public meeting are included in Appendix B.

III. SUMMARY OF MAJOR QUESTIONS AND COMMENTS

A. Written Comments

During the public comment period from April 22, 2003 to May 23, 2003, no written comments were received from the public pertaining to OU 5. No new comments were received from NJDEP or USEPA.

B. Public Meeting Comments

Questions or comments concerning OU 5 received from the public at the January 15, 2003 RAB meeting and the May 6, 2003 public meeting are presented with the government responsiveness summary in Appendix C.

APPENDIX A

TERMS USED IN THE RECORD OF DECISION

Appendix A
TERMS USED IN THE RECORD OF DECISION

1,2-Dichloroethene (1,2-DCE): Common volatile organic solvent formerly used for cleaning, degreasing, or other uses in commerce and industry.

Applicable or Relevant and Appropriate Requirements (ARARs): The federal and state requirements with which a selected remedy must comply. These requirements may vary among sites and remedial activities.

Administrative Record: An official compilation of site-related documents, data, reports, and other information that are considered important to the status of and decisions made relative to a Superfund site. The public has access to this material.

Carcinogenic: A type of risk resulting from exposure to chemicals that may cause cancer in one or more organs.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): A federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act (SARA). The Act created a trust fund, known as Superfund, to investigate and clean up abandoned or uncontrolled hazardous substance facilities.

Feasibility Study (FS): Report identifying and evaluating alternatives for addressing the contamination present at a site or group of sites.

Groundwater Quality Standards (GWQS): New-Jersey-promulgated groundwater quality requirements, N.J.A.C. 7:9-6.

Hazard Index (HI): The sum of chemical-specific Hazard Quotients. A Hazard Index of greater than 1 is associated with an increased level of concern about adverse non-cancer health effects.

Hazard Quotient (HQ): A comparison of the level of exposure to a substance in contact with the body per unit time to a chemical-specific Reference Dose to evaluate potential non-cancer health effects. Exceedence of a Hazard Quotient of 1 is associated with an increased level of concern about adverse non-cancer health effects.

Initial Assessment Study (IAS): Preliminary investigation usually consisting of review of available data and information on a site, interviews, and a non-sampling site visit to observe areas of potential waste disposal and migration pathways.

Land Disposal Restrictions (LDRs): A set of USEPA-prescribed limit concentrations with associated treatment standards regulating disposal in landfills.

Maximum Contaminant Level (MCL): USEPA-published (promulgated as law) maximum concentration level for compounds found in water in a public water supply system.

Noncarcinogenic: A type of risk resulting from the exposure to chemicals that may cause systemic human health effects.

National Contingency Plan (NCP): The basis for the nationwide environmental restoration program known as Superfund; administered by USEPA under the direction of the U.S. Congress.

National Priorities List (NPL): USEPA's list of the nation's top-priority hazardous substance disposal facilities that may be eligible to receive federal money for response under CERCLA.

Presumptive Remedy: Preferred technologies for common categories of sites based on historical patterns of remedy selection and USEPA's scientific and engineering evaluation of performance data on technology implementation. Presumptive remedies ensure the consistent selection of remedial actions.

Record of Decision (ROD): A legal document that describes the remedy selected for a Superfund facility, why the remedial actions were chosen and others not, how much they are expected to cost, and how the public responded.

Reference Dose (RD): An estimate with an uncertainty spanning an order of magnitude or greater of a daily exposure level for the human population, including sensitive subpopulations, that is likely to be without an appreciable risk of deleterious effects during a portion of a lifetime.

Remedial Action Objective (RAO): An objective selected in the FS against which all potential remedial actions are judged.

Remedial Investigation (RI): Study that determines the nature and extent of contamination at a site.

Site Inspection (SI): Sampling investigation with the goal of identifying potential sources of contamination, types of contaminants, and potential migration of contaminants. The SI generally is conducted prior to the RI.

Semivolatile Organic Compounds (SVOCs): Organic chemicals [e.g., phthalates or polycyclic aromatic hydrocarbons (PAHs)] that do not readily evaporate under atmospheric conditions.

Target Compound List/Target Analyte List (TCL/TAL): List of routine organic compounds (TCL) or metals (TAL) included in the USEPA Contract Laboratory Program.

Trichloroethene (TCE): Common volatile organic solvent formerly used for cleaning, degreasing, or other uses in commerce and industry.

Volatile Organic Compounds (VOCs): Organic liquids [e.g., vinyl chloride or trichloroethene (TCE)] that readily evaporate under atmospheric conditions.

APPENDIX B

ATTENDANCE LIST

January 15, 2003 AND May 6, 2003

PUBLIC MEETINGS

ATTENDANCE LIST
JANUARY 15, 2003
RESTORATION ADVIORY BOARD MEETING

NAME	ORGANIZATION
Larry Burg	NWS Earle
Michele DiGeambeardino	Engineering Field Activity Northeast
Gus Hermanni	NWS Earle
John Mayerski	RAB Member
Russell Turner	Tetra Tech NUS
Bob Marcolina	NJDEP - BCM
Nancy Eldredge	NWS Earle
Lester Jargowsky	Monmouth County Health Department
Mary Lanko	Howell Resident
Chris Kerlish	EA Engineering and Science
Rick Woodworth	Foster Wheeler Environmental Corp
Chris Joblon	Foster Wheeler Environmental Corp
Sharon Brown	Public

ATTENDANCE LIST
MAY 6, 2003
PUBLIC MEETING

NAME	AFFILIATION	E-MAIL	PHONE
Russ Turner	Tetra Tech	turnerr@ttnus.com	610-491-9688
Michele DiGeambeardino	EFANE - RPM	digeambeardinomx@efane.navfac.navy.mil	610-595-0567 x117
Bob Marcolina	NJDEP-BCM		609-633-7237
Chris Kerlish	EA Engineering	ckerlish@eaest.com	732-404-9370
Jessica Mollin	USEPA	mollin.jessica@epamail.epa.gov	
John Mayerski	RAB (Colts Neck)		732-462-9608
Carol Balmer	Holmdel Zoning Board		732-946-3507
Mary Lanko	Howell Resident		732-462-2199
Merwin Kinkade	Tinton Falls	merwin@viridianinc.com	
Gus Hermani	NWS Earle		732-866-2624
Nancy Eldredge	NWS Earle		
Larry Burg	NWS Earle	lburg@earle.navy.mil	732-866-2621
Lester Jargowsky	Monmouth County Health Department		732-303-2157

APPENDIX C

RESPONSE TO QUESTIONS AND COMMENTS
RAB MEETING HELD ON JANUARY 15, 2003
PUBLIC MEETING HELD ON MAY 6, 2003

RESPONSIVENESS SUMMARY
OU 5 ROD (Site 13)
NAVAL WEAPONS STATION EARLE
COLTS NECK, NEW JERSEY
(January 15, 2003 RAB Meeting)

I. Reply to Comments on the Site 13 Proposed Plan

1. A member of the public asked if the wastes disposed at Site 13 were typical municipal wastes.

Response: Mr. Turner replied that test pits dug at the site for the purpose of characterizing landfill contents and identifying the southern limit of landfill activity, encountered crushed metal drums, empty used metal shell casings, metal cables, metal doors, an air compressor, and rubber materials.

2. A member of the public mentioned that there are stories that the landfill was used to dispose of equipment.

Response: Mr. Turner agreed that there are stories of equipment and maybe a car being buried there that appear to be at least partly true. At least one piece of equipment was found in a test pit and other equipment was removed by the Navy from the site surface during a clean up performed several years back.

3. A member of the public stated that the planned cap is elaborate.

Response: Mr. Turner replied that the Navy, USEPA and NJDEP discussed the type of cover system that would be protective of human health and the environment. The Navy proposed this RCRA-type cap that was acceptable to all parties.

4. A member of the public asked if no pesticides or PCB's were encountered in that neighborhood.

Response: Mr. Turner replied PCB's, pesticides and petroleum compounds were found in sediments at two drainage areas at levels that could impact ecological receptors. Although the ecological risk assessment concluded that there would be low risk from these compounds, the Navy proposes to excavate these sediments and place them in an area to be capped.

5. A member of the public asked if the Navy plans to collect any landfill leachate for off site treatment or disposal or will all remediation be performed on site.

Response: Mr. Turner replied that right now the site is stable. There is no leachate collected or being discharged to bother human or ecological receptors. The proposed remedial actions will not result in any leachate for treatment or disposal.

6. A member of the public asked what type of institutional controls might be put in place.

Response: Mr. Turner referred to a projected slide of the site to point out the existing fence and the location of the proposed fence after the landfill cap is installed. The entire former landfill area would be capped and then surrounded by a new fence with gates to limit access. Besides being within a secure Navy Base, there would be a fence around the site with signs limiting access and saying what types of activities would not be permitted, like excavation, excessive vehicular traffic or other activities that could damage the cap.

7. A member of the public asked who will maintain the cap.

Response: Mr. Burg and Ms. DiGeambeardino replied that the Navy will maintain the cap. The cap installation contractor will prepare an Operations and Maintenance Manual and maintain the landfill cap for the first year. The Navy will remain responsible after that.

8. A member of the public asked if there were copies of the Proposed Plan that they could take with them.

Response: Mr. Burg replied that he had copies for the public, but that with new security measures on the Navy Base in response to possible terrorism, there was one map included that may be a security problem. Copies with the figure removed could be distributed to anyone requesting one.

RESPONSIVENESS SUMMARY
OU 5 ROD (Site 13)
NAVAL WEAPONS STATION EARLE
COLTS NECK, NEW JERSEY
(May 6, 2003 Public Meeting)

II. Reply to Comments on the Site 13 Proposed Plan

1. A member of the public asked if there was any indication of contaminant migration, and if there was no indication of migration why weren't the other less costly alternatives selected. Why was the more expensive alternative selected?

Response: Mr. Turner replied that the groundwater contains contaminants that do not appear to be migrating beyond the wetland area to the north. Contaminated groundwater has not been found migrating to surface water bodies like Hockhochson Brook to the north. After discussions among the Navy and the regulatory agencies, the landfill cap was proposed and accepted in part to reduce the potential for continued (rain) water infiltration through the landfill contents. Ms DiGeambeardino added that there was also the objective to cover the landfill to preclude human or ecological contact with landfill contents.

2. A member of the public asked what levels of arsenic were found. Were the levels significant? What is the New Jersey DEP standard?

Response: Mr. Turner replied that the levels of arsenic (found at a range from 15.2 to 29.2 micrograms per liter (ug/l)) in groundwater were above the NJDEP standard as well as background concentrations of arsenic in the area, so there was no choice but to propose a Classification Exception Area (CEA). Ms DiGeambeardino and Mr. Marcolina added that the NJDEP standard is 8 ug/l maximum.

3. A member of the public asked about the planned sampling of sediment/soil from the two "washout" areas indicated on the figure displayed in the presentation. One of the areas appears to be within about 20 feet of an existing fence in what appears to be a channelized stream. Is that the Hockhockson Brook or a tributary? Is it only sampling that is proposed, not removal of say 500 cubic feet of soil?

Response: Mr. Turner replied that the Navy has prepared a work plan to sample sediment/soil in the two "washout" areas to delineate the extent of silver and other contaminants thought to be there. The Navy plans to obtain approximately 30 samples for analysis to identify the extent of

contamination. Ms. DiGeambeardino mentioned that the Navy is in the process of preparing the sampling work plan. Depending on the results of sediment/soil sampling, an excavation of sediment/soil would be performed to remove contaminated materials. Any excavated areas would be restored to pre-excavation conditions, and the fence, if it would have to be removed for remediation, would be replaced in an equal or better condition in the same place.

4. A member of the public asked if the contaminated soil excavated from the "washout" areas would be used for the cap.

Response: Mr. Turner replied that the excavated sediments or soils would be placed in an area on the existing landfill that will eventually be capped. The soils, although not hazardous, would be placed under the (to be constructed) cap for ease of disposal. Mr. Burg and Ms. DiGeambeardino clarified that the excavated materials would be under the cap so that there would be no future exposure to them.

5. A member of the public asked if there would continue to be erosion washout areas after the Navy grades the landfill and places the cap.

Response: Mr. Turner replied there would be a careful design and maintenance to ensure no erosion of the cap.

6. A member of the public asked if the costs for institutional controls are included in the estimated costs. For instance, is the cost of the fence included?

Response: Mr. Turner replied that the cost estimate prepared to implement the proposed remedy includes an estimate of the cost for fencing and other institutional controls.