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RECORD OF DECISION SITE 9 LANDFILL SOUTHEAST OF "P" BARRICADES OPERABLE UNIT 11 (OU 11) NWS EARLE NJ

08/01/2014

TETRA TECH

RECORD OF DECISION

SITE 9
LANDFILL SOUTHEAST OF "P" BARRICADES
OPERABLE UNIT (OU) 11

NAVAL WEAPONS STATION EARLE, COLTS NECK, NEW JERSEY

NAVFAC
Naval Facilities Engineering Command

AUGUST 2014

1.0 DECLARATION

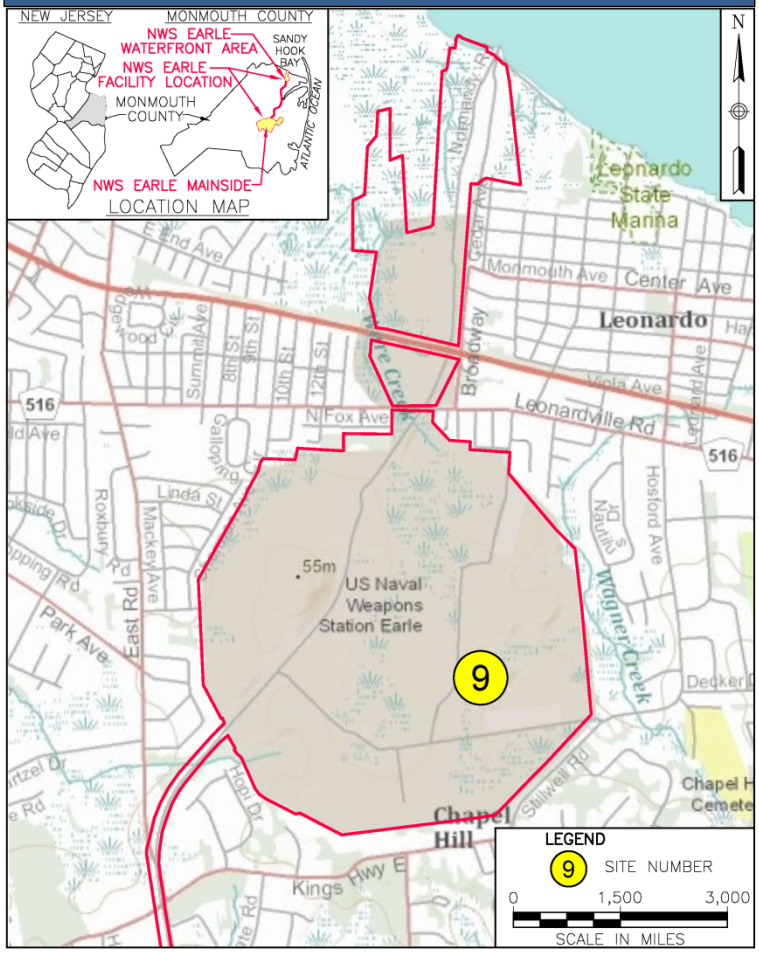
1.1 SITE NAME AND LOCATION

Site 9 – Landfill Southeast of "P" Barricades, Operable Unit (OU) 11 at Naval Weapons Station (NWS) Earle, Colts Neck, New Jersey, United States Environmental Protection Agency (EPA) ID number NJ0170022172.

1.2 STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) presents the Selected Remedy for Site 9 (see Figure 1-1), which was selected by the United States Navy (Navy) and EPA in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act, as amended (CERCLA), 42 U.S.C. §§9601, et seq, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on information contained in the Administrative Record for the site. The New Jersey Department of Environmental Protection (NJDEP) concurs with the Selected Remedy.

FIGURE 1-1 SITE LOCATION MAP



1.3 DESCRIPTION OF SELECTED REMEDY

The Navy and EPA, in consultation with the NJDEP, have determined that a CERCLA remedial action is not necessary at Site 9 to protect the public health and welfare or the environment from actual or threatened releases of hazardous substances, pollutants, or contaminants into the environment. No action (NA) is the Selected Remedy for Site 9.

1.4 STATUTORY DETERMINATIONS

No threats to human health or the environment have been identified at Site 9; therefore, no remedial action is required. This NA determination meets the requirements of CERCLA Section 121 and the NCP. Because no hazardous substances, pollutants, or contaminants are present at the site in excess of levels that allow for unlimited use and unrestricted exposure, five-year reviews are not required.

No remedial action is necessary to ensure protection of human health and the environment at Site 9.

1.5 AUTHORIZING SIGNATURES

4 August 2014

R. C. Valentine, Captain, U.S. Navy
Commanding Officer
Naval Weapons Station Earle

Date

September 18, 2014

Walter Mugdan, Director
Emergency Remedial Response Division
U. S. Environmental Protection Agency,
Region 2

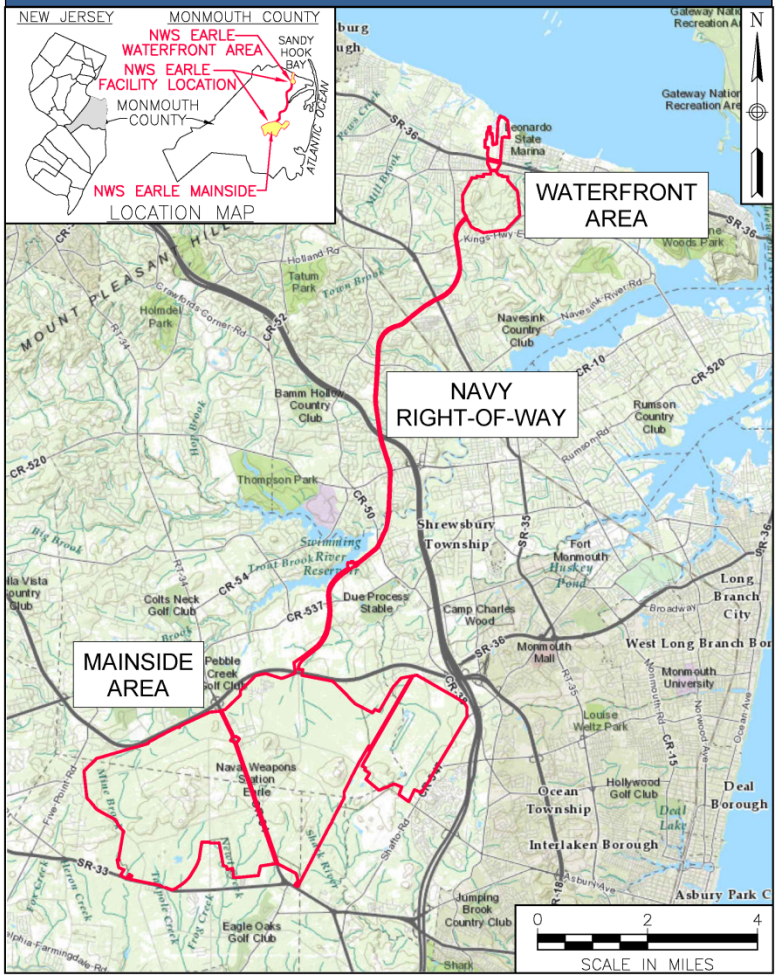
Date

2.0 DECISION SUMMARY

2.1 SITE NAME, LOCATION, AND BRIEF DESCRIPTION

NWS Earle, EPA ID number NJ0170022172 is located in Monmouth County, New Jersey, approximately 47 miles south of New York City. Commissioned in 1943, the primary mission of NWS Earle is to supply ammunition to the Atlantic Fleet. The station consists of two areas, the 10,248-acre Main Base (Mainside area), located inland, and the 706-acre Waterfront Area. The two areas are connected by a 10-mile-long corridor that serves as a right-of-way for a government road and rail line (see Figure 2-1).

FIGURE 2-1 FACILITY LOCATION MAP

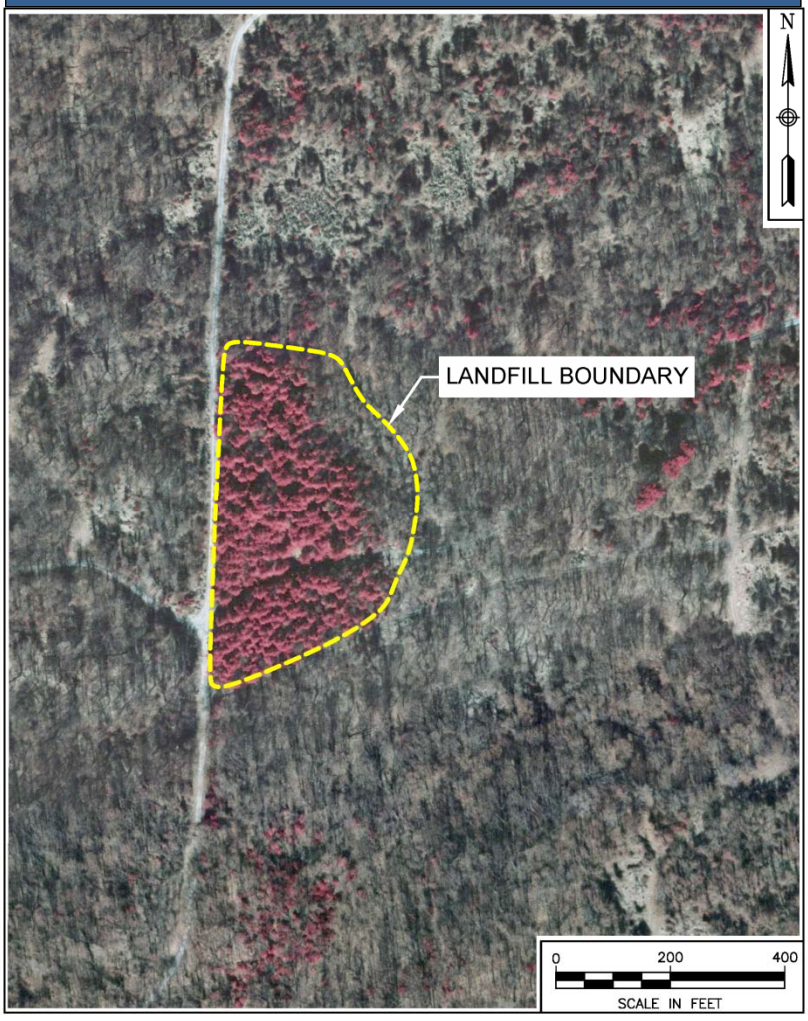


The Mainside area is located in Colts Neck Township and consists primarily of a large area specially developed for ordnance handling and storage operations; the area is encumbered by explosive safety quantity distance (ESQD) arcs. Other land use in the Mainside area consists of residences, offices, workshops, warehouses, recreational space, open space, and undeveloped land. The Waterfront Area, approximately 20 percent of which is considered marshland, is located in Middletown Township. The surrounding land use is commercial and single-family residential. Munitions and other supplies destined for Navy ships are transported through the 10-mile-long right of way from the Mainside to the Waterfront Area and to waiting ships at piers located in the Lower Hudson River Bay near Sandy Hook, New Jersey. Site 9 is located in the southern portion of the Waterfront Area known as Chapel Hill.

Site 9, the Landfill Southeast of "P" Barricades, is approximately 3 acres in size based on a 1974 EPA Environmental Photographic Interpretation Center (EPIC) aerial photograph and test pit investigations conducted in 1982 and 1995. From 1967 to 1972, the site was used for the **disposal of dunnage lumber** and construction debris from Waterfront operations. Dunnage is lumber that is used to secure and space a ship's cargo during transport. The waste lumber was stacked, burned (using a petroleum ignition source), and then covered with local soil. The landfill materials were covered with a thin to non-existent layer of loose sand quarried from the surrounding area. An estimated **4,500 to 7,500 cubic yards** of lumber were disposed of in this manner. The immediate areas surrounding Site 9 are heavily wooded. An unpaved road provides access to the site. The site is currently covered by pine trees and tall grasses. Figure 2-2 details the current site layout.

NWS Earle is an active facility, and CERCLA environmental investigations and remediation at the base are funded under the Department of the Navy Environmental Restoration Program (ER Program). The Navy is the lead agency for CERCLA activities at the facility, and EPA and NJDEP are support agencies.

FIGURE 2-2 AERIAL PHOTOGRAPH OF SITE 9



2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

Table 2-1 provides brief summaries of previous investigations at Site 9. Previous investigations found that approximately 3 acres of the site were used for the disposal of waste lumber, known as dunnage, and some construction debris from Navy operations at the Waterfront Area.

TABLE 2-1. PREVIOUS INVESTIGATIONS AND SITE DOCUMENTATION

INVESTIGATION	DATE	ACTIVITIES
Initial Assessment Study	1983	Site-wide survey that identified 29 areas of concern at NWS Earle based on employee interviews, record searches, and site tours. No sampling was conducted, and Site 9 was not recommended for a confirmation study.
Site Investigation (SI)	1991-1992	In May 1992, as part of a facility-wide SI**, test pits** were excavated at Site 9 to define the general limits of former site operations and to collect soil samples for chemical analysis. Six test pits were excavated to depths ranging from 7 to 10 feet below ground surface (bgs).
Phase II Remedial Investigation (RI)	1995-1996	In December 1995, as part of the base-wide RI, two additional test pits were excavated at Site 9. Surface and sediment samples were also collected from three locations within an intermittent stream that is located approximately 300 feet south of Site 9. One set of surface water and sediment samples were collected from Wagner Creek located east of the site. The objective of the RI test pit investigation was to confirm the northern extent of the filled area.
Feasibility Study (FS)	2013	Based on the results of the SI and RI field investigations, a FS was conducted. One remedial alternative was identified and evaluated.

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

2.3 COMMUNITY PARTICIPATION

The Navy performed public participation activities in accordance with CERCLA and the NCP throughout the CERCLA site cleanup process at NWS Earle. The Navy has a community relations program for NWS Earle, and community relations activities are conducted in accordance with the NWS Earle Community Relations Plan. These activities include technical and Restoration Advisory Board (RAB) meetings with local officials and the establishment of an Information Repository at the local library for dissemination of information to the community. The public participation activities conducted by the Navy in accordance with CERCLA meets the requirements for Notification and Public Outreach as outlined by NJDEP for site remediation.

The Navy organized a RAB in 1995 to review and discuss NWS Earle environmental issues with local community officials and concerned citizens. The RAB consisted of representatives of the Navy, EPA, NJDEP, and members of the community. The RAB met routinely as a number of the ER Program sites were investigated and remediated. However, in recent years, the Navy has received little or no response when RAB meetings have been announced or arranged by the Navy. As a result, public meetings and comment periods are announced and held by the Navy as needed for specific sites (i.e., Site 9 Proposed Plan) and will continue to be held as the remaining ER Program sites at NWS Earle are addressed. Additional RAB meetings and/or distribution of information will be held and arranged if requested by the local community. The NWS Earle Information Repository is located at the Monmouth County Library – Eastern Branch, 1001 Route 35, Shrewsbury, New Jersey. Documents and other relevant information relied on in the remedy selection process are available for public review at the Information Repository, which includes a copy of the Administrative Record. For access to the Administrative Record or additional information about the Environmental Restoration Program at NWS Earle, contact the NWS Public Affairs Office, Building C-2, 201 Highway 34 South, Colts Neck, NJ, 07722.

In accordance with Sections 113 and 117 of CERCLA, the Navy provided a public comment period from January 13 to February 13, 2014, for the proposed NA described in the Proposed Plan for Site 9. A public meeting to present the Proposed Plan was held on January 28, 2014, at the Middletown Township Municipal Building, 1 Kings Highway, Middletown New Jersey. **Public notice** of the meeting and availability of documents was published in the Asbury Park Press on January 11 through January 13, 2014.

2.4 SCOPE AND ROLE OF OPERABLE UNIT

Site 9 is part of a comprehensive environmental investigation and cleanup program currently being performed at NWS Earle under CERCLA authority pursuant to the Federal Facility Agreement (FFA) signed by the Navy in December 1990. Navy ER Program cleanup activities are being performed under CERCLA, except at those sites that are subject to Resource Conservation and Recovery Act (RCRA) regulations or the NJDEP Underground Storage Tank (UST) program. Site 9 has been identified by EPA as OU 11 and is one of the 27 Installation Restoration (IR) sites that have been identified at NWS Earle. RODs for OUs 1 through 10 have been finalized and signed by the Navy and EPA. The Site Management Plan (SMP) for NWS Earle further details the IR sites, OU designations, ROD issuance dates (if applicable), and schedule for post-ROD activities. The SMP is updated by the Navy on a regular basis.

No remedial actions are required at Site 9 because no unacceptable risks to human health or the environment were identified.

2.5 SITE CHARACTERISTICS

Figure 2-3 presents the Site 9 conceptual site model (CSM), which identifies potential contaminant sources, contaminant release mechanisms, transport routes, and receptors under current and future land use scenarios. The primary contaminant release and transport mechanisms include infiltration of precipitation through site soil. Runoff and erosion of site-related constituents are also plausible release and transport mechanisms, but to a much lesser extent due to vegetation (ground cover and tree cover) present at the site. Human health and ecological receptors are discussed in Sections 2.7.1 and 2.7.2, respectively.

2.5.1 Physical Characteristics

Site 9 is located in a heavily wooded area within the Chapel Hill portion of the Waterfront Area. The site is accessed by a dirt road to the west and is covered by pine trees and tall grasses.

As noted in the SI Report, the original soils within Site 9 are part of the Tinton-Phalanx Group. In general, shallow soils at Site 9 consisted of a silty sandy loam, dark yellow brown to light yellowish brown in color. Coarse fragments of iron-cemented sandstone were also encountered in the test pits.

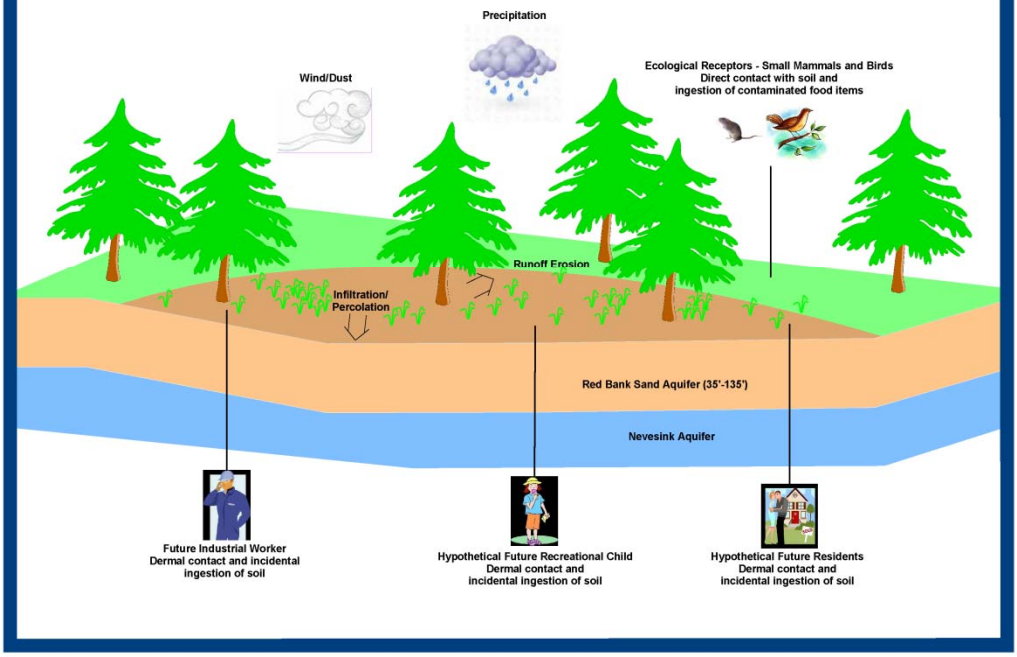
Based on the test pit findings and soil analyses results, the 1992 SI concluded that past activities at Site 9 have had minimal impact on site soils. Small amounts or pieces of brick fragments, steel sheeting, metal banding, burnt wood, and timber were identified in several test pits.

2.5.2 Nature and Extent of Contamination

Soil

The soil sampling at Site 9 was limited to subsurface soil due to the lack of visible impacts to surface soil noted during the SI and RI test pit investigations. The **Site 9 test pit soil samples** were collected from depths ranging from 3 to 10 feet below ground surface (bgs). Summary tables of the detected soil analytical results and comparison to NWS Earle background subsurface and surface soil concentrations

FIGURE 2-3 SITE 9 CONCEPTUAL SITE MODEL



are provided in Appendix A. Additional detail is provided in the 1996 RI Report. None of the detected compounds exceeded NJDEP residential or non-residential soil remediation standards. During the 1996 RI, no waste fill, dunnage lumber, or construction debris was encountered in the test pits that were excavated. Based on this visual evidence, no soil samples were collected or analyzed during the 1996 RI.

Surface Water and Sediment

An intermittent stream/drainage ditch tributary to Wagner Creek is located approximately 300 feet south of Site 9. As noted in the RI report, the tributary is small and usually dry; water is present only after periods of heavy rainfall. **Three surface water and three sediment samples** were collected from the tributary as part of the 1996 RI. A number of inorganic and organic compounds were detected in surface water or sediment samples collected from the intermittent stream/drainage ditch tributary and Wagner Creek; however, many of the detected compounds were not detected in any of the Site 9 test pit soil samples. Therefore, these compounds are unrelated to Site 9. Appendix B contains summary tables of the compounds and analytical results detected in surface water and sediment samples collected as part of the 1996 RI.

2.6 CURRENT AND POTENTIAL FUTURE SITE AND RESOURCES USES

NWS Earle is an active Navy facility and is expected to remain active for the foreseeable future. The primary mission of the facility is to supply ammunition to the Atlantic Fleet.

Site 9 is located in the southern portion of the Waterfront Area in a heavily wooded area. The Navy currently does not use Site 9 and does not have any plans to change its current non-use status.

Groundwater classification areas are established in New Jersey under the Groundwater Quality Standards in New Jersey Administrative Code (N.J.A.C.) 7:9C. The Waterfront Area, including Site 9 is

located in a Class II-A: Groundwater Supporting Potable Water Supply area. Currently, groundwater underlying Site 9 is not used for drinking water and is not expected to be used in the future. The various buildings and facilities located in the Waterfront Area are connected to a public water supply (New Jersey American Water Company).

2.7 SUMMARY OF SITE RISKS

2.7.1 Summary of Human Health Risk Assessment

A **human health risk assessment** (HHRA) was performed as part of the 2013 FS process. The HHRA concluded that soil did not present an unacceptable risk to current or potential users. For future exposure scenarios the calculated reasonable maximum exposure (RME) carcinogenic and non-carcinogenic risks were within EPA's target acceptable risk range. Table 2-2 summarizes the **hypothetical future exposure pathways** at Site 9 and Appendix C contains a summary table of the calculated RME carcinogenic and non-carcinogenic risks for the exposure scenarios with and without background contribution as outlined in the 2013 HHRA.

TABLE 2-2. RECEPTORS AND EXPOSURE ROUTES EVALUATED IN HHRA

Receptor	Exposure Routes
Future Recreational User	Surface soil dermal absorption
Future Residential Child	Surface soil ingestion Surface soil dermal absorption Surface soil inhalation
Future Residential Adult	Surface soil ingestion Surface soil dermal absorption Surface soil inhalation
Future Lifetime Resident	Surface soil ingestion Surface soil dermal absorption Surface soil inhalation
Future Industrial Worker	Subsurface soil ingestion Subsurface soil dermal absorption Subsurface soil inhalation
Future Construction Worker	Subsurface soil ingestion Subsurface soil dermal absorption Subsurface soil inhalation

The HHRA identified chemicals of potential concern (COPCs) that were the principal inorganics or organics contributing to the RME calculated risks. The principal COPCs that were identified as contributing to the calculated risk were aluminum, arsenic, chromium, and iron. Note that, out of the four COPCs, only aluminum was present at levels that were shown to be statistically greater than NWS Earle background levels.

2.7.2 Summary of Ecological Risk Assessment

In June 2011, the Navy conducted a **screening-level ecological risk assessment (ERA)** at Site 9. The purpose of the Site 9 ERA was to determine whether adverse ecological impacts are potentially occurring from exposure to chemicals released to the environment as a result of historical operations at the site. Based on the habitat present at Site 9, potentially exposed ecological receptors include a variety of terrestrial plants, invertebrates, mammals, and birds that may be exposed to chemicals in site soil. From the initial screening of the chemical data, several chemicals were initially selected as COPCs in soil. These included aluminum, iron, lead, vanadium, zinc, cyanide, chloroform, and methoxychlor.

The initial set of soil COPCs was further evaluated by refining the conservative assumptions in order to focus the ERA process on the chemicals of greatest concern at the site. After this step, no chemicals

were retained as COPCs in soil for risks to terrestrial plants, invertebrates, mammals, or birds. Based on the ERA, no site-related contaminants posed potential ecological concern and no risks to ecological receptors need to be addressed at Site 9.

2.7.3 No Action Determination

The overall objective for the remediation of CERCLA sites is to protect human health and the environment from current or future risks posed by the site. Based on the baseline HHRA, the ERA, and the current and reasonably anticipated future use of the site, no CERCLA remedial action is warranted for Site 9 environmental media.

2.8 DOCUMENTATION OF SIGNIFICANT CHANGES

CERCLA Section 117(b) requires an explanation of significant changes from the selected remedy presented in the Proposed Plan that was published for public comment. No significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate.

3.0 RESPONSIVENESS SUMMARY

3.1 STAKEHOLDER COMMENTS AND LEAD AGENCY RESPONSES

Participants in the public meeting held on January 28, 2014, included representatives of the Navy, EPA, and NJDEP. Questions and concerns raised at the meeting were addressed at the meeting, as summarized in Table 3-1. Written comments were received from one citizen during the public comment period and are summarized in Table 3-2 below.

TABLE 3-1. SUMMARY OF QUESTIONS FROM PUBLIC INFORMATION SESSION

Question	Response
A member of the public asked if there was a public website that the Proposed Plan was located on.	The web address to the NWS Earle website is: http://go.usa.gov/kYQW
A member of the public asked how dunnage lumber was treated.	Ms. Mang (Tetra Tech, Navy Contractor) indicated that no information on the type of preservatives used on the lumber during the 1967 to 1972 time period was available. Ms. Bergman (NJDEP) indicated that fuel was used as an ignition source and that the soil samples collected from the test pits were analyzed for the full suite of TCL/TAL parameters including volatiles, semivolatiles, metals, pesticides and PCBs and the results were below New Jersey residential soil cleanup standards.
A member of the public asked if PAH was included in the analysis.	Ms. Bergman (NJDEP) explained that since the analyses included semivolatiles, the individual PAH constituents would have been analyzed.
A member of the public asked how far upstream does the intermittent stream go. Does it leave the base or does it originate in the base.	Ms. Mang (Tetra Tech, Navy Contractor) explained that the stream is located upgradient of Site 9 and that the point where it originates could be determined. As noted in the 1996 RI Report the stream is intermittent and water is present only after heavy rainfalls. The origination point of the intermittent stream is not defined in the RI Report.
A member of the public asked what metals were found in Wagner Creek sediments that are associated with the activity at Site 9.	Ms. Mang (Tetra Tech, Navy Contractor) explained that while metals were detected in the sediments, it could not be concluded that they were related to the activities at Site 9. Four different organic compounds were detected in the sediment samples; however, only one of the four compounds was detected in the Site 9 test pit soils. The concentration detected in the Site 9 soil sample was below residential and non-residential NJDEP levels and below the level found in the stream sediment sample.

TABLE 3-2. SUMMARY OF WRITTEN COMMENTS FROM TOWNSHIP OF MIDDLETOWN ENVIRONMENTAL COMMISSION

Question	Response
Background Information. Several of the following comments are due to the omission of historical information. Data summary tables from the 1992-94 Site Investigation (SI) and 1995-96 Remedial Investigation (RI) are presented, however, associated information such as soil logs and sample location maps were not included to support the data.	As outlined in USEPA guidance, the purpose of the Proposed Plan is to present to the public the preferred alternative or remedy for a given site and briefly summarize background information on the site and alternatives studied and evaluated. The Proposed Plan and the other documents prepared as part of the Remedial Investigation/Feasibility Study process form the basis for identification and selection of the preferred alternative. Soil logs and sample location maps are provided in the respective reports for the SI (January 1994) and RI (March 1996). The sampling logs, figures

TABLE 3-2. SUMMARY OF WRITTEN COMMENTS FROM TOWNSHIP OF MIDDLETOWN ENVIRONMENTAL COMMISSION	
Question	**Response**
	showing sample locations, summary of analytical results, and comparison to NJDEP and EPA regulatory criteria are included in the April 2013 Feasibility Study report. These reports are available in the NWS Earle public repository which is located at the Monmouth County Library Eastern Branch, Route 35, Shrewsbury, New Jersey.
Landfill Dimensions and Contents. (a) How thick is the landfill material? The test pit soil samples were collected over a 2 to 4-foot depth interval. Such sampling would be composite sample and not discretely collected from a 6-inch interval. (b) Are the samples from the landfill material or the underlying native soil? If native soil, the analytical results document the ability of the overlying landfill contaminants to become soluble and vertically migrate downward via rainfall infiltration. The pesticide traces suggest downward migration. (c) The landfill was mostly waste lumber however anything that is considered "waste" could have been added to the landfill. The presence of trace volatile organic compounds (VOCs) and pesticides document these potential non-lumber additions to the landfill. (d) The landfill contents should have been sampled and submitted for PP+40 analyses as the worse-case materials. Documenting the magnitude of the contents' contamination should be the most important basis for determining the feasibility of a "No Action" proposal for these materials.	(a) No significant amount of buried waste materials were found in any of the test pits conducted as part of the May 1992 and December 1995 field investigations. The Navy used the site to burn waste dunnage lumber. The test pit logs identified only several pieces of debris such as cement, trace brick fragments, steel sheeting, metal bands, wood and timber pieces, and plaster sheeting. The majority of these items were found near or at the landfill surface; no layer or horizon of waste fill was identified in any of the excavated pits. The maximum depth of the May 1992 test pits was 10 feet bgs. The two test pits excavated in December 1995 as part of the RI field investigation were completed to a final depth of 8.5 feet. (b) As noted in the 2013 FS Report, the January 1994 SI Report indicated that samples were collected at specified horizons considered to be representative of potentially impacted soils that were in contact with waste materials. Where no waste materials were encountered, samples were taken from immediately above the soil/water interface, or, if no water was encountered, from the base of the test pit. (c) and (d) The 1992 test pit samples were analyzed for EPA Contract Laboratory Program (CLP) TAL metals, TCL volatile and semivolatiles organic compounds, pesticides, PCBs, and total petroleum hydrocarbons. The complete summary table of analytical results is provided in Appendix C of the 2013 FS Report. An HNU field instrument was used to monitor organic levels in air during the excavation of the 1992 test pits. All HNU readings listed in the 1992 test pit logs were 0.0. An HNU instrument was also used to measure organic levels in air during the 1995 test pit investigation. All reported HNU readings were 0 parts per million (ppm) during the 1995 investigation of Site 9.
Leaching Potential. (a) The presence of pesticides 3 to 6 feet below grade suggests leaching of the landfill contents. (b) The presence of the chlorinated VO compound tetrachloroethene (PCE) in the stream sediment is a red flag. The site history documented by historic aerial photographs was from an active farm, successional field, active landfill, and successional forest. The only potential PCE source was its disposal into the landfill. From the point where the PCE occurrence was detected further sampling upstream to detect the source and downstream to delineate its extent should have been performed. Were the sediment samples (WS SD series) collected sequentially along the stream length? If so, sample WS SD 20 presented as the "last" sample suggests it PCE presence continued either farther upstream or downstream depending on the direction of the	(a) The levels of 4,4'-DDD, 4,4'-DDE and 4,4'-DDT detected in test pits TP9-04 and TP9-05 were data qualified "J" meaning that the concentration value was estimated because it was below the analytical method quantitation level. The detected levels ranged from 0.41J micrograms per kilogram (µg/kg) to 1.2J µg/kg. As outlined in Table 1-2 from the 2013 FS Report, the USEPA Regional Screening Level (RSL) for residential soil exposure for 4,4'-DDD is 2,000 µg/kg; for 4,4'-DDE is 1,400 µg/kg, and 4,4'-DDT is 1,700 µg/kg. RSLs for industrial soil exposure are also outlined in the table. RSLs are risk-based values developed by the USEPA for exposure to a given contaminant and are used as a screening tool to determine if a site requires further investigation. The levels of 4,4'-DDD, 4,4'-DDE and 4,4'-DDT detected in the test pit samples are significantly below the RSLs for both residential and

TABLE 3-2. SUMMARY OF WRITTEN COMMENTS FROM TOWNSHIP OF MIDDLETOWN ENVIRONMENTAL COMMISSION	
Question	**Response**
sequential sampling. (c) The sediment samples were analyzed for VOs, base neutrals, TAL metals and geochemical compounds. The analyses of the sediment and water should have been for the same parameters and included VOs and base neutrals. (d) What has been found suggests contaminant migration and potential leachate from a "lumber" landfill. This potential to ground water contamination should be further investigated. The presence of contaminant mobilization would lead to a permanent impermeable cap over the landfill or the removal of the landfill contents.	non-residential exposure scenarios. Methoxychlor was detected in one test pit sample (TP9-04) at 93 µg/kg. The USEPA RSL for methoxychlor for residential soil is 31,000 µg/kg. Therefore, while several pesticides were detected in two of the test pit soil samples, the levels detected are significantly below current USEPA screening levels for residential direct contact soil exposure. Current and foreseeable land use is non-residential as the Navy has no plans to change the current use of the site. (b) Sediment sample WSSD20 is located in Wagner Creek and was the farthest downstream sediment sample detected during the 1995 RI field investigation. This location is downstream of the location where the unnamed intermittent stream merges into Wagner Creek. PCE was detected in one sediment sample from the intermittent stream, just east of a dirt road (WSSD17). This concentration (24J µg/kg) was lower than the concentration detected in the Wagner Creek sample (46 µg/kg). PCE was not detected in any of the six test pit soil samples. Based on no detection of PCE in any of the test pit samples and the location of sample WSSD17 from the site (estimated 600 feet away), it was concluded that Site 9 was most likely not the source of PCE in the stream sediment samples. (c) Tables 1-3 and 1-4 from the 2013 FS Report summarize the analytical data for the RI surface water and sediment samples. Surface water and sediment samples were analyzed for the same list of parameters: TAL inorganics, TCL semivolatile and volatile organic compounds and a number of miscellaneous compounds. (d) Test pits excavated into the landfill did not find the presence of any significant amount or layer of buried lumber waste, in fact, only several pieces of wood, concrete or bricks were found. Soil sampling at Site 9 was limited to subsurface soil due to the lack of any visible impacts to surface soil as determined by visual investigations conducted during the 1992 SI and 1995 RI field investigations. As part of the 2013 FS, the analytical results from soil collected from the 1992 test pit investigation were compared to current USEPA screening levels for residential and nonresidential soil exposure and background soil levels detected as part of the 1995 RI. Aluminum, potassium, and silver were the only metals detected in the Site 9 samples at concentrations above background levels. Aluminum and iron were detected at levels greater than the residential RSL; arsenic and total chromium were detected at levels greater than their respective RSLs for residential and nonresidential. However, arsenic, iron, and total chromium did not exceed the levels found in background surface and subsurface soils. Based on these findings, the Navy, USEPA, and NJDEP concluded that a groundwater investigation at Site 9 is not warranted.
Dataset. The data are 18 to 20 years old which is fine for immobile contaminants, however, any compound detected in the stream or is soluble has likely migrated since the time of sample collection.	Agreed. Data was collected during the 1990's, however, Site 9 was used by the Navy from 1967 to 1972 and no additional use of the site has occurred during the 40+ years since then.

3.2 TECHNICAL AND LEGAL ISSUES

No technical or legal issues associated with the Site 9 ROD were identified.

Acronyms

ACRONYMS

bgs	below ground surface
B&RE	Brown and Root Environmental
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CLP	Contract Laboratory Program
COPC	Chemical of Potential Concern
CSM	Conceptual Site Model
EPA	United States Environmental Protection Agency
EPIC	Environmental Photographic Interpretation Center
ERA	Ecological Risk Assessment
ER Program	Environmental Restoration Program
ESQD	Explosive Safety Quantity Distance
FFA	Federal Facility Agreement
FS	Feasibility Study
HHRA	Human Health Risk Assessment
HQ	Hazard Quotient
IR	Installation Restoration
mg/kg	milligrams per kilogram
NA	No Action
Navy	United States Department of the Navy
NCP	National Contingency Plan
N.J.A.C.	New Jersey Administrative Code
NJDEP	New Jersey Department of Environmental Protection
NWS	Naval Weapons Station
OU	Operable Unit
PCE	tetrachloroethene
ppm	parts per million
RAB	Restoration Advisory Board
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RME	Reasonable Maximum Exposure
ROD	Record of Decision
RSL	Regional Screening Level
SI	Site Investigation
SMP	Site Management Plan
µg/kg	micrograms per kilogram
UST	Underground Storage Tank
VOC	Volatile Organic Compound
Weston	Roy F. Weston, Inc.

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Weston (Roy F. Weston, Inc.), 1994. Installation Restoration Program Site Investigation for 16 Sites at NWS Earle, Colts Neck, New Jersey. West Chester, Pennsylvania. January.

Detailed Reference Table

DETAILED REFERENCE TABLE

Item	Reference Phrase in ROD	Location in ROD	Location of Information in Administrative Record
1	Disposal of dunnage lumber	Section 2.1	*Installation Restoration Program, Site Investigation for 16 Sites at NWS Earle, Colts Neck, NJ.* Section 1.5.4, page 1-14. Roy F. Weston, 1994.
2	4,500 to 7,500 cubic yards	Section 2.1	*Installation Restoration Program, Site Investigation for 16 Sites at NWS Earle, Colts Neck, NJ.* Section 1.5.4, page 1-14. Roy F. Weston, 1994.
3	Test pits	Section 2.2	*Installation Restoration Program, Site Investigation for 16 Sites at NWS Earle, Colts Neck, NJ*. Section 4.3, page 4-19. Roy F. Weston, 1994. *Remedial Investigation Report for Naval Weapons Station Earle, Colts Neck, NJ.* Section 11.3.1, page 11-3. Brown & Root Environmental, 1996.
4	Public notice	Section 2.3	Public Notice for the Proposed Plan for Site 9 published in the Asbury Park Press newspaper on January 11, 2014 through January 13, 2014.
5	Site 9 test pit soil samples	Section 2.5.2	*Installation Restoration Program, Site Investigation for 16 Sites at NWS Earle, Colts Neck, NJ*. Section 4.3, page 4-19. Roy F. Weston, 1994. *Remedial Investigation Report for Naval Weapons Station Earle, Colts Neck, NJ.* Section 11.3.1, page 11-3. Brown & Root Environmental, 1996.
6	Three surface water and three sediment samples	Section 2.5.2	*Remedial Investigation Report for Naval Weapons Station Earle, Colts Neck, NJ.* Section 11.3.2, page 11-4. Brown & Root Environmental, 1996.
7	Human health risk assessment	Section 2.7.1	*Feasibility Study for Site 9 Landfill Southeast of "P" Barricades, Naval Weapons Station Earle, Colts Neck, NJ.* Section 1.2.6, pages 1-14 through 1-15. Tetra Tech, 2013.
8	Hypothetical future exposure pathways	Section 2.7.1	*Human Health Risk Assessment for Site 9 Landfill Southeast of "P" Barricades, Naval Weapons Station Earle, Colts Neck, NJ.* Section 4.0, pages 8 through 12. Tetra Tech 2013.
9	Screening-level ecological risk assessment	Section 2.7.2	*Feasibility Study for Site 9 Landfill Southeast of "P" Barricades, Naval Weapons Station Earle, Colts Neck, NJ.* Section 1.2.7, pages 1-15 through 1-16. Tetra Tech, 2013.

Detailed site information referenced in this ROD in bold blue text is contained in the Administrative Record. For access to information contained in the Administrative Record for "Site 9 - Landfill Southeast of "P" Barricades, Operable Unit 11" please contact the NWS Public Affairs Office, Building C-2, 201 Highway 34 South, Colts Neck, NJ 07722.

Appendix A
Site 9 Soil Results & Screening Criteria

112G02091\0810\112G2091GM05.DWG 03/25/14 MKB

N

WSSW20/WSSD20

WAGNER CREEK

DIRT ROAD

TP9-07

TP9-08

TP9-06

TP9-04

TP9-05

TP9-02

TP9-03

STONE FOUNDATION

WSSW19/WSSD19

EPIC BOUNDARY

WSSW17/WSSD17

TP9-01

INTERMITTENT STREAM

WSSW18/WSSD18

0 200 400

SCALE IN FEET

LEGEND

- EPIC BOUNDARY
  REFERENCE: EPIC 03/13/74 PHOTO
- SURFACE WATER AND SEDIMENT SAMPLE
- TEST PIT LOCATION, RI 1996
- TEST PIT LOCATION, SI 1994
- WETLANDS DELINEATION SOURCE: US FISH & WILDLIFE SERVICE NATIONAL WETLAND INVENTORY
- WOODLAND AREA
- PINE TREE AREA
- WETLANDS
- STREAM SOURCE: USGS TOPOGRAPHIC QUAD
- INTERMITTENT STREAM/DRAINAGE

TETRA TECH

SAMPLE LOCATIONS AND SITE FEATURES SITE 9 – LANDFILL SOUTHEAST OF "P" BARRICADES NAVAL WEAPONS STATION COLTS NECK, NEW JERSEY

FILE	SCALE
112G2091GM05	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE A–1	0 / 03/25/14

TABLE A- 1
SUMMARY OF 1994 SI TEST PIT DETECTED COMPOUNDS IN SOIL COMPARED TO BACKGROUND LEVELS
SITE 9 - LANDFILL SOUTHEAST OF "P" BARRICADES
NAVAL WEAPONS STATION EARLE
COLTS NECK, NEW JERSEY

SAMPLE LOCATION	TP9-01	TP9-02	TP9-03	TP9-04	TP9-05	TP9-06	BACKGROUND							
SAMPLE NOMENCLATURE (RI)	09-001-T007	09-002-T010	09-003-T001	09-004-T001	09-005-T001	09-006-T008	SUBSURFACE				SURFACE			
SAMPLE DEPTH	4 - 7 feet bgs	6 -10 feet bgs	6 - 9 feet bgs	3 - 5 feet bgs	3 - 6 feet bgs	5 - 8 feet bgs								
DATA SOURCE	SI (Weston, 1994)	SI (Weston, 1994)	SI (Weston, 1994)	SI (Weston, 1994)	SI (Weston, 1994)	SI (Weston, 1994)	Frequency of Detection	Range of Detection	Mean or Geometric Mean	95% Upper Tolerance Limit	Frequency of Detection	Range of Detection	Mean or Geometric Mean	95% Upper Tolerance Limit
INORGANICS	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**		**mg/kg**	**mg/kg**	**mg/kg**		**mg/kg**	**mg/kg**	**mg/kg**
aluminum	2,320	9,070	6,090	7,350	6,280	9,220	8 / 8	675 - 5,310	2,690	5,870	4 / 4	1710 - 5310	3,080	7,510
arsenic	6	7.9	13.2	6.5	6.3	8.8	8 / 8	1.35 - 14.4	6.64	17.1	4 / 4	1.35 - 14.4	6.71	23
barium	5 B	13.5 B	7.7 B	20.4 B	31.8 B	10.1 B	8 / 8	0.92 - 31	8.96	29.50	4 / 4	1.85 - 31	11.30	47.1
beryllium	0.3 B	1.2 B	0.52 B	0.72 B	0.58 B	0.93 B	2 / 8	0.12 - 0.28	0.0738	1.22	1 / 4	0.28	0.112	5.55
calcium	110 B	242 B	141 B	750 B	799 B	89.5 B	8 / 8	28.6 - 799	289	864	4 / 4	40.1 - 519	144	6810
chromium, total	10.9	16.2	21	19.4	16.9	25.8	8 / 8	4.7 - 59.5	27.4	73.4	4 / 4	7.8 - 59.5	34.5	107
cobalt	2.1 B	4.3 B	2.3 B	4.6 B	3.9 B	4 B	4 / 8	0.75 - 5	1.38	4.73	2 / 4	0.75 - 5	1.58	7.61
copper	3 B	4.2 B	4.1 B	4.9 B	6.3	3.1 B	8 / 8	0.97 - 8.6	4.33	11.2	4 / 4	0.97 - 8.4	5.03	15.1
iron	8,580	36,300	22,300	33,300	27,600	26,600	8 / 8	3745 - 62,500	20,400	59,500	4 / 4	3745 - 62500	26,200	95,800
lead	5.5	5.6	9.9	12.7	17.4	6.9	8 / 8	1.4 - 39.4	12.2	39.5	4 / 4	1.8 - 39.4	11.4	397
magnesium	147 B	1,210 B	911 B	1,100	893 B	1,520	8 / 8	18.5 - 619	172	1,600	4 / 4	71.7 - 619	289	901
manganese	59.2	112	24.4	104	168	28.1	8 / 8	2.6 - 214	46.3	189	4 / 4	3.45 - 214	64.2	329
potassium	209 U	1,840	1,970	2,040	1,420	4,120	7 / 8	95 - 792	276	2,780	4 / 4	95 - 792	358	4,050
silver	1.87 U	2.7	1.97 U	2.5	2.2 B	2.01 U	2 / 8	0.37 - 0.67	0.256	0.622	2 / 4	0.37 - 0.67	0.345	0.967
sodium	42.6 B	52.8 B	47.8 B	50.5 B	36.5 B	51.3 B	8 / 8	17.5 - 94.8	39.7	103	4 / 4	-	39.2	123
vanadium	23.2	5.7 B	20.8	11	11.7 B	11.5 B	8 / 8	11.05 - 64	27.70	96.7	4 / 4	11.05 - 64	29.40	201
zinc	5.3	39.8	17.5	60.3	44.6	60.1	6 / 8	1.1 - 50.7	15.7	50.2	3 / 4	1.1 - 27.6	4.7	461
cyanide	1.17 U	1.31 U	1.27 U	1.07 U	1.21 U	1.57	-	-	-	-	-	-	-	-
SEMIVOLATILES	**µg/kg**	**µg/kg**	**µg/kg**	**µg/kg**	**µg/kg**	**µg/kg**		**µg/kg**	**µg/kg**	**µg/kg**		**µg/kg**	**µg/kg**	**µg/kg**
bis(2-ethylhexyl)phthalate	390 U	35 J	440 U	410 U	26 J	34 J	-	-	-	-	-	-	-	-
di-n-butylphthalate	23 J	37 J	25 J	28 J	25 J	21 J	2 / 8	45 J - 48 J	46.5 J	-	2 / 4	45 - 48	46.5	-
VOLATILES	**µg/kg**	**µg/kg**	**µg/kg**	**µg/kg**	**µg/kg**	**µg/kg**		**µg/kg**	**µg/kg**	**µg/kg**		**µg/kg**	**µg/kg**	**µg/kg**
chloroform	1 J	1 J	13 U	11 U	12 U	13 U	-	-	-	-	-	-	-	-
PESTICIDES	**µg/kg**	**µg/kg**	**µg/kg**	**µg/kg**	**µg/kg**	**µg/kg**		**µg/kg**	**µg/kg**	**µg/kg**		**µg/kg**	**µg/kg**	**µg/kg**
4,4'-DDD	3.8 U	4.3 U	4.3 U	4.1 U	0.41 J	4.2 U	-	-	-	-	-	-	-	-
4,4'-DDE	3.8 U	4.3 U	4.3 U	0.41 J	1.2 J	4.2 U	2 / 8	16 J - 330	-	-	2 / 4	16 - 330	-	-
4,4'-DDT	3.8 U	4.3 U	4.3 U	0.82 J	0.41 JP	4.2 U	3 / 8	1.6 JN - 420	-	-	2 / 4	43 - 420	-	-
methoxychlor	19 U	22 U	22 U	93	20 U	21 U	-	-	-	-	-	-	-	-
MISCELLANEOUS	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**								
petroleum hydrocarbons	4.7 J	5.1 U	4.3 J	4.8 U	3.6 J	5.1 U	-	-		-	-	-		-

Notes:

	Shading indicates exceedance of 95% upper tolerance limit for subsurface soil only
	Shading indicates exceedance of 95% upper tolerance limit for surface soil only
	Shading indicates exceedance of 95% upper tolerance limit for subsurface and surface soil
NA	Not Sampled
J	Value is estimated because concentration is below the quantitation limit or because of exceedances of data validation quality control criteria.
JP	Value is estimated because concentration is below the quantitation limit or because of exceedances of data validation quality control criteria.
B	Analyte also detected in a the blank sample.
U	Compound or element was not detected. Value is the detection limit (inorganics) or quantitation limit (organics).

Sample Data Source:
Weston (Roy F. Weston, Inc.), 1994. Installation Restoration Program Site Investigation for 16 Sites at NWS Earle, Colts Neck, NJ. West Chester, PA. January.

Appendix B
Site 9 Surface Water and Sediment Results & Background Levels

112G02091\0810\112G2091GM05.DWG 03/25/14 MKB

N

WSSW20/WSSD20

WAGNER CREEK

DIRT ROAD

TP9-07

TP9-08

TP9-06

TP9-04

TP9-05

TP9-02

TP9-03

STONE FOUNDATION

WSSW19/WSSD19

EPIC BOUNDARY

WSSW17/WSSD17

TP9-01

INTERMITTENT STREAM

WSSW18/WSSD18

0 200 400

SCALE IN FEET

LEGEND

- EPIC BOUNDARY
  REFERENCE: EPIC 03/13/74 PHOTO
- SURFACE WATER AND SEDIMENT SAMPLE
- TEST PIT LOCATION, RI 1996
- TEST PIT LOCATION, SI 1994
- WETLANDS DELINEATION SOURCE: US FISH & WILDLIFE SERVICE NATIONAL WETLAND INVENTORY
- WOODLAND AREA
- PINE TREE AREA
- WETLANDS
- STREAM SOURCE: USGS TOPOGRAPHIC QUAD
- INTERMITTENT STREAM/DRAINAGE

TETRA TECH

SAMPLE LOCATIONS AND SITE FEATURES SITE 9 – LANDFILL SOUTHEAST OF "P" BARRICADES NAVAL WEAPONS STATION COLTS NECK, NEW JERSEY

FILE	SCALE
112G2091GM05	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE B–1	0 / 03/25/14

TABLE B-1
COMPARISON OF 1996 RI SURFACE WATER DATA TO BACKGROUND LEVELS
SITE 9 - LANDFILL SOUTHEAST OF "P" BARRICADES
NAVAL WEAPONS STATION EARLE
COLTS NECK, NEW JERSEY

Parameter	SAMPLE LOCATION										BACKGROUND		
	WS SW 17		WS SW 17 DUP		WS SW 18		WS SW 19		WS SW 20		Frequency of Detection	Range of Detection	Mean Concentration
INORGANICS	µg/L		µg/L		µg/L		µg/L		µg/L			µg/L	µg/L
aluminum	1,480	J	4,570	J	7,880	J	820	J	16600	J	3 / 3	265 - 409	353
antimony	2.8		4.4		2.5	U	2.5	U	2.5	U	not detected	-	-
arsenic	9.5		18.8	J	18.9		6.6		25.4		not detected	-	-
barium	39.0		79.9		89.0		41.1		133		3 / 3	16.3 - 34	26.9
beryllium	0.40		0.79		0.84		0.19		2.2		2 / 3	0.22 - 0.33	0.205
cadmium	0.17	U	0.17	U	0.34		0.17	U	0.17	U	1 / 3	0.18	0.115
calcium	5,970		6,490		4,640		9,930		9,640		3 / 3	462 - 10,100	4,564
chromium, total	3.4		10.1		14.0		2.1		37.5		3 / 3	0.72 - 2.6	1.36
cobalt	2.5		4.0		4.2		1.6		17.8		3 / 3	0.81 - 1.9	1.27
copper	18.7		25.4	J	28.7	J	14.4		31.7	J	2 / 3	1.1 - 9.8	3.70
cyanide	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	NA	-	-
iron	14,200	J	36,100	J	11,000		17,200		56,400		3 / 3	160 - 702	520
lead	14.2	J	33.9	J	50.4		5.5		49.0		1 / 3	4.4	1.72
magnesium	2,770		3,500		3,020		2,750		6,720		3 / 3	369 - 2,770	1,260
manganese	106		150		68.3		185		1,050		3 / 3	14 - 55.5	30
mercury	0.051		0.10		0.14		0.038		0.14		2 / 3	0.023 - 0.028	0.02
nickel	9.3		16.3		13.5		6.6		29.7		3 / 3	2.1 - 7.1	4.3
potassium	3,040		4,350		1,710		3,630		6,470		2 / 3	251 - 1,850	741
selenium	2.5	UJ	5.3	J	3.2	J	4.9	J	3.3	J	1 / 3	3.5	2.0
silver	0.63	U	0.63	U	0.74		0.63	U	0.63	U	1 / 3	0.86	0.495
sodium	11,900	R	13,100	R	10,500	R	11,900	R	15,100	R	3 / 3	3,060 - 3,890	3,520
thallium	4.1		3.0	U	3.0	U	3.0	U	4.3		2 / 3	3.5 - 5.5	3.5
vanadium	7.2		20.2		35.4		3.5		45.2		2 / 3	0.89 - 0.9	0.66
zinc	33.2	J	64.3	J	70.4	J	25.2	J	127.0	J	3 / 3	7.6 - 29.4	16.3
SEMIVOLATILES	µg/L		µg/L		µg/L		µg/L		µg/L			µg/L	µg/L
1,2,4-trichlorobenzene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
1,2-dichlorobenzene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
1,3-dichlorobenzene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
1,4-dichlorobenzene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
2,2'-oxybis(1-chloropropane)	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
2,4,5-trichlorophenol	25.0	U	25.0	U	25.0	U	25.0	U	25.0	U	NA	-	-
2,4,6-trichlorophenol	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
2,4-dichlorophenol	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
2,4-dimethylphenol	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
2,4-dinitrophenol	25.0	UJ	25.0	UJ	25.0	U	25.0	UJ	25.0	U	NA	-	-
2,4-dinitrotoluene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
2,6-dinitrotoluene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
2-chloronaphthalene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-

TABLE B-1
COMPARISON OF 1996 RI SURFACE WATER DATA TO BACKGROUND LEVELS
SITE 9 - LANDFILL SOUTHEAST OF "P" BARRICADES
NAVAL WEAPONS STATION EARLE
COLTS NECK, NEW JERSEY

Parameter	SAMPLE LOCATION										BACKGROUND		
	WS SW 17		WS SW 17 DUP		WS SW 18		WS SW 19		WS SW 20		Frequency of Detection	Range of Detection	Mean Concentration
2-chlorophenol	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
2-methylnaphthalene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
2-methylphenol	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
2-nitroaniline	25.0	U	25.0	U	25.0	U	25.0	U	25.0	U	NA	-	-
2-nitrophenol	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
3,3'-dichlorobenzidine	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
3-nitroaniline	25.0	U	25.0	U	25.0	U	25.0	U	25.0	U	NA	-	-
4,6-dinitro-2-methylphenol	25.0	U	25.0	U	25.0	U	25.0	U	25.0	U	NA	-	-
4-bromophenyl-phenylether	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
4-chloro-3-methylphenol	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
4-chloroaniline	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
4-chlorophenyl-phenylether	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
4-methylphenol	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
4-nitroaniline	25.0	U	25.0	U	25.0	U	25.0	U	25.0	U	NA	-	-
4-nitrophenol	25.0	UJ	25.0	UJ	25.0	U	25.0	UJ	25.0	U	NA	-	-
N-nitroso-di-n-propylamine	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
N-nitrosodiphenylamine	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
acenaphthene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
acenaphthylene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
anthracene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
benzo(a)anthracene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
benzo(a)pyrene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
benzo(b)fluoranthene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
benzo(g,h,i)perylene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
benzo(k)fluoranthene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
bis(2-chloroethoxy)methane	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
bis(2-chloroethyl)ether	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
bis(2-ethylhexyl)phthalate	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
butylbenzylphthalate	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
carbazole	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
chrysene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
di-n-butylphthalate	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
di-n-octylphthalate	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
dibenz(a,h)anthracene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
dibenzofuran	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
fluoranthene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
fluorene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
hexachlorobenzene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
hexachlorobutadiene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-

TABLE B-1
COMPARISON OF 1996 RI SURFACE WATER DATA TO BACKGROUND LEVELS
SITE 9 - LANDFILL SOUTHEAST OF "P" BARRICADES
NAVAL WEAPONS STATION EARLE
COLTS NECK, NEW JERSEY

Parameter	SAMPLE LOCATION										BACKGROUND		
	WS SW 17		WS SW 17 DUP		WS SW 18		WS SW 19		WS SW 20		Frequency of Detection	Range of Detection	Mean Concentration
hexachlorocyclopentadiene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
hexachloroethane	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
indeno(1,2,3-cd)pyrene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
isophorone	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
naphthalene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
nitrobenzene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
pentachlorophenol	25.0	U	25.0	U	25.0	UJ	25.0	U	25.0	UJ	NA	-	-
phenanthrene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
phenol	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
pyrene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
VOLATILES	**µg/L**		**µg/L**		**µg/L**		**µg/L**		**µg/L**			**µg/L**	**µg/L**
1,1,1-trichloroethane	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
1,1,2,2-tetrachloroethane	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
1,1,2-trichloroethane	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
1,1-dichloroethane	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
1,1-dichloroethene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
1,2-dichloroethane	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
1,2-dichloroethene (total)	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
1,2-dichloropropane	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
2-butanone	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
2-hexanone	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
4-methyl-2-pentanone	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
acetone	11.0	U	12.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
benzene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
bromodichloromethane	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
bromoform	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
bromomethane	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
carbon disulfide	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
carbon tetrachloride	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
chlorobenzene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
chloroethane	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
chloroform	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
chloromethane	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
cis-1,3-dichloropropene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
dibromochloromethane	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
ethylbenzene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
methylene chloride	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
styrene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
tetrachloroethene	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-

TABLE B-1
COMPARISON OF 1996 RI SURFACE WATER DATA TO BACKGROUND LEVELS
SITE 9 - LANDFILL SOUTHEAST OF "P" BARRICADES
NAVAL WEAPONS STATION EARLE
COLTS NECK, NEW JERSEY

Parameter		SAMPLE LOCATION										BACKGROUND		
		WS SW 17		WS SW 17 DUP		WS SW 18		WS SW 19		WS SW 20		Frequency of Detection	Range of Detection	Mean Concentration
toluene		10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
trans-1,3-dichloropropene		10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
trichloroethene		10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
vinyl chloride		10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
xylene (total)		10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	NA	-	-
MISCELLANEOUS														
ammonia nitrogen	mg/L	0.30	J	0.40	J	0.70	J	1.0	U	0.3	J	NA	-	-
biochemical oxygen demand	mg/L	4.0		4.0		5.0		1.8	J	3		NA	-	-
chemical oxygen demand	mg/L	56.0	J	150	J	390		32.0		70.0		NA	-	-
chloride	mg/L	13.0		13.0		11.0		12.0		17.0		NA	-	-
nitrate nitrogen	mg/L	0.50	U	0.26	J	0.32	J	0.38	J	0.43	J	NA	-	-
total hardness	mg/L	18.0		17.0		19.0		6.0		27.0		NA	-	-
total organic carbon	mg/L	9.0		10.0		NA		NA		NA		NA	-	-
total phosphorus as PO4	mg/L	6.3	J	2.9	J	3.8		3.1		3.4		NA	-	-
turbidity	NTU	15.3		22.0		66.0		37.0		175.0		NA	-	-

Footnotes to sample results:

	Shading denotes exceedance of mean surface water background concentration (values for non-detects considered to be half the detection limit)
	Shading denotes exceedance of maximum surface water background concentration
NA	Not Sampled
J	Value is estimated because concentration is below the quantitation limit or because of exceedances of data validation quality control criteria.
R	Positive result is considered rejected based on exceedance of data validation quality control criteria.
U	Compound or element was not detected. Value is the detection limit (inorganics) or quantitation limit (organics).
UJ	Not detected. Detection limit or quantitation limit shown is considered estimated due to exceedance of data validation quality control criteria.

Sample Data Source:
Brown & Root Environmental. 1996. Remedial Investigation Report for Naval Weapons Station Earle, Colts Neck, New Jersey. Wayne, Pennsylvania. July.

TABLE B-2
COMPARISON OF 1996 RI SEDIMENT DATA TO BACKGROUND LEVELS
SITE 9 - LANDFILL SOUTHEAST OF "P" BARRICADES
NAVAL WEAPONS STATION EARLE
COLTS NECK, NEW JERSEY

Parameters	SAMPLE LOCATION										BACKGROUND		
	WS SD 17		WS SD 17 DUP		WS SD 18		WS SD 19		WS SD 20		Frequency of Detection	Range of Detection	Mean Concentration
INORGANICS	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg			mg/kg	mg/kg
aluminum	10,300	J	10,500	J	1,530		3,010		8,680		3 / 3	839 - 3,940	2,750
arsenic	32.9	J	26.2	J	3.2		12.2		11.7		2 / 3	2.4 - 6.2	3.0
barium	69.9	J	92.2	J	7.4		40.9		42.7		3 / 3	3.9 - 10.6	7.04
beryllium	1.2	J	1.3	J	0.21	U	0.64		1.3		1 / 3	0.57	0.335
cadmium	1.3	UJ	1.4	UJ	0.73	U	0.66	U	0.77	U	not detected	-	-
calcium	765	J	927	J	143		638		821		3 / 3	197 - 518	343
chromium, total	47.5	J	41.2	J	4.4		7.9		25.8		3 / 3	4.3 - 56	21.6
cobalt	4.2	J	5.1	J	1.4	U	1.5		7.2		1 / 3	2.1	1.65
copper	20.7	J	21.5	J	2.4		1.5		7.6		3 / 3	1.5 - 13	6.24
cyanide	0.62	UJ	0.71	UJ	0.36	UJ	0.33	UJ	0.37	UJ	not detected	-	-
iron	61,500	J	52,600	J	3,130		37,200		28,200		3 / 3	228 - 7,650	3,290
lead	46.3	J	55.9	J	9.6	J	6.6	J	19.3	J	3 / 3	4.6 - 34.3	15.3
magnesium	1,780	J	1,470	J	182		504		1780	J	3 / 3	60.7 - 256	153
manganese	56.9	J	73.8	J	4.7		74.6	J	172	J	3 / 3	4.6 - 9.2	6.9
mercury	0.11	J	0.14	J	0.0094	U	0.0086	U	0.032		1 / 3	0.068	0.03
nickel	8.3	J	10.9	J	2.3	U	2.9		12		2 / 3	2.1 - 6.0	4.0
potassium	3,960	J	2,620	J	317		1,140		3,850		2 / 3	86.1 - 681	295
selenium	5.4	J	5.6	J	0.73	U	1.8	J	1.4	J	not detected	-	-
silver	2.2	UJ	2.3	UJ	1.2	U	1.1	U	1.3	U	not detected	-	-
sodium	120	J	79.8	J	13.9		36.8		63.2		3 / 3	26.6 - 116	57.6
thallium	3.4	J	1.9	J	0.87	U	0.79	U	0.92	U	not detected	-	-
vanadium	57.7	J	54.9	J	8.0		11.2		28.3		3 / 3	5.9 - 42.7	18.5
zinc	58.0	J	73.1	J	6.0	J	38.7	J	49.5	J	3 / 3	14.2 - 26.9	18.7
SEMIVOLATILES	µg/kg		µg/kg		µg/kg		µg/kg		µg/kg			µg/kg	µg/kg
1,2,4-trichlorobenzene	900	UJ	950	UJ	480	U	440	U	510	U	NA	-	-
1,2-dichlorobenzene	900	UJ	950	UJ	480	U	440	U	510	U	NA	-	-
1,3-dichlorobenzene	900	UJ	950	UJ	480	U	440	U	510	U	NA	-	-
1,4-dichlorobenzene	900	UJ	950	UJ	480	U	440	U	510	U	NA	-	-
2,2'-oxybis(1-chloropropane)	900	UJ	950	UJ	480	U	440	U	510	U	NA	-	-
2,4,5-trichlorophenol	2,200	UJ	2,400	UJ	1,200	U	1,100	U	1,300	U	NA	-	-
2,4,6-trichlorophenol	900	UJ	950	UJ	480	U	440	U	510	U	NA	-	-
2,4-dichlorophenol	900	UJ	950	UJ	480	U	440	U	510	U	NA	-	-
2,4-dimethylphenol	900	UJ	950	UJ	480	U	440	U	510	U	NA	-	-
2,4-dinitrophenol	2,200	UJ	2,400	UJ	1,200	UJ	1,100	UJ	1,300	UJ	NA	-	-
2,4-dinitrotoluene	900	UJ	950	UJ	480	U	440	U	510	U	NA	-	-
2,6-dinitrotoluene	900	UJ	950	UJ	480	U	440	U	510	U	NA	-	-
2-chloronaphthalene	900	UJ	950	UJ	480	U	440	U	510	U	NA	-	-
2-chlorophenol	900	UJ	950	UJ	480	U	440	U	510	U	NA	-	-
2-methylnaphthalene	900	UJ	950	UJ	480	U	440	U	510	U	not detected	-	-

TABLE B-2
COMPARISON OF 1996 RI SEDIMENT DATA TO BACKGROUND LEVELS
SITE 9 - LANDFILL SOUTHEAST OF "P" BARRICADES
NAVAL WEAPONS STATION EARLE
COLTS NECK, NEW JERSEY

Parameters	SAMPLE LOCATION										BACKGROUND		
	WS SD 17		WS SD 17 DUP		WS SD 18		WS SD 19		WS SD 20		Frequency of Detection	Range of Detection	Mean Concentration
2-methylphenol	900	UJ	950	UJ	480	U	440	U	510	U	NA	-	-
2-nitroaniline	2,200	UJ	2,400	UJ	1,200	U	1,100	U	1,300	U	NA	-	-
2-nitrophenol	900	UJ	950	UJ	480	U	440	U	510	U	NA	-	-
3,3'-dichlorobenzidine	900	UJ	950	UJ	480	U	440	U	510	U	NA	-	-
3-nitroaniline	2,200	UJ	2,400	UJ	1,200	U	1,100	U	1,300	U	NA	-	-
4,6-dinitro-2-methylphenol	2,200	UJ	2,400	UJ	1,200	U	1,100	U	1,300	U	NA	-	-
4-bromophenyl-phenylether	900	UJ	950	UJ	480	U	440	U	510	U	NA	-	-
4-chloro-3-methylphenol	900	UJ	950	UJ	480	U	440	U	510	U	NA	-	-
4-chloroaniline	900	UJ	950	UJ	480	U	440	U	510	U	NA	-	-
4-chlorophenyl-phenylether	900	UJ	950	UJ	480	U	440	U	510	U	NA	-	-
4-methylphenol	900	UJ	950	UJ	480	U	440	U	510	U	NA	-	-
4-nitroaniline	2,200	UJ	2,400	UJ	1,200	U	1,100	U	1,300	U	NA	-	-
4-nitrophenol	2,200	UJ	2,400	UJ	1,200	UJ	1,100	UJ	1,300	UJ	NA	-	-
N-nitroso-di-n-propylamine	900	UJ	950	UJ	480	U	440	U	510	U	NA	-	-
N-nitrosodiphenylamine	900	UJ	950	UJ	480	U	440	U	510	U	NA	-	-
acenaphthene	900	UJ	950	UJ	480	U	440	U	510	U	not detected	-	-
acenaphthylene	900	UJ	950	UJ	480	U	440	U	510	U	not detected	-	-
anthracene	900	UJ	950	UJ	480	U	440	U	510	U	not detected	-	-
benzo(a)anthracene	900	UJ	950	UJ	480	U	440	U	510	U	2 / 3	140 - 560	350
benzo(a)pyrene	900	UJ	950	UJ	480	U	440	U	510	U	2 / 3	160 - 590	375
benzo(b)fluoranthene	900	UJ	950	UJ	480	U	440	U	510	U	2 / 3	150 - 490	320
benzo(g,h,i)perylene	900	UJ	950	UJ	480	U	440	U	510	U	2 / 3	130 - 380	255
benzo(k)fluoranthene	900	UJ	950	UJ	480	U	440	U	510	U	2 / 3	150 - 470	310
bis(2-chloroethoxy)methane	900	UJ	950	UJ	480	U	440	U	510	U	NA	-	-
bis(2-chloroethyl)ether	900	UJ	950	UJ	480	U	440	U	510	U	NA	-	-
bis(2-ethylhexyl)phthalate	900	U	950	U	480	U	440	U	510	U	NA	-	-
butylbenzyl phthalate	900	UJ	97.0	J	480	U	440	U	510	U	not detected	-	-
carbazole	900	UJ	950	UJ	480	U	440	U	510	U	not detected	-	-
chrysene	900	UJ	950	UJ	480	U	440	U	510	U	2 / 3	250 - 940	595
di-n-butylphthalate	900	UJ	950	UJ	480	U	66.0	J	1300		not detected	-	-
di-n-octylphthalate	900	UJ	950	UJ	480	U	440	U	510	U	not detected	-	-
dibenz(a,h)anthracene	900	UJ	950	UJ	480	U	440	U	510.0	U	NA	-	-
dibenzofuran	900	UJ	950	UJ	480	U	440	U	510	U	not detected	-	-
diethylphthalate	900	UJ	110	J	480	U	45.0	J	52	J	1 / 3	44	44
dimethylphthalate	900	UJ	950	UJ	480	U	440	U	510	U	NA	-	-
fluoranthene	130	J	130	J	480	U	440	U	510.0	U	2 / 3	300 - 1800	1050
fluorene	900	UJ	950	UJ	480	U	440	U	510	U	1 / 3	190	190
hexachlorobenzene	900	UJ	950	UJ	480	U	440	U	510	U	NA	-	-
hexachlorobutadiene	900	UJ	950	UJ	480	U	440	U	510	U	NA	-	-
hexachlorocyclopentadiene	900	UJ	950	UJ	480	U	440	U	510	U	NA	-	-

TABLE B-2
COMPARISON OF 1996 RI SEDIMENT DATA TO BACKGROUND LEVELS
SITE 9 - LANDFILL SOUTHEAST OF "P" BARRICADES
NAVAL WEAPONS STATION EARLE
COLTS NECK, NEW JERSEY

Parameters	SAMPLE LOCATION										BACKGROUND		
	WS SD 17		WS SD 17 DUP		WS SD 18		WS SD 19		WS SD 20		Frequency of Detection	Range of Detection	Mean Concentration
hexachloroethane	900	UJ	950	UJ	480	U	440	U	55	J	not detected	-	-
indeno(1,2,3-cd)pyrene	900	UJ	950	UJ	480	U	440	U	510	U	2 / 3	110 - 310	210
isophorone	900	UJ	950	UJ	480	U	440	U	510	U	NA	-	-
naphthalene	900	UJ	950	UJ	480	U	440	U	510	U	not detected	-	-
nitrobenzene	900	UJ	950	UJ	480	U	440	U	510	U	NA	-	-
pentachlorophenol	2,200	UJ	2,400	UJ	1,200	U	1,100	U	1,300	U	NA	-	-
phananthrene	900	UJ	950	UJ	480	U	440	U	510	U	2 / 3	200 - 1900	1050
phenol	900	UJ	950	UJ	480	U	440	U	120	J	not detected	-	-
pyrene	900	UJ	110	J	480	UJ	440	UJ	510	UJ	2 / 3	350 - 1900	1125
VOLATILES	**µg/kg**		**µg/kg**		**µg/kg**		**µg/kg**		**µg/kg**			**µg/kg**	**µg/kg**
1,1,1-trichloroethane	27.0	UJ	28.0	UJ	14.0	UJ	13.0	UJ	15.0	U	NA	-	-
1,1,2,2-tetrachloroethane	27.0	UJ	28.0	UJ	14.0	UJ	13.0	UJ	15.0	U	NA	-	-
1,1,2-trichloroethane	27.0	UJ	28.0	UJ	14.0	UJ	13.0	UJ	15.0	U	NA	-	-
1,1-dichloroethane	27.0	UJ	28.0	UJ	14.0	UJ	13.0	UJ	15.0	U	NA	-	-
1,1-dichloroethene	27.0	UJ	28.0	UJ	14.0	UJ	13.0	UJ	15.0	U	NA	-	-
1,2-dichloroethane	27.0	UJ	28.0	UJ	14.0	UJ	13.0	UJ	15.0	U	NA	-	-
1,2-dichloroethene (total)	27.0	UJ	28.0	UJ	14.0	UJ	13.0	UJ	15.0	U	NA	-	-
1,2-dichloropropane	27.0	UJ	28.0	UJ	14.0	UJ	13.0	UJ	15.0	U	NA	-	-
2-butanone	45.0	UJ	51.0	UJ	14.0	U	13.0	U	15.0	U	not detected	-	-
2-hexanone	27.0	UJ	28.0	UJ	14.0	UJ	13.0	UJ	15.0	U	NA	-	-
4-methyl-2-pentanone	27.0	UJ	28.0	UJ	14.0	UJ	13.0	UJ	15.0	U	NA	-	-
acetone	100	UJ	130	UJ	14.0	UJ	13.0	UJ	24.0	U	NA	-	-
benzene	27.0	UJ	28.0	UJ	14.0	UJ	13.0	UJ	15.0	U	NA	-	-
bromodichloromethane	27.0	UJ	28.0	UJ	14.0	UJ	13.0	UJ	15.0	U	NA	-	-
bromoform	27.0	UJ	28.0	UJ	14.0	UJ	13.0	UJ	15.0	U	NA	-	-
bromomethane	27.0	UJ	28.0	UJ	14.0	UJ	13.0	UJ	15.0	U	NA	-	-
carbon disulfide	27.0	UJ	28.0	UJ	14.0	UJ	13.0	UJ	15.0	U	NA	-	-
carbon tetrachloride	27.0	UJ	28.0	UJ	14.0	UJ	13.0	UJ	15.0	U	NA	-	-
chlorobenzene	27.0	UJ	28.0	UJ	14.0	UJ	13.0	UJ	15.0	U	NA	-	-
chloroethane	27.0	UJ	28.0	UJ	14.0	UJ	13.0	UJ	15.0	U	NA	-	-
chloroform	27.0	UJ	28.0	UJ	14.0	UJ	13.0	UJ	15.0	U	NA	-	-
chloromethane	27.0	UJ	28.0	UJ	14.0	UJ	13.0	UJ	15.0	U	NA	-	-
cis-1,3-dichloropropene	27.0	UJ	28.0	UJ	14.0	UJ	13.0	UJ	15.0	U	NA	-	-
dibromochloromethane	27.0	UJ	28.0	UJ	14.0	UJ	13.0	UJ	15.0	U	NA	-	-
ethylbenzene	27.0	UJ	28.0	UJ	14.0	UJ	13.0	UJ	15.0	U	not detected	-	-
methylene chloride	27.0	UJ	28.0	UJ	14.0	UJ	13.0	UJ	15.0	U	not detected	-	-
styrene	27.0	UJ	28.0	UJ	14.0	UJ	13.0	UJ	15.0	U	NA	-	-
tetrachloroethene	27.0	UJ	24.0	J	14.0	UJ	13.0	UJ	46.0		2 / 3	3 - 50	26.5
toluene	27.0	UJ	28.0	UJ	2.0	J	13.0	U	15.0	U	1 / 3	480	480
trans-1,3-dichloropropene	27.0	UJ	28.0	UJ	14.0	UJ	13.0	UJ	15.0	U	NA	-	-

TABLE B-2
COMPARISON OF 1996 RI SEDIMENT DATA TO BACKGROUND LEVELS
SITE 9 - LANDFILL SOUTHEAST OF "P" BARRICADES
NAVAL WEAPONS STATION EARLE
COLTS NECK, NEW JERSEY

Parameters		SAMPLE LOCATION										BACKGROUND		
		WS SD 17		WS SD 17 DUP		WS SD 18		WS SD 19		WS SD 20		Frequency of Detection	Range of Detection	Mean Concentration
trichloroethene		27.0	UJ	28.0	UJ	14.0	UJ	13.0	UJ	15.0	U	NA	-	-
vinyl chloride		27.0	UJ	28.0	UJ	14.0	UJ	13.0	UJ	15.0	U	NA	-	-
xylene (total)		27.0	UJ	28.0	UJ	14.0	UJ	13.0	UJ	15.0	U	NA	-	-
MISCELLANEOUS														
ammonia nitrogen	mg/kg	300	J	400	J	100	U	100	U	100	J	NA	-	-
biochemical oxygen demand	mg/kg	NA		NA		NA		NA		NA		NA	-	-
chemical oxygen demand	mg/kg	NA		NA		NA		NA		NA		NA	-	-
chloride	mg/kg	22.0	J	25.0	J	24.0	J	4.0	J	9.0	J	NA	-	-
nitrate nitrogen	mg/kg	1.2	J	1.5	J	0.9	J	1.2	J	0.8	J	NA	-	-
total hardness	mg/kg	NA		NA		NA		NA		NA		NA	-	-
total organic carbon	mg/kg	27,000	J	47,000	J	NA		NA		NA		NA	-	-
total phosphorus as PO4	mg/kg	13,000	J	13,000	J	1,800		6,900		5,500		NA	-	-
turbidity	NTU	NA		NA		NA		NA		NA		NA	-	-
moisture	%	62.8		64.9		31.3		24.3		NA		NA	-	-

Footnotes to sample results:

	Shading denotes exceedance of mean sediment background concentration
	Shading denotes exceedance of maximum sediment background concentration
NA	Not Sampled
J	Value is estimated because concentration is below the quantitation limit or because of exceedances of data validation quality control criteria.
R	Positive result is considered rejected based on exceedance of data validation quality control criteria.
U	Compound or element was not detected. Value is the detection limit (inorganics) or quantitation limit (organics).
UJ	Not detected. Detection limit or quantitation limit shown is considered estimated due to exceedance of data validation quality control criteria.

Sample Data Source:
Brown & Root Environmental. 1996. Remedial Investigation Report for Naval Weapons Station Earle, Colts Neck, New Jersey. Wayne, Pennsylvania. July.

Appendix C
Summary of Estimated Potential Human Health Risks (2013 HHRA)

TABLE C-1
SUMMARY OF ESTIMATED POTENTIAL HUMAN HEALTH RISKS (2013 HHRA)
SITE 9 - LANDFILL SOUTHEAST OF "P" BARRICADES
NAVAL WEAPONS STATION EARLE

Receptor	Medium	Pathway	RME		RME (Background Eliminated)	
			Cancer Risk	Non-Cancer HQ	Cancer Risk	Non-Cancer HQ
Future Recreational User	Surface Soil	Ingestion	4.66×10^{-7}	1.51×10^{-2}	---	1.34×10^{-3}
		Dermal	5.34×10^{-8}	1.04×10^{-3}	---	N/A
		Inhalation	1.56×10^{-10}	1.16×10^{-5}	---	7.64×10^{-6}
		Total	5.19×10^{-7}	1.61×10^{-2}	---	1.34×10^{-3}
Future Residential Child	Surface Soil	Ingestion	8.27×10^{-5}	1.26	---	1.13×10^{-1}
		Dermal	1.42×10^{-6}	3.69×10^{-2}	---	N/A
		Inhalation	1.98×10^{-8}	4.16×10^{-4}	---	2.74×10^{-4}
		Total	8.41×10^{-5}	1.3	---	1.13×10^{-1}
Future Residential Adult	Surface Soil	Ingestion	1.69×10^{-5}	1.36×10^{-1}	---	1.21×10^{-2}
		Dermal	8.69×10^{-5}	5.63×10^{-3}	---	2.74×10^{-4}
		Inhalation	2.88×10^{-8}	4.16×10^{-4}	---	N/A
		Total	1.78×10^{-5}	1.41×10^{-1}	---	1.21×10^{-2}
Future Lifetime Resident	Surface Soil	Ingestion	9.96×10^{-5}	N/A	---	N/A
		Dermal	2.29×10^{-6}	N/A	---	N/A
		Inhalation	4.86×10^{-8}	N/A	---	N/A
		Total	1.02×10^{-4}	N/A	---	---
Future Industrial Worker	Subsurface Soil	Ingestion	9.33×10^{-6}	9.68×10^{-2}	---	8.62×10^{-3}
		Dermal	1.07×10^{-6}	6.65×10^{-3}	---	N/A
		Inhalation	8.32×10^{-9}	1.98×10^{-4}	---	1.31×10^{-4}
		Total	1.04×10^{-5}	1.03×10^{-1}	---	8.62×10^{-3}
Future Construction Worker	Subsurface Soil	Ingestion	6.4×10^{-7}	1.66×10^{-1}	---	1.48×10^{-2}
		Dermal	2.22×10^{-8}	3.46×10^{-3}	---	N/A
		Inhalation	1.73×10^{-10}	1.03×10^{-4}	---	6.79×10^{-5}
		Total	6.63×10^{-7}	1.70×10^{-1}	---	1.49×10^{-2}

RME = Reasonable Maximum Exposure
--- RME cancer or non-cancer risk was either not required or not applicable.
N/A - Not applicable