FINAL EXPLANATION OF SIGNIFICANT DIFFERENCES NAVAL WEAPONS STATION, YORKTOWN SITE 17 HOLM ROAD LANDFILL NWS YORKTOWN VA

04/01/2008

NAVFAC ATLANTIC

Final
Explanation of Significant Differences
Naval Weapons Station, Yorktown
Site 17 - Holm Road Landfill

1.0 INTRODUCTION

This Explanation of Significant Differences (ESD) to the Record of Decision (ROD) for Site 17, the Holm Road Landfill (the Site), Naval Weapons Station (WPNSTA) Yorktown, Virginia, was prepared as per section 117(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and section 300.435(c)(2)(i) of the National Contingency Plan (NCP). The ROD was signed by the Department of the Navy (Navy), as lead agency, and the U. S. Environmental Protection Agency (USEPA), with the concurrence of the Virginia Department of Environmental Quality (VDEQ), in September 2000 (Baker, 2000).

1.1 Statement of Purpose

This ESD documents a significant positive difference in soil clean-up levels achieved at the site, over those required by the ROD, and consequently eliminates land use controls and five-year reviews from the remedy, since they are no longer necessary to protect human health or the environment. The remedy for soil at the Site required excavation and removal of contaminated soil exceeding commercial/industrial clean-up levels and imposition of land use controls limiting future use of the site to commercial or industrial activity only. A review of data from the site construction completion report (OHM, 2001) and a test pit investigation (CH2M Hill, 2007) demonstrate that residential cleanup levels have been met and that all buried debris has been removed from the site. The clean-up levels achieved exceed those required in the ROD and, thus, constitute a significant change in the remedy. Site conditions now allow for unlimited use and unrestricted exposure, negating the need for land use controls or five-year reviews pursuant to CERCLA section 121 (c).

1.2 Public Availability

This ESD, and the documents forming the basis for issuing this ESD, will become part of the Administrative Record File for WPNSTA Yorktown as per section 300.825(a)(2) of the NCP. The Administrative Record File for WPNSTA Yorktown may be viewed by contacting Ms. Bonnie Capito, Librarian and Records Manager, Naval Facilities Engineering Command, Atlantic, at 757-322-4785 or bonnie.capito@navy.mil. This ESD, the ROD, and a 2001 construction close-out report (documenting remedy completion) will also be available, for 30 days from the effective date of this document, at the following Information Repository:

Virgil I. Grissom Public Library
366 DeShazor Dr.
Newport News, Virginia 23506
(757) 369-3190
http://www.newport-news.va.us/library/libsys/locat/grissom/grissom.htm

2.0 SUMMARY OF SITE HISTORY, EXTENT OF CONTAMINATION AND SELECTED REMEDY

The Site is located within WPNSTA Yorktown, a 10,624-acre installation located on the Virginia Peninsula in York and James City Counties and the City of Newport News (See Figure 1 in Attachment 1). WPNSTA Yorktown is bounded on the northwest by another Navy installation, commonly known as Cheatham Annex, and the King's Creek Plantation resort community; on the northeast by the York River and the Colonial National Historic Parkway; on the southwest by Route 143 and Interstate 64; and on the southeast by Route 238 and the community of Lackey.

2.1 Site Description and History

The Site is a two-acre disposal area located south of Holm Road and east of Main Road (See Figure 2 in Attachment 1). A landfill was operated there for approximately 10 years, from the 1950s to the 1960s. Wastes reportedly disposed in the landfill included acid batteries from underwater weapons, hydraulic fluids (Dolconik) from de-militarization of torpedoes, other types of hydraulic fluids, drums from the Public Works Department and ordnance production shops, and scrap metal. An estimated 60 tons of waste were reportedly deposited there.

2.2 Site Investigations and Contamination

Initial Assessment Study (IAS)

An IAS, completed in 1984 for the purpose of identifying and assessing sites posing a potential threat to human health and the environment from prior contamination, concluded that 15 of 19 sites, including Site 17, were of sufficient threat to human health or the environment to warrant Confirmation Studies (C.C. Johnson & Associates, Inc. and CH2M Hill, July 1984).

Confirmation Study/Remedial Investigation Interim Report

The Site was included in the "Confirmation Study Step IA (Verification), Round One" (Dames & Moore, 1986) and "Confirmation Study Step IA (Verification), Round Two" (Dames & Moore, 1988). Results of the two investigations were presented in a RI Interim Report, which recommended further investigation (Vesar, 1991).

Round One Remedial Investigation

The Round One RI was completed in 1993 (Baker and Weston, 1993). Results from a 1992 geophysical investigation, conducted as part of the Round One RI, indicated "no widespread occurrence of buried metals or other high conductors." However, surface soil contained various organic compounds, low levels of semi-volatile organic compounds (SVOCs), and inorganic contaminants apparently related to railroad track run-off or pest control spraying. Subsurface soil did not appear to have been affected. Inorganics were prevalent in groundwater. The Round One RI concluded that soil and groundwater at the Site did not appear to have been impacted by past waste disposal on-site, but rather may have been affected by off-site sources, such as railroad track runoff or pest control spraying.

Round Two Remedial Investigation

The Round Two RI was completed in 1998 (Baker, 1998). Field activities, conducted in 1996, consisted of surface soil, subsurface soil, and groundwater sampling and excavating test pits. In surface soil, low concentrations of SVOCs were detected, mainly comprised of Polynuclear Aromatic Hydrocarbons (PAHs). At five locations, PAH concentrations exceeded USEPA Region

III Risk-Based Concentrations (RBCs). A hot spot was delineated (the Site 17 Soil Area of Concern (AOC)). Figure 3 in Attachment 1 shows where PAH-containing soil samples were taken, as well as the locations of six test pits. The six test pits were chosen based on information about past site activities, as further defined by geophysical investigation during the Round One RI. The test pits were excavated from 4 to 8 ft below ground surface (bgs) before encountering groundwater. No debris was observed at any test pit except 17TP03. At this pit, pieces of concrete, scrap iron, and roofing shingles were discovered at and near the surface. There was no indication that other debris might be buried deeper, or that other debris would be found elsewhere on the same plane. Debris such as this near the surface is not necessarily indicative of landfill activity.

Summary of 2007 Test Pit Investigation

The 1992 geophysical survey (conducted for the Round One RI) stated that the "only evidence of a possible waste area [at the Site] was the anomaly located in the southern portion of the survey area between Main Road and the railroad tracks." Therefore, in May 2007, CH2M Hill conducted a test pit investigation to confirm that no waste material remained in the southwest portion of the Site (CH2M Hill, 2007). Five test pits were sunk in the southwest quadrant, where previous geophysical surveys indicated anomalies or potential metallic waste. The pits were dug down to between 7.5 and 8.5 feet bgs. Of the five, only Test Pit 03 contained debris, a small, rusted metal strap (approximately 18 inches long by 1 inch wide) at a depth of 7 feet bgs. No other debris was observed in the four remaining test pits. In addition to visual inspection, a photo-ionization detector (PID) was used to screen the soil for volatile organic compounds (VOCs). The maximum PID reading was 5.7 parts per million (ppm) in Test Pit 02, at an approximate depth of 7 ft bgs, indicating the absence of VOCs. A copy of the June 22, 2007 Technical Memorandum, originally submitted in the November 2007 Final Five-Year Review Report, is Attachment 2. Figure 1 in the Technical Memorandum displays the locations of the test pits. The CH2M Hill Test Pit investigation concluded that waste is not present in the southwest portion of Site 17.

2.3 Summary of Site Risks

Results of the ecological risk assessment conducted as part of the Round Two RI (Baker, 1998) revealed no unacceptable risks to ecological receptors. However, the human health risk assessment (HHRA) identified potentially unacceptable risks to human health, based on exposure to cancer-causing PAHs (cPAH). Tables 2-13 and 2-14 in the ROD summarize the human health risk (see Attachment 3).

Due to the PAH contamination in several soil samples from within the Site 17 AOC, the Site was subdivided so that the statistical analysis of PAH concentrations in the HHRA would not be skewed by the larger number of non-PAH contaminated soil samples obtained at other locations, an area referred to as "Site 17 Proper." Thus, human health risks were evaluated for both the Site 17 Soil AOC and Site 17 Proper. These risks were evaluated for the following receptors: current adult and child trespassers, future adult and child residents, future commercial/industrial workers, and future construction workers. The HHRA indicated that the only potentially unacceptable risk at the site is for future residents.

Site 17 Proper: Table 2-13 presents total carcinogenic and non-carcinogenic risks for future residents at Site 17 Proper. Total site carcinogenic risk, expressed as a total lifetime cancer risk (ICR) of $1.6x10^{-5}$, was within USEPA's acceptable risk range of 1×10^{-06} to 1×10^{-04} for future adult and

child residents exposed to soil at Site 17 Proper. Non-carcinogenic risk is evaluated by comparing an exposure level over a specified time period with a reference dose for a similar exposure period. The ratio of exposure to the reference dose is called a hazard quotient (HQ). HQ values are summed to produce hazard indices (HIs) for each potential receptor and receptor pathway (dermal contact, ingestion, and inhalation). An HI represents a conservative, qualitative estimate of potential non-carcinogenic hazards associated with exposure to site contaminants, with an HI value less than or equal to 1.0 indicating that exposure concentrations will not result in adverse effects. As shown on Table 2-13, the total HI value of 2.7 exceeds USEPA's acceptable HI value and indicated the potential for noncarcinogenic adverse health effects from soils at Site 17 Proper.

However, an evaluation of the HI for Site 17 Proper indicated that the contaminants iron (HQ = 1.3) and manganese (HQ = 1.3) produced more than 96 percent of the unacceptable HI. However, iron and manganese concentrations detected within Site 17 Proper were within the range of Installation-wide surface soil background concentrations. Thus, iron and manganese detected within Site 17 Proper exist naturally and do not occur because of past disposal practices. These contaminants were, therefore, not evaluated as Chemicals of Concern (COCs).

Site 17 AOC: Unacceptable carcinogenic risk was calculated for future residents exposed to Site 17 Soil AOC surface soil. A total ICR of 2.1×10^{-4} was derived for future residents living on or near the Site 17 Soil AOC for thirty years (Table 2-14). Total cPAHs were responsible for 99 percent of the unacceptable risk to future residents. As a result, cPAHs were retained as COCs for evaluating remedial alternatives. An unacceptable HI value of 1.42 was also derived for the Site 17 Soil AOC due to manganese, iron, and arsenic. However, the concentrations of manganese, iron, and arsenic detected there were within the installation-wide surface soil background ranges for these likely natural occurrences. These contaminants were therefore not evaluated as COCs.

HHRA Conclusion: Future residents potentially exposed to cPAHs in surface soil from the Site 17 Soil AOC would experience unacceptable cancer risk. The cPAHs were retained as COCs for evaluating remedial alternatives.

2.4 Selected Remedy

The ROD concluded that cPAH-contaminated soil required remediation to protect human health, but did not present unacceptable risk to the environment. A remediation goal of 10 milligrams per kilogram (mg/kg) of cPAH was determined to be protective for commercial/industrial use of the site. The ROD noted that concentrations exceeding residential remediation goals would remain after completion of the remedial action; therefore, land use controls would be required at the site.

The ROD selected the following remedy for soil at the Site:

- Excavating soil in the area identified as the area of concern (AOC) at Site 17. Soil concentrations in this area exceed the total cPAH concentration of 10 mg/kg. The excavation will be approximately two feet in depth, resulting in the removal of approximately 1,300 cubic yards of soil.
- Disposing of the cPAH-contaminated soil at an approved off-site disposal facility.
- Backfilling the excavation area with clean soil fill from the WPNSTA borrow pit.

- Restoring topsoil over the excavation area, and then revegetating the area with native grasses.
- Land use controls will prohibit future residential property use because soil will be remediated to meet commercial/industrial levels, the reasonably anticipated future land use scenario. Contaminant concentrations exceeding residential remediation levels will, however, remain in the soil at Site 17.

Remedial action was conducted from May to August 2000. It included: (1) excavation of a 120' by 150' area to a depth of approximately two feet (or roughly 1,300 cubic yards of soil); (2) off-site disposal of nearly 940 tons of PAH-contaminated soil (i.e., soil that exceeded the commercial/industrial clean-up goal of 10 mg/kg); (3) collection and analysis of confirmation samples;(4) placement of clean fill and topsoil; and (5) establishment of a vegetative cover (OHM, 2001). Figure 4 in Attachment 1 shows where PAH-contaminated soil was removed and where confirmation samples were taken. Since cPAHs were the only COCs, confirmation samples were taken only for PAHs.

As noted previously, historic information indicated that an estimated 60 tons of waste had been deposited in the landfill. Documentation in the construction close-out report (OHM, 2001) does not specifically indicate that debris was encountered during the remedial action. However, interviews with Navy and VDEQ personnel who oversaw the remedial action indicate that very little debris encountered , and that all such waste material was removed from the Site.

3.0 BASIS FOR THE ESD

The ROD also required land use controls. During its review of post-ROD documentation for the Site, the Navy concluded that residential clean-up goals had been met by the remedial action and all waste has been removed. Land use controls are therefore not required at the Site, which is already suitable for unlimited use and unrestricted exposure.

Post-excavation analytical results were reviewed to determine if cPAH concentrations in the soil were below the residential soil clean-up goal of 1.0 mg/kg. This review indicated that statistical evaluation justified eliminating land use controls from the remedy. This information is presented in the Final Site 17 Statistical Evaluation of Post-Excavation Soil Sampling Data (Baker, 2005), which is provided as Attachment 4.

Sixteen post-excavation confirmation samples from the Site were compared to the cPAH residential soil clean-up goal (1.0 mg/kg). Except for two, all samples tested below 1.0 mg/kg. The 95 percent upper confidence limit (UCL) was calculated on the sample data in order to demonstrate that, when considering exposure across the whole site, the site meets the residential soil cleanup level. The USEPA statistical software package, ProUCL, was used to calculate the 95 percent UCL. ProUCL uses several different distribution tests to determine the best fit of the data. The 95 percent UCL for the total cPAH soil data was calculated at 0.8 mg/kg based on an approximate gamma distribution. Therefore, based on the 95 percent UCL of less than 1.0 mg/kg, the Site meets the residential clean-up goal.

The May 2007 Test Pit Investigation by CH2M Hill reported that one rusted metal strap was found at a depth of 7 ft bgs in Test Pit 03. None of the other test pits contained any debris. Based on the 1996 Baker Test Pit investigation and the 2007 CH2M Hill Test Pit Investigation, there is no significant evidence of waste remaining at the site. As previously noted, Navy and VDEQ personnel whom provided oversight during the remedial action indicate that there was very little debris encountered during the remedial action, and that all waste material was removed from the site.

4.0 DESCRIPTION OF SIGNIFICANT DIFFERENCES

Based on the foregoing, the following significant differences occurred:

- Residential soil cleanup criteria were met, exceeding the clean-up levels required by the ROD.
- No debris remains at the Site.
- Land use controls prohibiting future residential property use are no longer necessary to ensure protectiveness.

The remedy, as required by the ROD and as modified by this ESD, remains protective and continues to meet applicable or relevant and appropriate requirements as per section 300.430(f)(1)(ii)(B)(*2*) of the NCP. Because the Site has achieved unlimited use and unrestricted exposure, five-year reviews will not be necessary.

5.0 SUPPORT AGENCY COMMENTS

USEPA, as support agency, has reviewed this ESD and supports the above changes to the remedy. VDEQ concurs.

6.0 STATUTORY DETERMINATIONS

Considering the new information that has been developed and the changes that have been made to the remedy, the Navy and USEPA have determined that the remedy for soil at the Site, as revised, remains protective of human health and the environment, and satisfies the requirements of CERCLA section 121 for remedial actions. The revised remedy also complies with Federal and State requirements identified in the ROD as applicable or relevant and appropriate to the remedial action and is cost-effective. In addition, the revised remedy continues to utilize permanent solutions and alternative treatment technologies to the maximum extent practicable for the Site.

As per CERCLA section 121(c) and NCP section 300.430 (f)(4)(ii), a review of the effectiveness of the remedy must be undertaken every five years when, following completion of the remedial action, hazardous substances, pollutants or contaminants remain at a site above levels that allow for unlimited use and unrestricted exposure. Based on this ESD, the 2001 remedial action close-out report, the 2005 post-remedial soil data statistical analysis, and the 2007 test pit investigation, conditions at the Site allow for unlimited use and unrestricted exposure and, thus, five-year reviews are unnecessary.

29 APR 08

BABETTE BOLIVAR
Captain, U.S. Navy
Commanding Officer
Naval Weapons Station, Yorktown

Date

7/9/08

JAMES J. BURKE
Director
Hazardous Site Cleanup Division
U. S. Environmental Protection Agency, Region III

Date

7.0 PUBLIC PARTICIPATION ACTIVITIES

As per section 300.435(c)(2)(i) of the NCP, this ESD and its supporting documents will be added to the Administrative Record, and a notice of availability and brief description of this ESD will be published in the *Daily Press* and *The Virginia Gazette* within 30 days of its effective date.

8.0 REFERENCES

Baker Environmental, Inc. (Baker). 2005. Final Site 17 Statistical Evaluation of Post-Excavation Soil Sampling Data, Site 17-Holm Road Landfill, Naval Weapons Station Yorktown, Yorktown, Virginia. September 2005.

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9.0 ATTACHMENTS

Attachment 1: Site 17 Figures

Attachment 2: Technical Memorandum: Summary of 2007 Test Pit Investigation at Site 17, Holm Road Landfill

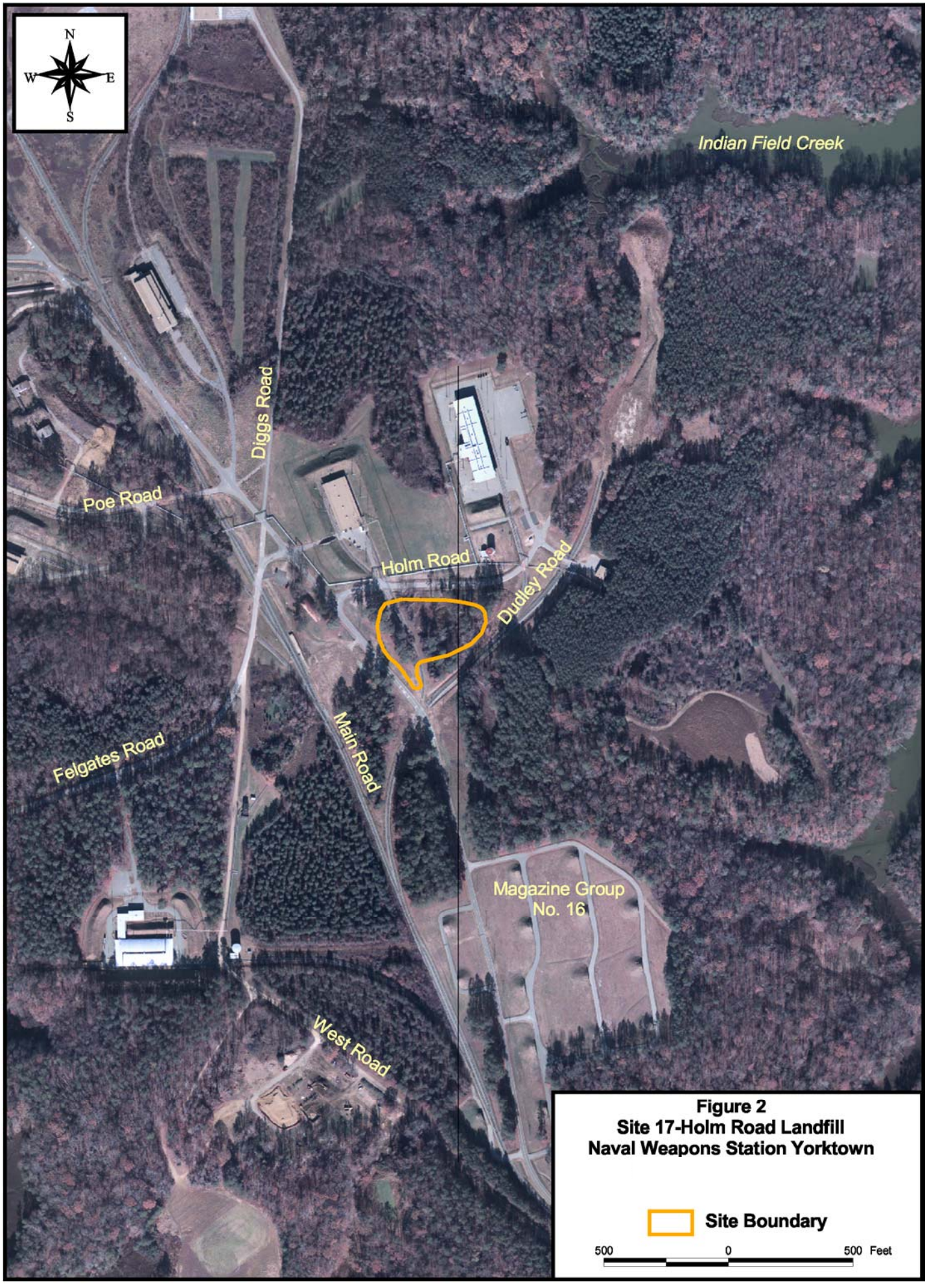
Attachment 3: Site 17 Human Health Risk Summary Tables

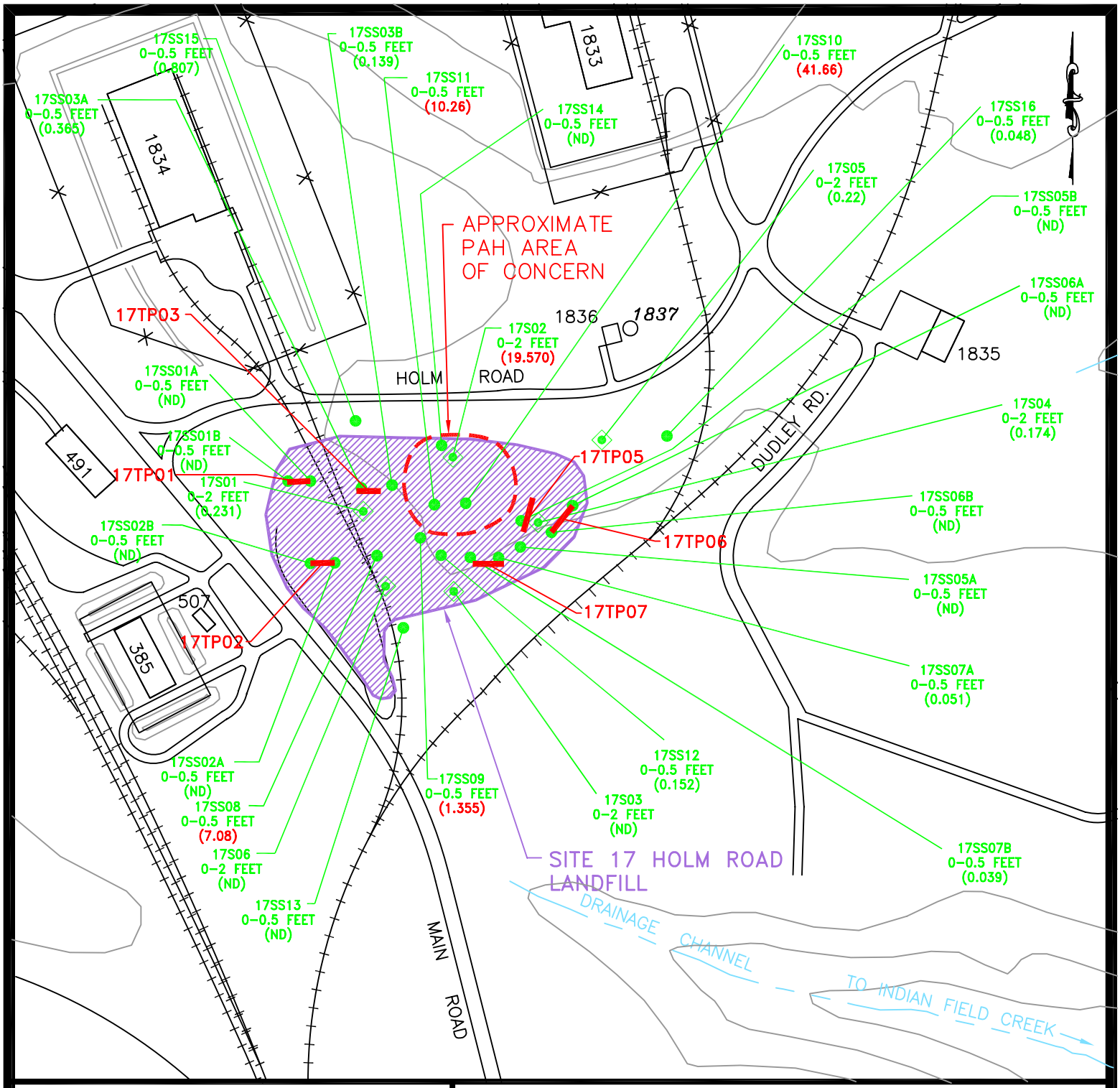
Attachment 4: Final Site 17 Statistical Evaluation of Post-Excavation Soil Sampling Data

Attachment 5: Regulator Response to Comments

Attachment 1
Site 17 Figures

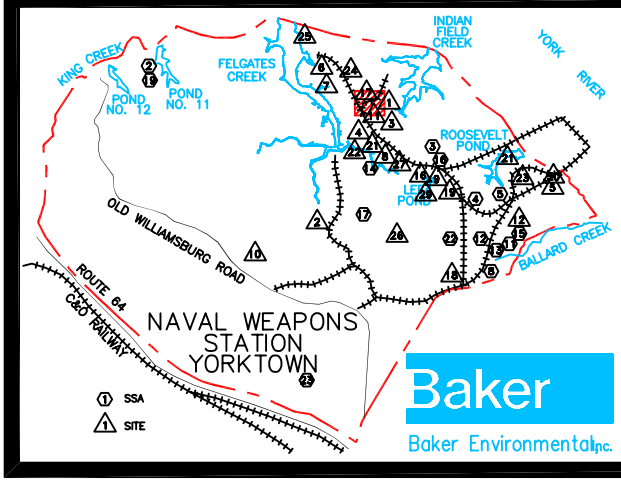

N
W
E
S
Site 17-Holm Road Landfill
Figure 1
Vicinity Map
Naval Weapons Station Yorktown
Facility Boundary
2000
0
2000
4000 Feet


N
W
E
S
Indian Field Creek
Diggs Road
Poe Road
Holm Road
Dudley Road
Main Road
Felgates Road
Magazine Group
No. 16
West Road
Figure 2
Site 17-Holm Road Landfill
Naval Weapons Station Yorktown
Site Boundary
500
0
500 Feet



200 0 100 200

1 inch = 200 ft.



Baker

Baker Environmental Inc.

DRAINAGE
EDGE OF PAVEMENT
RAILROAD
FENCE
BUILDING
APPROXIMATE SITE AREA
TEST PIT AND SURFACE SOIL SAMPLE LOCATION

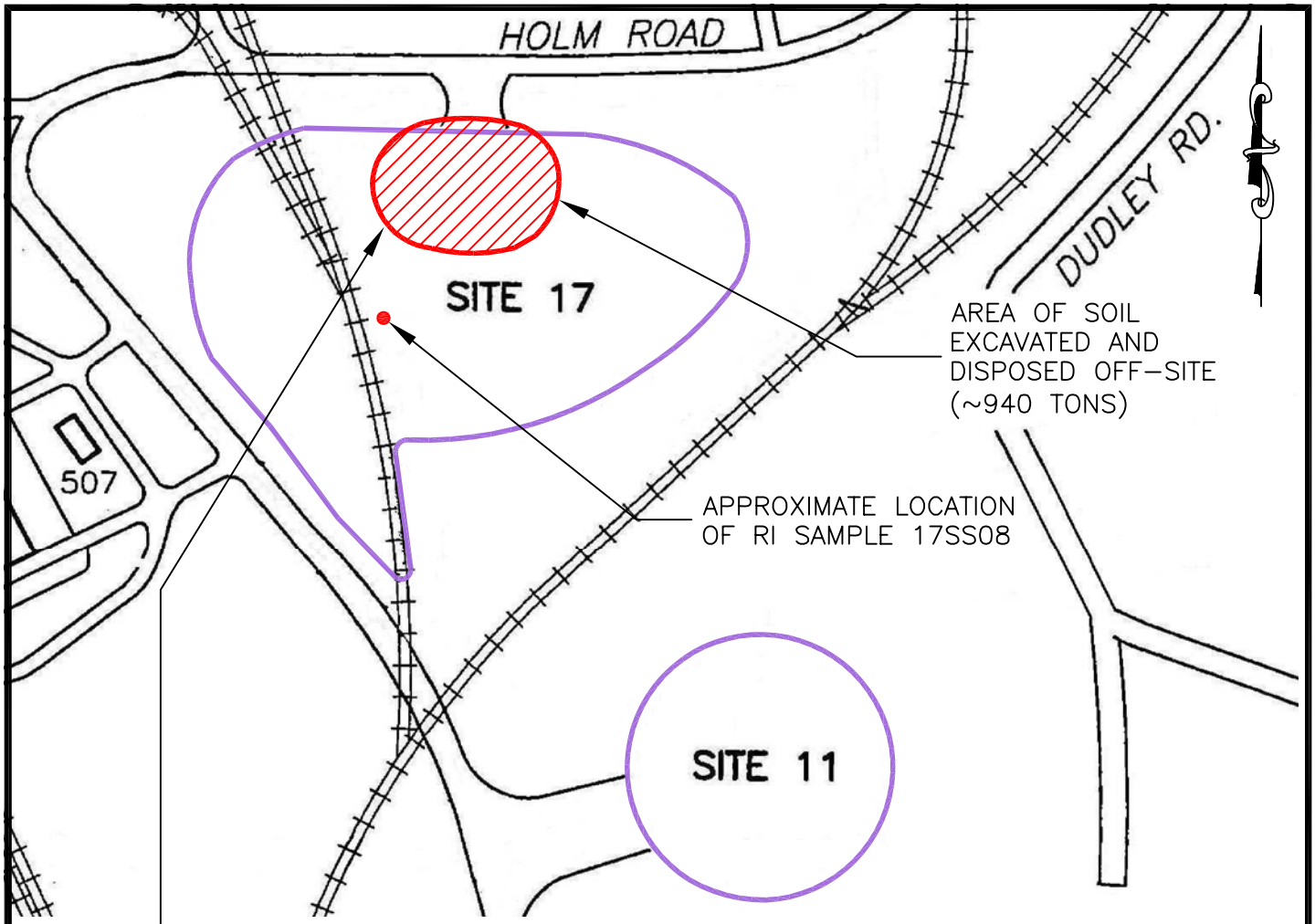
SURFACE SOIL SAMPLE LOCATION (ROUND ONE RI – APPROXIMATE LOCATION)
SURFACE SOIL SAMPLE LOCATION (ROUND TWO RI)
ND – NOT DETECTED
RESULTS ARE MILLIGRAMS/KILOGRAM (mg/kg).
(0.051) – TOTAL CARCINOGENIC PAHs

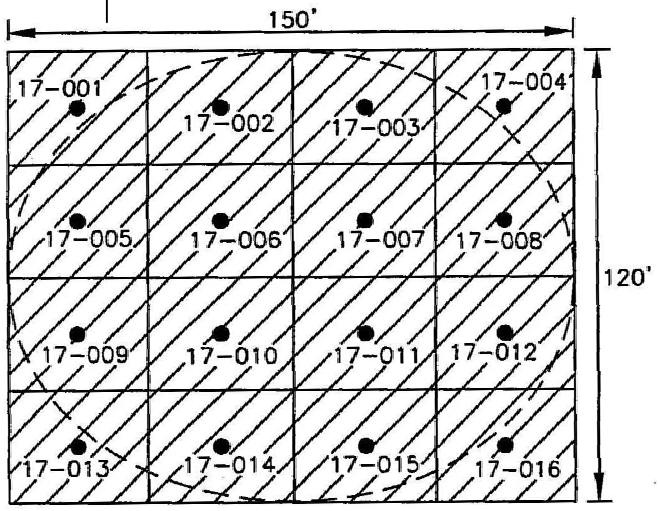
NOTE:
–ITALICIZED CONCENTRATIONS IN RED INDICATE AN EXCEEDANCE OF THE TOTAL CARCINOGENIC PAH REMEDIATION LEVEL OF 9.6 mg/kg.

FIGURE3SITE17–1

FIGURE 3
SITE 17
PAH AREA OF CONCERN

NAVAL WEAPONS STATION YORKTOWN YORKTOWN, VIRGINIA





POST-EXCAVATION SAMPLE LOCATIONS

NOT TO SCALE

LEGEND

- EDGE OF PAVEMENT
- 506 STRUCTURE/BUILDING
- RAILROAD
- REMEDIAL INVESTIGATION AREA

DRAWING FROM FINAL REPORT REMEDIAL ACTION SITES 11 & 17 (OHM, 2001)

FIGURE 4
POST-EXCAVATION SOIL SAMPLE LOCATIONS
SITE 17 – HOLM ROAD LANDFILL

NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Attachment 2
Technical Memoradum: Summary of 2007 Test Pit Investigation at Site 17, Holm Road Landfill

Summary of 2007 Test Pit Investigation at Site 17, Holm Road Landfill, Naval Weapons Station Yorktown, Yorktown, Virginia

PREPARED FOR: NAVFAC Mid Atlantic

PREPARED BY: CH2M HILL

COPIES: David Livingston/VBO
Rebekah Ives/VBO

DATE: June 22, 2007

PROJECT NUMBER: 343901.CE.SR

Introduction

This technical memorandum summarizes activities and findings of a May 2007 test pit investigation conducted at Site 17, Holm Road Landfill, NWS Yorktown. The objective of the investigation was to determine the presence or absence of waste in the area of previously identified geophysical anomalies at Site 17.

Background and Site History

Site 17 is a cleared area on a topographic high off Holm Road and Main Road (Figure 1). An estimated 60 tons of waste were disposed of at Site 17 over approximately 10 years from the 1950s to the 1960s (*NEESA, 1984*). Disposed wastes reportedly included acidic batteries from underwater weapons, hydraulic fluids (Dolconik) from the demilling of torpedoes, other types of hydraulic fluids, drums, and scrap metal. There is no documentation of activities conducted at Site 17 since the cessation of landfill operations until the site was identified during the 1984 IAS.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) investigations conducted at Site 17 included sampling and analysis of soil and groundwater, geophysical survey, and test pits. No waste was identified in test pits excavated during the Round I or Round II Remedial Investigations (Baker, 1993 and 1997, respectively). No waste was encountered in monitoring well borings during these investigations. Additionally, no waste was reported during utility installation of communication, water, and gas lines within the site boundary. Base procedures require base environmental be contacted if waste is encountered and no such contact was made during utility installation.Interviews with Navy personnel report the landfill waste was removed; however, there is no documentation of construction of a soil cover on the landfill or removal of landfill waste.

A Feasibility Study, Proposed Plan and Record of Decision document remedial action plans for the removal of soil contaminated with polycyclic aromatic hydrocarbons (PAHs) in the north-central portion of Site 17. Remedial activities completed in August 2000 included the

excavation of approximately 940 tons of PAH-contaminated soil to a depth of 2 feet (OHM, 2001). The material was classified as non-hazardous and no waste debris was encountered during the remedial action. Post-removal confirmation sample results demonstrated that all concentrations were below the remediation cleanup levels to mitigate unacceptable human health risks and potential ecological risks. LUCs prohibiting residential development at Site 17 have been maintained by the Navy through routine inspections. Site 17 is inaccessible to the general public with controlled access by the Navy.

Test Pit Investigation 2007

A May 2007 test pit investigation was conducted in the southwest portion of Site 17 where the 1992 geophysical survey identified anomalies (Figure 3-7A). The placement of test pits were controlled by the presence of cable, gas, and water utilities running north/south through the most concentrated area of recorded anomalies. The location of the test pits are shown on Figure 1.

Test pits were excavated with a backhoe to the approximate depth of the water table (8 ft bgs). The dimensions of each test pit are identified in Table 1. The soil type and presence/absence of waste was logged for each test pit; test pit logs are provided in Attachment A. In addition to visual observation, a photoionization detector (PID) screened for the presence of volatile organic compounds in the excavated soils. All test pits were backfilled with the excavated soil.

Table 1
Test Pit Summary

Location	Depth (ft)	Length (ft)	Width (ft)	Observed Debris	Water table (ft bgs)
Test Pit 01	8.0	14	8	No debris observed	8.0
Test Pit 02	8.5	16	8	No debris observed	8.5
Test Pit 03	7.5	12	8	rusted metal strap (18" long, 1" wide)	not observed
Test Pit 04	8.5	12	8	No debris observed	7.5
Test Pit 05	8.5	14	8	No debris observed	8.0

Of the five test pits, only Test Pit 03 contained a small, rusted metal strap (approximately 18" long by 1" wide) at a depth of 7 ft bgs. No other debris was observed in the remaining four test pits. The maximum PID detection was 5.7 ppm in Test Pit 02 at an approximate depth of 7 ft bgs, indicating the absence of detectable volatile organic compounds.

Based on the lack of observed waste in the 2007 test pits, coincident with the area of previous geophysical anomaly and low PID detections during test pit excavations, waste is not present in the southwestern portion of Site 17. Based on the absence of waste observed in test pits and soil/monitoring well-borings across the remainder of Site 17 during previous investigations, either historical reports of waste disposal in the area are inaccurate, or as noted in interviews with Navy personnel, the landfill waste was removed although no documentation is available.

References

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Versar, 1991. *Remedial Investigation Interim Report, Naval Weapons Station, Yorktown, Virginia.* July 1, 1991.

Tables

Table 1
Site 17
Test Pit investigation - May 2007
NWS Yorktown
Yorktown, Virginia

Location	Depth (ft)	Length (ft)	Width (ft)	Observed Debris	Water table (ft bgs)
Test Pit 01	8.0	14	8	No debris observed	8.0
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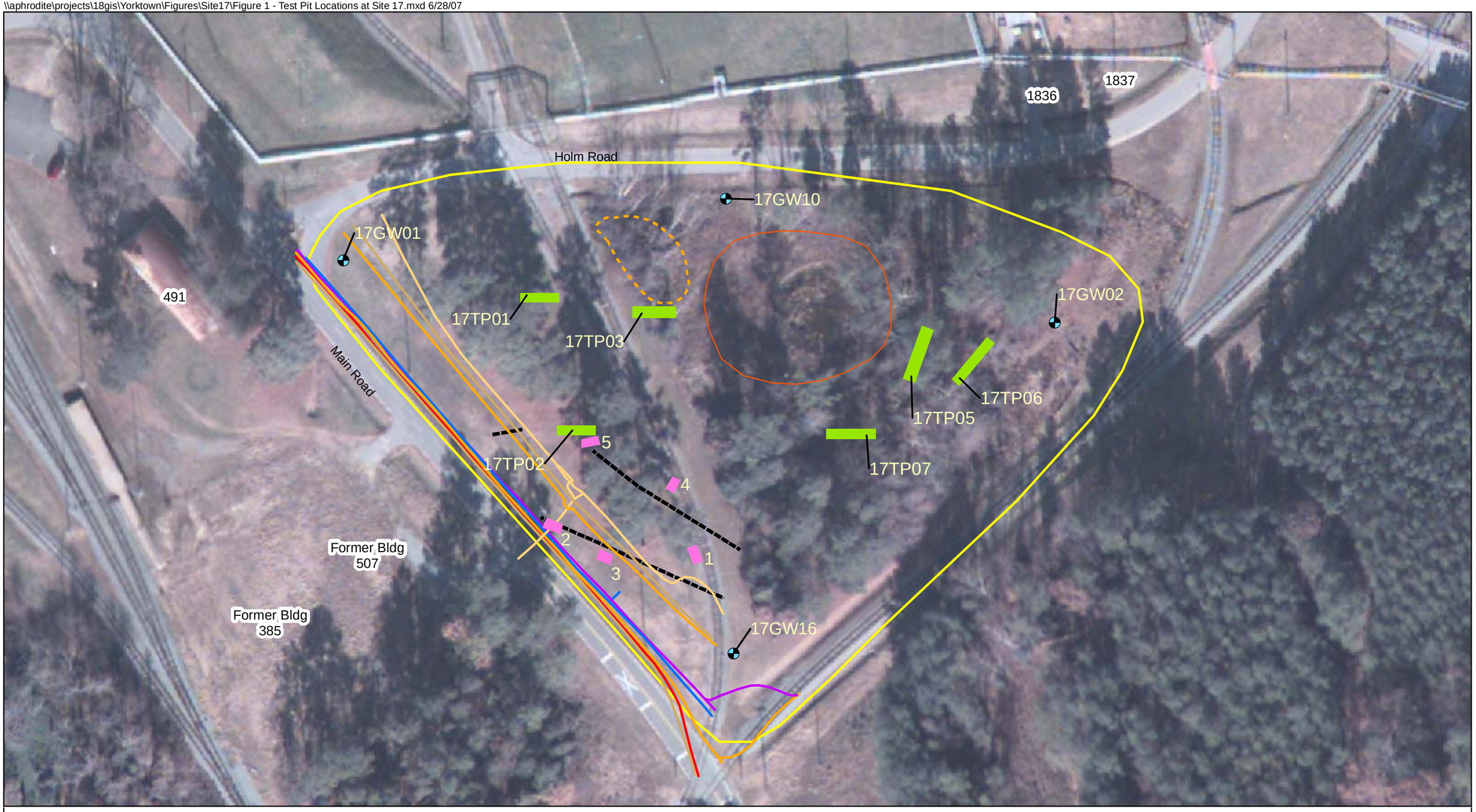
Test Pit 05	8.5	14	8	No debris observed	8.0

Figures

\\aphrodite\projects\18gis\Yorktown\Figures\Site17\Figure 1 - Test Pit Locations at Site 17.mxd 6/28/07



Legend

- Round 2 RI Monitoring Wells
- Test Pit Locations (2007)
- Round 2 RI Test Pit and Surface Soil Sample Locations (1996)
- Study Area Boundary
- Depression Surface Water
- Area of Excavation to Remove PAH and Metals Contaminated Soil (~1300 cu-yards)
- Interpreted Waste Boundary from 1992 geophysical survey (area of anomolies - potential metallic waste)

Utility Lines

- E
- Tele
- Tele F.O.
- Gas
- W
- Unk

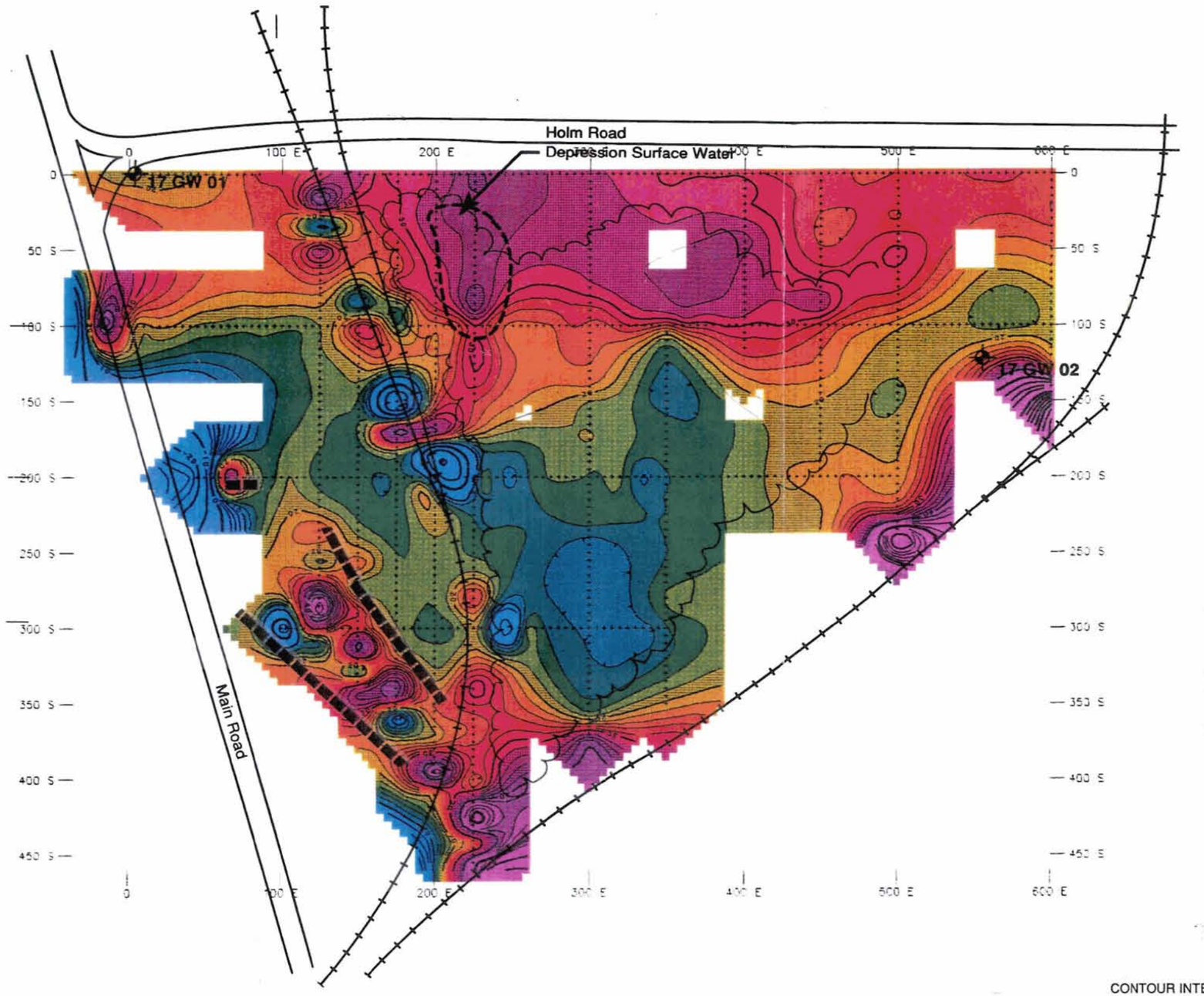
Note:
Utility lines are approximated.

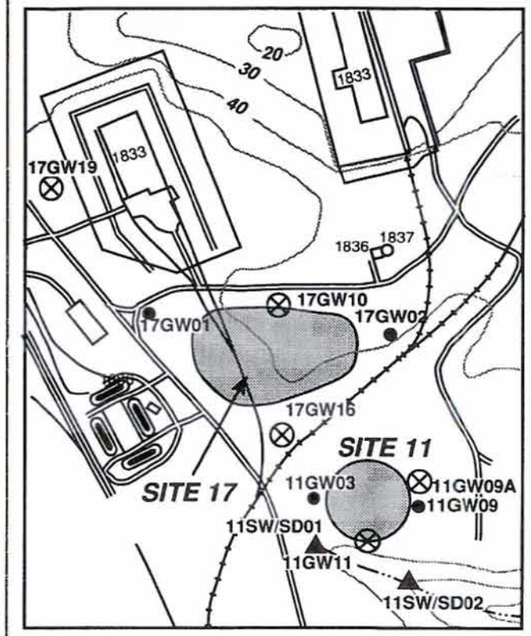
N
W E
S

0 37.5 75
Feet

Figure 1
Test Pit Locations at Site 17
Naval Weapons Station Yorktown
Yorktown, Virginia

CH2MHILL





Legend

- Interpreted Waste Boundary
- Drainage Depression

Scale 1:600

NOTE: Grid Reference:
17 GW01 Located at Grid Node O/O

FIGURE 3-7A
SITE 17 (HOLM ROAD LANDFILL),
EM-31 QUADRATURE

614-8589

CONTOUR INTERVAL

6/27/92

Attachment A

CH2MHILL

PROJECT NUMBER	TEST PIT NUMBER	SHEET 1 OF 1
	Test Pit 01	

TEST PIT WALL LOG

PROJECT: CTO-258, NWS Yorktown LOCATION: NWS Yorktown - Site 17

ELEVATION: CONTRACTOR: Parratt-Wolff DATE EXCAVATED: 5/17/07

WATER LEVEL: 8.0' bgs EXCAVATION METHOD: backhoe with 2' bucket LOGGER: D. Livingston

APPROXIMATE DIMENSIONS: LENGTH: 14' WIDTH: 8' DEPTH: 8'

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	NUMBER/TYPE	DESCRIPTION	COMMENTS
0	0'-1.5'	1	grass roots from grasses and trees silty top soil with considerable organics	PID: ~~[illegible]~~ 2.2 ppm
	1.5'-4'	2	medium to fine sand	PID: 1.8 ppm
	4'-6'	3	large roots from trees	PID: 2.4 ppm
5	6'-8'	4	medium to coarse sand medium to fine sand	PID: 1.9 ppm → water table at 8.0' bgs
			Total depth = 8.0' bgs	
10			Note: Excavation terminated at 8' bgs due to general guidelines in project instructions and presence of water table	
15			Note: No debris or staining encountered	
20				

CH2MHILL

PROJECT NUMBER	TEST PIT NUMBER	SHEET 1 OF 1
	Test Pit 02	

TEST PIT WALL LOG

PROJECT: CTO-258, NWS Yorktown LOCATION: NWS Yorktown – Site 17

ELEVATION: CONTRACTOR: Parratt-Wolff DATE EXCAVATED: 5/17/07

WATER LEVEL: 8.5' bgs EXCAVATION METHOD: Back hoe with 2' bucket LOGGER: D. Livingston

APPROXIMATE DIMENSIONS: LENGTH: 16' WIDTH: 8' DEPTH: 8.5'

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	NUMBER/TYPE	DESCRIPTION	COMMENTS
0	0'-2'	1	grass roots and tree roots — grass silty top soil with organics	PID = 3.1 ppm
	2'-4.5'	2	medium sand	PID = 4.9 ppm
	4.5'-7'	3		PID = 2.9 ppm
5	7'-8.5'	4	medium sand with some coarse	PID = 5.7 ppm
			medium to coarse sand	water table at 8.5' bgs
			Total depth = 8.5' bgs	
10			Note: Excavation terminated due to general guidelines in project instructions at encountered water table	
15			Note: No debris or staining encountered	
20				

PROJECT NUMBER	TEST PIT NUMBER	SHEET 1 OF 1
	Test Pit 03	

TEST PIT WALL LOG

PROJECT: CTO-258, Naus Yorktown LOCATION: Naus Yorktown - Site 17

ELEVATION: CONTRACTOR: Parratt-Wolff DATE EXCAVATED: 5/17/07

WATER LEVEL: Not encountered EXCAVATION METHOD: Back hoe with 2' bucket LOGGER: D. Livingston

APPROXIMATE DIMENSIONS: LENGTH: 12' WIDTH: 8' DEPTH: 7.5'

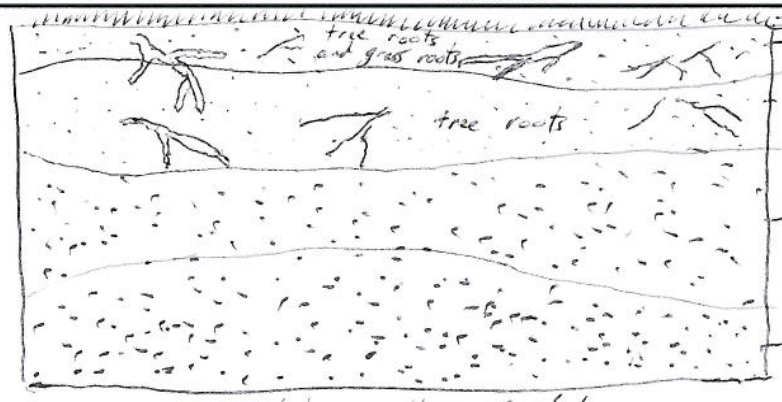
DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	NUMBER/TYPE	DESCRIPTION	COMMENTS
0	0'-1.5'	1	grass and tree roots — grass; sandy silt with some organics	PID = 1.9 ppm
	1.5'-3.5'	2	medium sand	PID = 2.5 ppm
	3.5'-6.0'	3		PID = 3.7 ppm
5	6.0'-7.5'	4	medium to coarse sand; medium with some coarse sand	PID = 2.9 ppm
			Total depth = 7.5' bgs	
10			rusted metal strap (approx 18" long, 1" wide) recovered at 7' bgs	Note: Water table not encountered, however soil at 7.5' bgs had high moisture content → believe water table location is consistent with rest of site (approximately 8.0' bgs)
			Note: Excavation terminated due to general guidelines in project instructions and time constraints	
15			Note: Metal debris (small, rusted metallic strap) uncovered at 7' bgs, no staining encountered	
20				

PROJECT NUMBER	TEST PIT NUMBER	SHEET 1 OF 1
	Test Pit 04	

TEST PIT WALL LOG

PROJECT: CTO-258, NWS Yorktown	LOCATION: NWS Yorktown - Site 17		
ELEVATION:	CONTRACTOR: Parratt-Wolff	DATE EXCAVATED:	5/18/07
WATER LEVEL: 7.5' bgs	EXCAVATION METHOD: Backhoe with 2' bucket	LOGGER:	D. Livingston
APPROXIMATE DIMENSIONS:	LENGTH: 12' WIDTH: 8'	DEPTH:	8.5'

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	NUMBER/TYPE	DESCRIPTION	COMMENTS
0	0'-1'	1	grass, sand silt with organics	PID: 1.9 ppm
	1'-3'	2	medium to fine sand with organics	PID: 3.2 ppm
	3'-6'	3	medium sand with some coarse	PID: 2.2 ppm
5	6'-8.5'	4	medium to coarse sand	PID: 2.1 ppm
				Water table at 7.5' bgs
10				
15				
20				



Total depth = 8.5' bgs

Note: Excavation terminated due to general guidelines in project instructions and presence of water table

Note: No debris or staining encountered

CH2MHILL

PROJECT NUMBER	TEST PIT NUMBER	SHEET 1 OF 1
	Test P.t 05	

TEST PIT WALL LOG

PROJECT: CTO-258, NWS Yorktown LOCATION: NWS Yorktown - Site 17

ELEVATION: CONTRACTOR: Parratt-Wolff DATE EXCAVATED: 5/18/07

WATER LEVEL: 8.0' bgs EXCAVATION METHOD: Backhoe with 2' bucket LOGGER: D. Livingston

APPROXIMATE DIMENSIONS: LENGTH: 14' WIDTH: 8' DEPTH: 8.5'

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	NUMBER/TYPE	DESCRIPTION	COMMENTS
0	0'-1.5'	1	grass and tree roots — grass; sandy silt with organics	PID: 2.2 ppm
	1.5'-3.4'	2	tree roots — medium to fine sand with silt and organics	PID: 3.3 ppm
	3.4'-7'	3	medium to coarse sand	PID: 2.7 ppm
5				
	7'-8.5'	4	medium to coarse sand	PID = 2.2 ppm; Water table at 8.0' bgs
10			Total depth = 8.5' bgs	
			Note: Excavation terminated due to general guidelines in project instructions and presence of water table	
15			Note: No debris or staining encountered	
20				

PROJECT NUMBER	TEST PIT NUMBER	
173946.FI.FK	**Test pit 01**	SHEET 1 OF 1

TEST PIT LOG

PROJECT : NWS Yorktown - CTO 258 LOCATION:NWS Yorktown - Site 17 LOGGER: D. Livingston

ELEVATION : CONTRACTOR: Parratt-Wolff

EXCAVATION EQUIPMENT: Catepillar Backhoe with 2' bucket DATE EXCAVATED: 05/17/2007

WATER LEVEL: 8.0' bgs APPROXIMATE DIMENSIONS: LENGTH: 14' WIDTH: 8' DEPTH: 8'

DEPTH BELOW SURFACE (FT)	INTERVAL (FT) NUMBER/TYPE	SOIL DESCRIPTION (SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	COMMENTS (DIFFICULTY IN EXCAVATION, RUNNING GRAVEL CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, WATER SEEPAGE, GRADATIONAL CONTACTS, TESTS, INSTRUMENTATION)
	1	0.0'-1.5' - Silty top soil with considerable organics and root material, OL, very dark grayish brown 2.5YR 3/2, dry medium to low density.	PID: 2.2 ppm
	2	1.5'-4.0' - Medium to fine sand with some silt, SP, light olive brown 2.5Y 5/4, dry, loose.	PID: 1.8 ppm
5	3	4.0'-6.0' - Medium to coarse sand, SW, very pale brown 10YR 7/4, moist, medium density	PID: 2.4 ppm
	4	6.0'-8.0' - Medium to fine sand with some coarse sand, SW, yellowish brown 10YR 5/4, wet, medium density (trace light gray medium sand mottling 2.5Y 6/1).	PID: 1.9 ppm
		End of Excavation at 8.0' bgs	Water table at 8.0' bgs
10			
15			
20			
25			

PROJECT NUMBER	TEST PIT NUMBER	
173946.FI.FK	**Test pit 02**	SHEET 1 OF 1

TEST PIT LOG

PROJECT : NWS Yorktown - CTO 258 LOCATION:NWS Yorktown - Site 17 LOGGER: D. Livingston

ELEVATION : CONTRACTOR: Parratt-Wolff

EXCAVATION EQUIPMENT: Catepillar Backhoe with 2' bucket DATE EXCAVATED: 05/17/2007

WATER LEVEL: 8.5' bgs APPROXIMATE DIMENSIONS: LENGTH: 16' WIDTH: 8' DEPTH: 8.5'

DEPTH BELOW SURFACE (FT)	INTERVAL (FT) / NUMBER/TYPE	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DIFFICULTY IN EXCAVATION, RUNNING GRAVEL CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, WATER SEEPAGE, GRADATIONAL CONTACTS, TESTS, INSTRUMENTATION
	1	0.0'-2.0' - Sandy silt with considerable organics, OL, very dark grayish brown 2.5 YR 3/2, dry, medium density	PID: 3.1 ppm
	2	2.0'-4.5' - Medium sand, SP, light olive brown 2.5Y 5/4, dry, medium to loose	PID: 4.9 ppm
5	3	4.5'-7.0' - Medium sand with some coarse, SW, light yellowish brown 2.5Y 6/4, moist, medium density	PID: 2.9 ppm
	4	7.0'-8.5' - Medium to coarse sand, SW, mottled gray 2.5Y 6/1 and dark yellowish brown 10YR 4/4, wet, medium	PID: 5.7 ppm
10		End of Excavation at 8.5' bgs	Water table at 8.5' bgs
15			
20			
25			

PROJECT NUMBER	TEST PIT NUMBER	
173946.FI.FK	**Test pit 03**	SHEET 1 OF 1

TEST PIT LOG

PROJECT : NWS Yorktown - CTO 258 LOCATION:NWS Yorktown - Site 17 LOGGER: D. Livingston

ELEVATION : CONTRACTOR: Parratt-Wolff

EXCAVATION EQUIPMENT: Catepillar Backhoe with 2' bucket DATE EXCAVATED: 05/17/2007

WATER LEVEL: APPROXIMATE DIMENSIONS: LENGTH: 12' WIDTH: 8' DEPTH: 7.5'

DEPTH BELOW SURFACE (FT)	INTERVAL (FT) NUMBER/TYPE	SOIL DESCRIPTION (SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	COMMENTS (DIFFICULTY IN EXCAVATION, RUNNING GRAVEL CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, WATER SEEPAGE, GRADATIONAL CONTACTS, TESTS, INSTRUMENTATION)
	1	0.0'-1.5' - Sandy silt with considerable organics, OL, very dark grayish brown 2.5YR 3/2, dry medium density.	PID: 1.9 ppm
	2	1.5'-3.5' - Medium sand with some silt, SP, light olive brown 2.5Y 5/4, medium density.	PID: 2.5 ppm
5	3	3.5'-6.0' - Medium to coarse sand, SW, mottled light yellowish brown 2.5Y 6/4 and gray 2.5Y 6/1, moist,	PID: 3.7 ppm
	4	6.0'-7.5' - Medium sand with some coarse sand, SW, gray 2.5Y 6/1, wet, medium density.	
		End of Excavation at 7.5 bgs	
10			
15			
20			
25			

PROJECT NUMBER	TEST PIT NUMBER	
173946.FI.FK	**Test pit 04**	SHEET 1 OF 1

TEST PIT LOG

PROJECT : NWS Yorktown - CTO 258 LOCATION:NWS Yorktown - Site 17 LOGGER: D. Livingston

ELEVATION : CONTRACTOR: Parratt-Wolff

EXCAVATION EQUIPMENT: Catepillar Backhoe with 2' bucket DATE EXCAVATED: 05/18/2007

WATER LEVEL: 7.5' bgs APPROXIMATE DIMENSIONS: LENGTH: 12' WIDTH: 8' DEPTH: 8.5'

DEPTH BELOW SURFACE (FT)	INTERVAL (FT) / NUMBER/TYPE	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DIFFICULTY IN EXCAVATION, RUNNING GRAVEL CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, WATER SEEPAGE, GRADATIONAL CONTACTS, TESTS, INSTRUMENTATION
	1	0.0'-1.0' - Sandy silt with considerable organics and root material, OL, very dark grayish brown 1.5Y 3/2, dry, medium density	PID: 1.9 ppm
	2	1.0'-3.0' - Medium to fine sand with some silt, SP, light olive brown 2.5Y 5/4, dry, loose	PID: 3.2 ppm
		3.0'-6.0' - Medium sand with some coarse sand, SW, yellowish brown 10YR 5/4, wet, medium density	PID: 2.2 ppm
5	3		
		6.0'-8.5' - Medium to coarse sand, SW, mottled gray 2.5Y 6/1 and dark yellowish brown 10YR 4/4, wet, medium	
	4		Water table at 7.5' bgs
		End of Excavation at 8.5' bgs	
10			
15			
20			
25			

PROJECT NUMBER	TEST PIT NUMBER	
173946.FI.FK	**Test pit 05**	SHEET 1 OF 1

TEST PIT LOG

PROJECT : NWS Yorktown - CTO 258 LOCATION:NWS Yorktown - Site 17 LOGGER: D. Livingston

ELEVATION : CONTRACTOR: Parratt-Wolff

EXCAVATION EQUIPMENT: Catepillar Backhoe with 2' bucket DATE EXCAVATED: 05/18/2007

WATER LEVEL: 8.5' bgs APPROXIMATE DIMENSIONS: LENGTH: 14' WIDTH: 8' DEPTH: 8.5'

DEPTH BELOW SURFACE (FT)	INTERVAL (FT) / NUMBER/TYPE	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DIFFICULTY IN EXCAVATION, RUNNING GRAVEL CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, WATER SEEPAGE, GRADATIONAL CONTACTS, TESTS, INSTRUMENTATION
	1	0.0'-1.5' Sandy silt with considerable organics and roots, OL, very dark grayish brown 2.5Y 3/2, dry, medium	PID: 2.2 ppm
	2	1.5'-3.4' - Medium to fine sand with silt, SP, light olive brown 2.5Y 5/4, dry loose	PID: 3.3 ppm
	3	3.4'-7.0' - Medium to coarse sand, SW, yellowish brown 10YR 5/4, wet, medium density	PID: 2.7 ppm
5			
	4	7.0'-8.5' - Medium to coarse sand, SW, mottled gray 2.5Y 6/1 and dark yellowish brown 10YR 4/4, wet, medium	PID: 2.2 ppm
			Water table at 8.5' bgs
		End of Ecavation at 8.5' bgs	
10			
15			
20			
25			

Attachment 3
Site 17 Human Health Risk Summary Tables

TABLE 2-13

**INCREMENTAL CANCER RISK AND HAZARD INDEX
FOR FUTURE POTENTIAL RESIDENTIAL RECEPTORS
REASONABLE MAXIMUM EXPOSURE VALUES
SITE 17 PROPER
NAVAL WEAPONS STATION YORKTOWN
YORKTOWN, VIRGINIA**

Pathway	Receptors						Total	
	Adults		Young Children (1-6 yrs.)		Adolescents (7-15 yrs)			
	ICR	HI	ICR	HI	ICR	HI	ICR	HI
Surface Soil - Site 17 Proper								
Ingestion	1.7×10^{-6}	0.06	6.4×10^{-6}	0.52	2.0×10^{-6}	0.11		
Dermal Contact	2.2×10^{-6}	0.48	1.5×10^{-6}	0.84	1.8×10^{-6}	0.67		
Total	3.9×10^{-6}	0.54	7.9×10^{-6}	1.4	3.8×10^{-6}	0.78	1.6×10^{-5}	2.7*

Notes:

ICR - incremental cancer risk
HI - hazard index

Shaded HI value in table represent exceedences of USEPA acceptable risk criteria (target HI value of 1.0) by total site risk.

*Value exceeds 1.0 primarily because of cumulative risks due to iron (HQ=1.3) and manganese (HQ=1.3).

TABLE 2-14

INCREMENTAL CANCER RISK AND HAZARD INDEX FOR FUTURE POTENTIAL RESIDENTIAL RECEPTORS REASONABLE MAXIMUM EXPOSURE VALUES SITE 17 SOIL AREA OF CONCERN NAVAL WEAPONS STATION YORKTOWN YORKTOWN, VIRGINIA

Pathway	Receptors						Total	
	Adults		Young Children (1-6 yrs.)		Adolescents (7-15 yrs)			
	ICR	HI	ICR	HI	ICR	HI	ICR	HI
Surface Soil - Soil AOC								
Ingestion	2.6×10^{-5}	0.06	9.7×10^{-5}	0.57	3.0×10^{-5}	0.12		
Dermal Contact [1]	2.6×10^{-6}	0.17	1.8×10^{-6}	0.30	1.8×10^{-6}	0.20		
Total	2.9×10^{-5}	0.23	9.9×10^{-5}	0.87	3.2×10^{-5}	0.32	2.1×10^{-4}*	1.42*

Notes:

ICR - incremental cancer risk
HI - hazard index

[1] Dermal contact with PAHs not evaluated as per USEPA Region III directive

Shaded values in table represent exceedences of USEPA acceptable risk criteria (i.e., target ICR range of 1×10^{-6} to 1×10^{-4} and target HI value of 1.0) by total site risk.

* The total ICR value exceeds 1×10^{-4} primarily because of cumulative risks due to benzo(a)pyrene (ICR = 1.0×10^{-4}) and dibenzo(a,h)anthracene (ICR = 1.9×10^{-5}). The total HI value exceeds 1.0 primarily because of cumulative risks due to iron (HI = 0.48), arsenic (HI = 0.30), and manganese (HI = 0.62).

Attachment 4
Final Site 17 Statistical Evaluation of Post-Excavation Soil Sampling Data

Baker Environmental, Inc.
A Unit of Michael Baker Corporation

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Suite 240
Virginia Beach, VA 23452
(757) 463-8770
FAX (757) 463-0503

September 16, 2005

Commanding Officer
Naval Facilities Engineering Command, Mid-Atlantic
9742 Maryland Avenue
Bldg N-26, Room 3208
Norfolk, Virginia 23511-3095

Attn: Ms. Linda Cole, P.E.
Code EV3

Re: Navy CLEAN III Program
Contract N62470-02-D-3052
Contract Task Order (CTO) 092
Final Site 17 Statistical Evaluation of Post-Excavation Soil Sampling Data
Naval Weapons Station Yorktown, Yorktown, Virginia

Dear Ms. Cole:

Enclosed is one electronic copy of the Final Statistical Evaluation of Post-Excavation Soil Sampling Data for Site 17 at Naval Weapons Station (WPNSTA) Yorktown, Yorktown, Virginia. This document evaluated cleanup levels at the site and concluded that residential cleanup levels were met. Therefore, no land use controls are necessary at Site 17 and a Remedial Design will not be necessary. An Explanation of Significant Differences will need to be prepared to document this change in the remedy for Site 17. This document has also been emailed to the other members of the Yorktown Partnering Team. Baker appreciates the opportunity to provide support to NAVFAC Mid-Atlantic and WPNSTA Yorktown. If you have any questions regarding this deliverable, please contact me at (757) 631-5416.

Sincerely,

BAKER ENVIRONMENTAL, INC.

Don P. Joiner, P.E.
Project Manager

Enclosures

cc: Ms. Elizabeth Rolle, NAVFAC Mid-Atlantic
Ms. Lee Anne Rapp, NAVFAC Atlantic
Ms. Sharon Lee, NAVFAC Atlantic
Ms. Bonnie Capito, NAVFAC Atlantic
Mr. Greyson Franklin, USEPA Region III
Mr. Steve Mihalko, VDEQ
Ms. Laura Cook, CH2M Hill

Statistical Evaluation of Post-Excavation Soil Sampling Data
Site 17 – Holm Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Purpose

Remedial Designs for Land Use Controls at Naval Weapons Station Yorktown sites were developed in 2005. The Record of Decision (ROD) for Site 17 requires land use controls since the remedy included the removal of contaminated soil exceeding industrial criteria. As part of the development of Remedial Designs, Site 17 was re-evaluated. The post-excavation analytical results were reviewed to determine if soil at the site was below the residential soil cleanup goal of 1.0 mg/kg for cPAHs. This review indicated that a statistical evaluation could provide justification to eliminate the requirement of land use controls at Site 17.

Site Description

Site 17 is a two-acre disposal area located south of Holm Road and east of Main Road. The site was operated for approximately 10 years, from the 1950s to the 1960s. Wastes reportedly disposed included acid batteries from underwater weapons, hydraulic fluids (Dolconik) from the demilling of torpedoes, other types of hydraulic fluids, drums from the Public Works Department and ordnance production shops, and scrap metal. An estimated 60 tons of waste were deposited in the landfill while in use. The site was overgrown with mature trees, and no evidence of surface waste was apparent. Results from the geophysical investigation of this site during the Round One Remedial Investigation (RI) did not indicate any evidence of buried material.

Previous Investigations

The Round Two RI was conducted in 1996. Results of the risk assessments conducted as part of the Round Two RI indicated that there were no ecological risks from soil. Only human health risks from carcinogenic polynuclear aromatic hydrocarbons (cPAHs) in soil were of concern at Site 17 (Baker, 1998). A cleanup goal of 10 mg/kg for cPAHs was developed based on the industrial use scenario (Baker, 1999).

The ROD identified the selected remedy as excavation and off-site disposal of cPAH-contaminated soil. Land use controls prohibiting future residential property use would be required since soil would be remediated to meet industrial levels (Baker, 2000).

A remedial action was conducted by OHM in 2000 and included the excavation and off-site disposal of approximately 940 tons of contaminated soil. Figure 1 depicts the location of the excavation area. Soils contaminated with cPAHs were excavated to approximately two feet below ground surface. Post-excavation samples were collected and analyzed for PAHs and cPAHs. Analytical results confirmed that soil remaining at the site was below the industrial cleanup goal of 10 mg/kg for cPAHs and the residential cleanup goal of 44 mg/kg for PAHs (OHM, 2001).

Statistical Evaluation of Post-Excavation Confirmation Samples

The 16 post-excavation confirmation samples were compared to the residential soil cleanup goal for cPAHs of 1.0 mg/kg. With the exception of two samples, all sample concentrations were below 1.0 mg/kg. Table 1 provides the analytical results of the confirmation samples. Given that most of the sample results were nondetect or detected below 1.0 mg/kg, a 95 percent upper confidence limit (UCL) was calculated in order to demonstrate that when considering exposure across the whole site,

the site meets the residential soil level. The USEPA statistical software package, ProUCL, was used to calculate the 95 percent UCL. ProUCL uses several different distribution tests to determine the best fit of the data. The 95 percent UCL for the total cPAH soil data was calculated at 0.8 mg/kg based on an approximate gamma distribution. Table 2 provides the results of the statistical evaluation. Therefore, based on the nondetect and low concentrations of the confirmation data and a 95 percent UCL less than 1.0 mg/kg, the site meets the residential soil criterion.

In addition to the post-excavation confirmation samples, analytical data from the Round Two RI report was reviewed to determine if any of the original site samples exceeded the residential soil goal. Of the 23 samples collected outside of the excavated area, only 1 location exceeded the residential goal for cPAHs (17SS08 at 1.5 mg/kg). Given that there are 23 RI samples versus the 16 post-excavation confirmation samples and that the maximum detected sample concentration is 1.5 mg/kg versus the 1.8 mg/kg value from the post-excavation confirmation samples, a statistical evaluation of the RI data would show a 95 percent UCL less than 1.0 mg/kg. Therefore, sample location 17SS08 is not a concern.

Conclusions and Recommendations

Land use controls prohibiting future residential property use at Site 17 are not required since soil at the site statistically meets the residential soil criterion. An Explanation of Significant Differences to the ROD is recommended to document the change from industrial to residential cleanup at the site.

References

Baker, 2000. Final Record of Decision Operable Unit Nos. X and XI, Sites 11 and 17, Naval Weapons Station Yorktown, Yorktown, Virginia. September 2000.

Baker, 1999. Final Feasibility Study for Sites 11 and 17, Naval Weapons Station Yorktown, Yorktown, Virginia. May 1999.

Baker, 1998. Final Round Two Remedial Investigation for Sites 11 and 17, Naval Weapons Station Yorktown, Yorktown, Virginia. August 1998.

OHM, 2001. Final Report Remedial Action at Sites 11 and 17, Naval Weapons Station Yorktown, Yorktown, Virginia. June 2001.

Table 1
Post-Excavation Soil Samples
Site 17 - Holm Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Sample ID	17-001	17-002	17-003	17-004	17-005	17-006	17-007
Sample Date	5/23/2000	5/23/2000	5/23/2000	5/23/2000	5/23/2000	5/23/2000	5/23/2000
cPAHs (mg/kg)							
Benzo(a)pyrene	<0.41	<0.41	<0.43	<0.46	0.21 J	0.29 J	0.54
Dibenzo(a,h)anthracene	<0.41	<0.41	<0.43	<0.46	<0.43	0.044 J	0.081 J
Benzo(a)anthracene	<0.41	<0.41	<0.43	<0.46	0.24 J	0.14 J	0.34 J
Benzo(b)fluoranthene	<0.41	<0.41	0.046 J	<0.46	0.16 J	0.17 J	0.38 J
Indeno(1,2,3-cd)pyrene	<0.41	<0.41	<0.43	<0.46	0.072 J	0.18 J	0.32 J
Benzo(k)fluoranthene	<0.41	<0.41	<0.43	<0.46	0.2 J	0.2 J	0.39 J
Chrysene	<0.41	<0.41	<0.43	<0.46	0.28 J	0.17 J	0.44
Total cPAHs	0.41 U	0.41 U	0.005	0.46 U	0.259	0.385	0.729

Shaded results exceed residential cleanup goal of 1 mg/kg

Total cPAHs = (a + b)*1 + (c + d + e)*0.1 + f*0.01 + g*0.001
Where
a = concentration of benzo(a)pyrene
b = concentration of dibenzo(a,h)anthracene
c = concentration of benzo(a)anthracene
d = concentration of benzo(b)fluoranthene
e = concentration of indeno(1,2,3-cd)pyrene
f = concentration of benzo(k)fluoranthene
g = concentration of chrysene

Source: Final Report Remedial Action Sites 11 and 17 (OHM, 2001)

Table 1
Post-Excavation Soil Samples
Site 17 - Holm Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

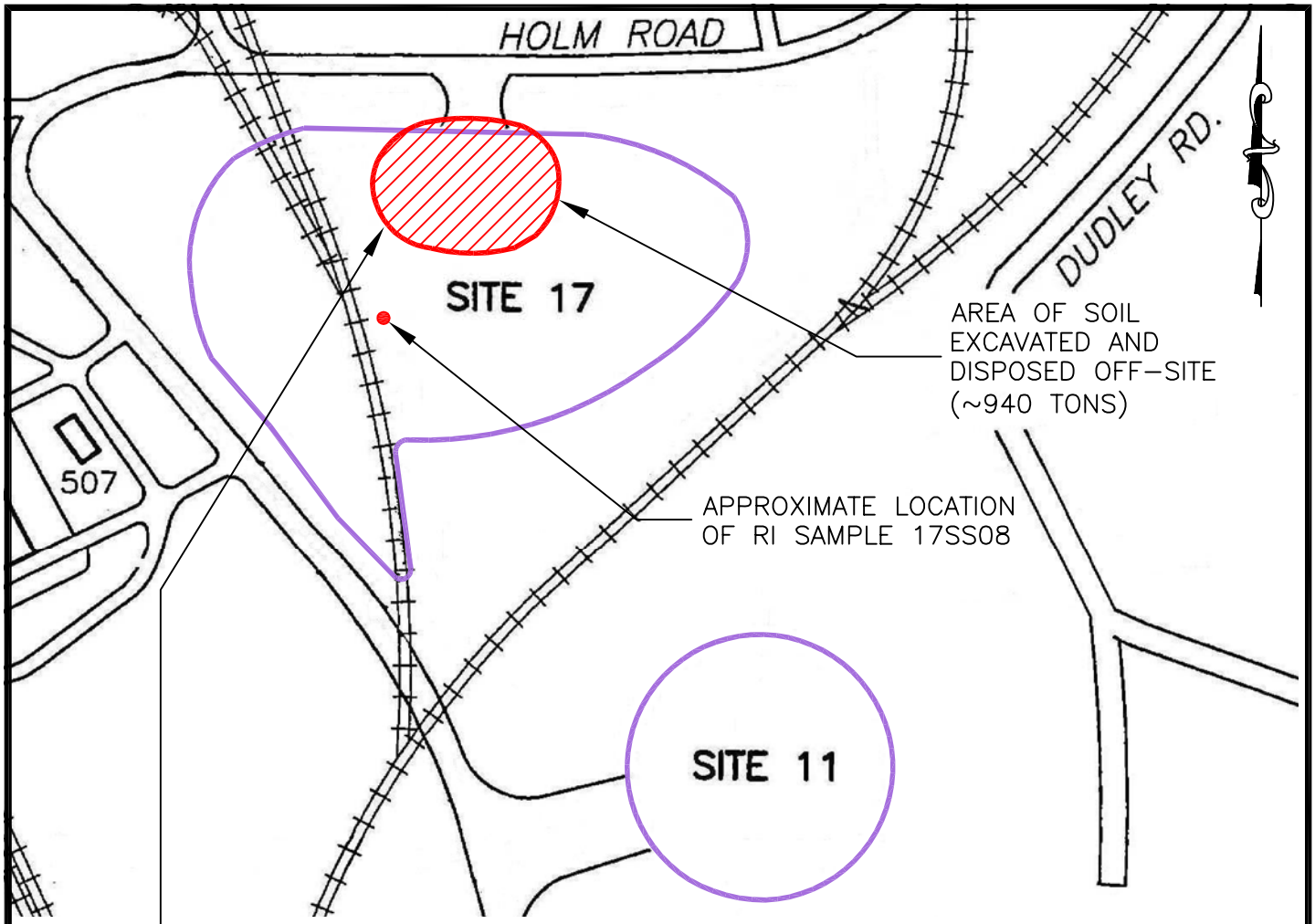
Sample ID	17-008	17-009	17-010	17-011	17-012	17-013	17-014	17-015	17-016
Sample Date	5/23/2000	6/8/2000	6/8/2000	6/8/2000	6/8/2000	6/8/2000	6/8/2000	6/8/2000	6/8/2000
cPAHs (mg/kg)									
Benzo(a)pyrene	0.41 J	0.65	<0.42	0.086 J	0.049 J	0.4	<0.37	0.89	1.3
Dibenzo(a,h)anthracene	0.071 J	0.12 J	<0.42	<0.39	<0.36	0.076 J	<0.37	0.12 J	0.23 J
Benzo(a)anthracene	0.28 J	0.35 J	<0.42	0.049 J	<0.36	0.21 J	<0.37	0.41	0.8
Benzo(b)fluoranthene	0.28 J	0.74	<0.42	0.083 J	0.05 J	0.41	<0.37	0.84	1.2
Indeno(1,2,3-cd)pyrene	0.22 J	0.37 J	<0.42	0.048 J	<0.36	0.27 J	<0.37	0.45	0.96
Benzo(k)fluoranthene	0.33 J	0.23 J	<0.42	<0.39	<0.36	0.13 J	<0.37	0.33 J	0.4 J
Chrysene	0.35 J	0.44	<0.42	0.056 J	<0.36	0.26 J	<0.37	0.5	0.91
Total cPAHs	0.563	0.919	0.42 U	0.104	0.054	0.567	0.37 U	1.184	1.831

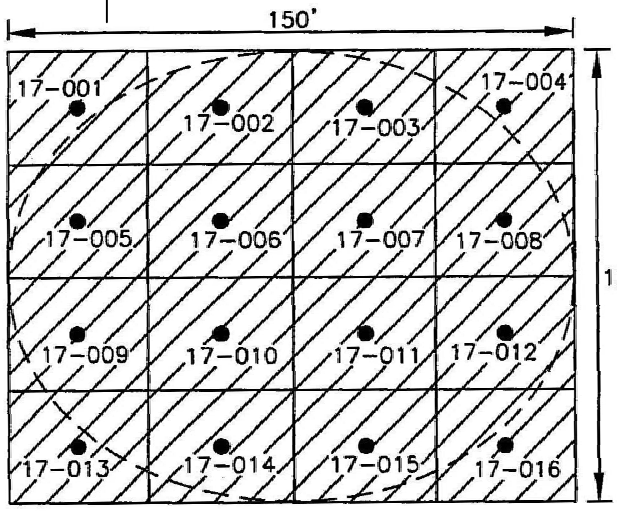
Table 2
Statistical Evaluation of Post-Excavation Soil Samples
Site 17 - Holm Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Variable:	Total cPAHs
Raw Statistics	
Number of Observations	16
Number of Missing Data	0
Number of Valid Observations	16
Number of Distinct Observations	15
Minimum	0.005
Maximum	1.831
Mean	0.4771875
Standard Deviation	0.487844814
Variance	0.237992563
Coefficient of Variation	1.022333598
Skewness	1.702449854
Too Few Distinct Observations?	NO
Normal Statistics	
Lilliefors Test Statisitic	N/R
Lilliefors 5% Critical Value	N/R
Shapiro-Wilk Test Statisitic	0.814552208
Shapiro-Wilk 5% Critical Value	0.887
5% Normality Test Result	NOT NORMAL
95% Student's-t UCL	0.690991604
Gamma Statistics	
k hat	0.965598756
k star (bias corrected)	0.826215656
Theta hat	0.494188189
Theta star	0.577558047
nu hat	30.89916018
nu star	26.43890098
5% Approximate Chi Square Value	15.71590818
Adjusted Level of Significance	0.03348
Adjusted Chi Square Value	14.77946842
Anderson-Darling Test Statistic	0.276508009
Anderson-Darling 5% Critical Value	0.764843928
Anderson-Darling 5% Gamma Test Result	AD GAMMA
Kolmogrov-Smirnov Test Statistic	0.141200736
Kolmogrov-Smirnov 5% Critical Value	0.221443466
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA
5% Gamma Test Result	GAMMA
95% Approximate Gamma UCL	0.802773401
95% Adjusted Gamma UCL	0.85363781
Lognormal Statistics	
Minimum of log data	-5.298317367
Maximum of log data	0.604862266
Mean of log data	-1.340110465
Standard Deviation of log data	1.398453442
Variance of log data	1.955672029
Lilliefors Test Statisitic	N/R
Lilliefors 5% Critical Value	N/R
Shapiro-Wilk Test Statisitic	0.887591795
Shapiro-Wilk 5% Critical Value	0.887

Table 2
Statistical Evaluation of Post-Excavation Soil Samples
Site 17 - Holm Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Variable:	Total cPAHs
5% Lognormality Test Result	LOGNORMAL
MLE Mean	0.696091299
MLE Standard Deviation	1.714797677
MLE Coefficient of Variation	2.463466617
MLE Skewness	22.34036032
MLE Median	0.261816745
MLE 80% Quantile	0.853493539
MLE 90% Quantile	1.579174445
MLE 95% Quantile	2.612598831
MLE 99% Quantile	6.771294232
MVU Estimate of Median	0.246240438
MVU Estimate of Mean	0.626654012
MVU Estimate of Standard Deviation	1.109524487
MVU Estimate of SE of Mean	0.250940967
95% H-UCL	2.358836389
95% Chebyshev (MVUE) UCL	1.720480326
97.5% Chebyshev (MVUE) UCL	2.193779846
99% Chebyshev (MVUE) UCL	3.123485104
Non-parametric Statisitics	
95% CLT UCL	0.677795828
95% Adjusted-CLT UCL	0.733260501
95% Modified-t UCL	0.699642972
95% Jackknife UCL	0.690991604
95% Chebyshev (Mean, Sd) UCL	1.008804061
97.5% Chebyshev (Mean, Sd) UCL	1.238834972
99% Chebyshev (Mean, Sd) UCL	1.690686153
Bootstrap Statistics	
Number of Bootstrap Runs	2000
95% Standard Bootstrap UCL	0.674016569
95% Bootstrap-t UCL	0.826860435
95% Hall's Bootstrap UCL	0.88804178
95% Percentile Bootstrap UCL	0.6881875
95% BCA Bootstrap UCL	0.728
Recommendations	
Human Inspection Recommended?	NO
Appropriate Distribution	GAMMA
1st Recommended UCL	0.802773401
UCL Test	95% Approximate Gamma UCL
2nd Recommended UCL	
3rd Recommended UCL	
Recommended UCL > Max Data Value	
Recommendation Warning!	NONE
Alternative UCL	NONE





POST-EXCAVATION SAMPLE LOCATIONS

NOT TO SCALE

LEGEND

- EDGE OF PAVEMENT
- 506 STRUCTURE/BUILDING
- RAILROAD
- REMEDIAL INVESTIGATION AREA

DRAWING FROM FINAL REPORT REMEDIAL ACTION SITES 11 & 17 (OHM, 2001)

FIGURE 1
POST-EXCAVATION SOIL SAMPLE LOCATIONS
SITE 17 – HOLM ROAD LANDFILL

NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Attachment 5
Regulator Response to Comments

CH2M HILL
5700 Cleveland Street
Suite 101
Virginia Beach, VA 23462
Tel 757.518.9666
Fax 757.497.6885

CH2MHILL

April 21, 2008

370301.PS.FL

Mr. Robert Thomson, P.E., R.E.M.
Office of Federal Facility Remediation
United States Environmental Protection Agency, Region III
1650 Arch Street
Philadelphia, PA 19103-2029

Subject: Response to Comments *Revised Draft Explanation of Significant Differences (ESD), Site 17, Holm Road Landfill*
Naval Weapons Station Yorktown and Cheatham Annex
Yorktown, Virginia

Dear Mr. Thomson:

This letter is in response to EPA comments on the subject document that were embedded in the electronic file of the document you provided in your email dated 19 December 2007. Comments are presented, shown in italics, followed by the Navy's response (note: all editorial comments were accepted without need for response, except those listed below).

1. Section 1.2 - *I strongly recommend making the three documents that form the basis of the ESD available with the ESD at the location near the facility.*

   The Technical Memorandum that documents the 2007 test pit investigation is included as part of the ESD (Attachment 2). The other two documents (Site 17 ROD and the construction completion report) will be available, along with the ESD, during the public comment period.

2. Section 2.4, Paragraph 3, last sentence – *cPAHs is the COC, right?*

   Yes. Revision noted and accepted.

3. Section 4, Paragraph 2, first sentence - *Paragraph 1, cited here which I've deleted, is not relevant to this action. It pertains to ARARs which are themselves amended by rulemaking or new regulations that are promulgated that are found to be ARARs after the ROD signature.*

   Comment noted and revision accepted.

4. Section 7 - *I picked 30 days because I thought it would be easy to achieve. As long as the time within which the notices will be published is reasonable (weeks), I don't believe EPA would object. It is important, however, that this ESD states (1) that the publication has occurred or (2)*

the date upon which the publication will occur or (3) the timeframe within which the publication will occur.

Thirty days is reasonable and the recommendation accepted. The ESD will state the timeframe (i.e., 30 days) from which the public notification will occur following signature.

5. Section 8, last USEPA reference - *Is this missing part of the document number?*

   Yes it was. "EPA 540/R/99/" has been changed to "EPA 540/R/99/005."

6. Section 9 - *I think the 2001 remedial action closeout report should also be an attachment to this ESD.*

   The Closeout Report is a stand-alone document in the Administrative Record and referenced in the ESD. It is a rather large document (168 pages) that would be a somewhat cumbersome addition to the ESD. Therefore, the Navy does not see the need to include it as an attachment to the ESD.

Sincerely,

CH2M HILL

William J Freedmann Jr.

for Rebekah Ives
Project Manager

cc: Ms. Linda Cole/NAVFAC Mid-Lant
Mr. Wade Smith/VDEQ
Ms. Bonnie Capito/NAVFAC Atlantic
Ms. Donna Caldwell/CH2M HILL
Mr. Don Joiner/Baker Environmental

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April 21, 2008

370301.PS.FL

Mr. Wade Smith
Commonwealth of Virginia
Department of Environmental Quality
P.O. Box 1105
Richmond, VA 23218

Subject: Response to Comments *Revised Draft Explanation of Significant Differences (ESD), Site 17, Holm Road Landfill*
Naval Weapons Station Yorktown and Cheatham Annex
Yorktown, Virginia

Dear Mr. Smith:

This letter is in response to Virginia DEQ comments on the subject document that you provided in your email dated 14 March 2008. Comments are presented, shown in italics, followed by the Navy's response.

1. Section 2.2 - *Please include a summary of the 1992 geophysical summary that identified anomalies and reference in Section 8.0.*

   The "Round One Remedial Investigation" summary in Section 2.2 was revised to include this sentence: "Results from a 1992 geophysical investigation, conducted as part of the Round One RI, indicated *no widespread occurrence of buried metals or other high conductors*." In addition, this sentence was added to the beginning of the "Summary of 2007 Test Pit Investigation" paragraph: "The 1992 geophysical survey (conducted for the Round One RI) stated that the *only evidence of a possible waste area* [at Site 17] *was the anomaly located in the southern portion of the survey area between Main Road and the railroad tracks.* Therefore, in May 2007, CH2M Hill conducted a test pit investigation . ."

   No reference was added to Section 8.0, as the 1992 geophysical survey is part of the Round One RI document, which is already cited.

2. Section 2.2 - *Please include a summary of the 1996 Baker Test Pit investigation and reference in Section 8.0.*

   The 1996 test pit investigation conducted by Baker in 1996 is summarized in the "Round Two Remedial Investigation" paragraph, as this investigation is part of the Round Two RI document. To clarify this point, the text was revised as follows: "The Round Two RI

was completed in 1998 (Baker, 1998). The field activities were conducted in 1996 and included surface soil, subsurface soil, and groundwater sampling and test pitting."

3. Section 2.2 - *Please change to: A copy of the June 22, 2007 Technical Memorandum, originally submitted in the November 2007 Final Five-Year Review Report, is included as Attachment 2 to this document.*

   Revision made.

4. Sections 2.2, 2.3, and 8.0 - *Please clarify: "The Round Two RI was completed in 1997 (Baker, 1997)." (Section 2.2) and "...the Round Two RI (Baker, 1997)..." (Section 2.3) and "Baker. 1997. Final Round Two Remedial Investigation Report for Sites 11 and 17, Naval Weapons Station Yorktown, Yorktown, Virginia. September 1997." (Section 8.0) versus "Baker. 1998. Final Round Two Remedial Investigation for Sites 11 and 17, Naval Weapons Station Yorktown, Yorktown, Virginia. August 1998." (Section 8.0).*

   The "Baker, 1997" reference in Sections 2.2 and 2.3 and the "Baker 1997" citation in Section 8.0 were in error. The correct date for the Final Round Two RI is August 1998. The "Baker 1997" citation has been deleted from Section 8.0. The "Baker, 1997" reference in Section 2.2 and Section 2.3 has been revised to reflect "Baker, 1998." The document was checked for additional "Baker, 1997" references and there were none.

5. Section 2.3 - *Please change to: Site non-carcinogenic ~~risk~~ risks are evaluated by...*

   Revision made.

6. Section 2.4 - *Please indicate the approximate width and length of excavation that was identified in the September 27, 2000 Record of Decision.*

   A width and length for the excavation was not provided in the ROD (nor in the Site 17 FS or Proposed Plan). The final 2001 remedial action report identified the excavation area (in Figure 2-2) as a 120' X 150' area. These dimensions have been added to the third paragraph of Section 2.4, which decribes the remedial action.

Sincerely,

CH2M HILL

William J Friedmann for

for Rebekah Ives
Project Manager

cc: Ms. Linda Cole/NAVFAC Mid-Lant
Mr. Robert Thomson/USEPA
Ms. Bonnie Capito/NAVFAC Atlantic
Ms. Donna Caldwell/CH2M HILL
Mr. Don Joiner/Baker Environmental