

**Soil Investigation
for
Volatile Organic Compound
Soil To Groundwater Impact
Site 1 - Privet Road Compound**

NAS JRB Willow Grove
Horsham, Pennsylvania



**Engineering Field Activity Northeast
Naval Facilities Engineering Command**

Contract No. N62472-03-D-0057
Contract Task Order 003

March 2006



TETRA TECH NUS, INC.



TETRA TECH NUS, INC.

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2192 - 5.2 - 022

PHIL-19922

March 16, 2006

Project Number 2192

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

Attn: Mr. Curtis Frye, Code EV21

Reference: Contract No. N62472-03-D-0057
Contract Task Order (CTO) No. 003

Subject: Copies of Final Site 1 and Site 5 Soil to Groundwater VOC Impact
NAS JRB Willow Grove, Pennsylvania

Dear Mr. Frye:

Tetra Tech NUS, Incorporated (TtNUS) is pleased to provide copies of the subject final documents. Four copies have been sent to Lisa Bradford at EPA Region 3, two copies have been sent to April Flipse at PADEP, three copies have been sent to Jim Edmond at NAS JRB Willow Grove and three are enclosed for Navy use.

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

Sincerely,

Russell E. Turner
Project Manager

RET/atg

Enclosure

c: Lisa Bradford (EPA Region 3)
April Flipse (PADEP)
Jim Edmond (NASJRB Willow Grove)
Garth Glenn (TtNUS) (without enclosures)

File

SOIL INVESTIGATION FOR VOLATILE ORGANIC COMPOUND
SOIL TO GROUNDWATER IMPACT
for
SITE 1 - PRIVET ROAD COMPOUND

NAVAL AIR STATION JOINT RESERVE BASE
WILLOW GROVE, PENNSYLVANIA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Engineering Field Activity Northeast
Environmental Branch, Code EV2
Naval Facilities Engineering Command
10 Industrial Highway, Mail Stop 82
Lester, Pennsylvania 19113-2090

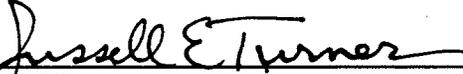
Submitted by:
Tetra Tech NUS, Inc.
600 Clark Avenue, Suite 3
King of Prussia, Pennsylvania 19406-1433

Contract No. N62472-03-D-0057
Contract Task Order 003

March 2006

PREPARED UNDER DIRECTION OF:

APPROVED FOR SUBMISSION BY:


RUSSELL E. TURNER
PROJECT MANAGER
TETRA TECH NUS, INC.
KING OF PRUSSIA, PENNSYLVANIA

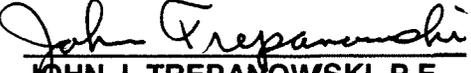

JOHN J. TREPANOWSKI, P.E.
PROGRAM MANAGER
TETRA TECH NUS, INC.
KING OF PRUSSIA, PENNSYLVANIA

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NUMBER

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**SOIL INVESTIGATION FOR VOLATILE ORGANIC COMPOUND
SOIL TO GROUNDWATER IMPACT
SITE 1 - PRIVET ROAD COMPOUND
NAS JRB WILLOW GROVE
HORSHAM TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA**

1.0 INTRODUCTION

Tetra Tech NUS (TiNUS) performed additional investigation of the soil at Site 1 (the former Privet Road Compound) at the Naval Air Station Joint Reserve Base (NAS JRB) Willow Grove, Pennsylvania. The work was performed under Contract Task Order No. 003 under Contract N62472-03-D-0057, Comprehensive Long-Term Environmental Action - Navy (CLEAN), in accordance with the approved Work Plan for Soil Investigation, Summer 2005, Volatile Organic Compound Soil to Groundwater Impact, Site 1 - Privet Road Compound, Operable Unit 1 (OU 1) (Tetra Tech NUS, December 2005). This work complements the previous remedial investigation work that is documented in the Remedial Investigation Report for Site 1 - Privet Road Compound (Tetra Tech NUS, July 2002), and the Remedial Investigation Report for Sites 1, 2, 3, and 5 (Halliburton NUS, February 1993).

The purpose of this soil investigation was to address regulatory concerns regarding the quality of the historical analytical data for volatile organic compounds (VOCs) in Site 1 soil. Specifically, the Environmental Protection Agency (EPA) had concerns regarding the sampling methods used during the previous investigations, and requested that these locations be resampled with the EnCore™ sampling technique (a sampling method that was not available during the previous investigations) to confirm the historical results. EPA concerns included:

- Whether the analytical non-detections of VOCs from soil samples taken within the compound could be false negatives. These samples were chosen in the field because of elevated photoionization detector (PID) responses observed during screening procedures.
- Whether the VOC concentrations exceed the applicable benchmark screening concentrations for the soil-to-groundwater migration pathway.

2.0 SITE DESCRIPTION AND SETTING

NAS JRB Willow Grove is located in Horsham Township, Montgomery County, Pennsylvania, approximately 20 miles north of the city of Philadelphia. NAS JRB Willow Grove occupies 1,000 acres of the 1,200 acres maintained by the Department of Defense at the Air Station, and the Willow Grove Air Reserve Station occupies the remaining 200 acres (see Figure 1). The Air Station is generally bounded by State Route 611 (Easton Road) to the east, State Route 463 (Horsham Road) to the southwest, and Keith Valley Road to the north.

The Privet Road Compound (Figure 1) is a fenced area that is approximately 0.5-acre in size and is located north of the bowling alley, adjacent to Privet Road and the Air Reserve and Pennsylvania Air National Guard facilities. The site was fenced; however, the fence was taken down during summer 2005. The compound, constructed to serve as a transfer station for wastes after closure of the Ninth Street Landfill in 1967, operated between 1967 and 1975 and was used as an open disposal area where appreciable quantities of waste were burned and buried. The compound was also used to store several Polychlorinated Biphenyl (PCB)-containing electrical transformers. Use of the site as a transfer station and for transformer storage resulted in the contamination of soil.

The Privet Road Compound lies within a heavily developed section of NAS JRB Willow Grove. Most of the area where wastes were formerly handled is now covered by gravel, a bowling alley, or a parking lot. The remainder of the site consists of mowed turf grass and a small area of occasionally mowed weeds. Additional site information can be found in the Remedial Investigation Report for Site 1 - Privet Road Compound (Tetra Tech NUS, July 2002).

3.0 SCOPE OF THE INVESTIGATION

The field investigation was designed to gather additional analytical data from subsurface soils at two locations where elevated PID readings were observed in the field, but no VOCs (other than acetone, a common laboratory artifact) were subsequently detected during the laboratory analyses. These soils were resampled to confirm that VOCs are not present at these locations.

The following field investigation tasks were completed to address the identified data gaps:

- Soil Borings (see Section 4.1). Two soil borings were drilled near the locations of the historical borings (see Figure 2). Continuous soil cores were obtained from the ground surface to the top of bedrock at each boring location.

- Soil Sampling and Analysis (see Section 4.2). The soil cores were screened in the field with a PID. Based on these results, two soil samples were selected from each boring using the EnCore™ sampling technique, and submitted to a fixed-base analytical laboratory for VOC analyses.

4.0 SUMMARY OF FIELD INVESTIGATION

The locations of the two borings are illustrated on Figure 2. Each drilling location was cleared for subsurface utilities by NAS JRB Willow Grove personnel, and by contacting the Pennsylvania One-Call utility clearing system.

4.1 BOREHOLE DRILLING

The drilling subcontractor was Vironex, Inc., of Bowie, Maryland. The soil borings were drilled by the direct push technology (DPT, or "Geoprobe") drilling method. With the DPT method, a sampling barrel fitted with a 2-inch-diameter by 4-foot-long acetate core sleeve is hydraulically advanced (or pushed) into the subsurface to obtain a soil core. The barrel is withdrawn from the borehole, the acetate core sleeve is removed, a new core sleeve is inserted into the barrel, and the sampling assembly is reinserted into the borehole to obtain the next core. The borehole stayed open when the sampling assembly was withdrawn due to the clayey and silty nature of the soil. At each location, continuous soil samples or cores were collected from the ground surface to the top of bedrock (which was defined as hydraulic refusal, or the inability to further advance the barrel). The depths of the two borings were 10 feet (01SB51) and 11 feet (01SB52). At the conclusion of each boring, the borehole was backfilled with a mixture of soil cuttings and bentonite.

The soil borings were surveyed for horizontal location and vertical elevation by James M. Stewart, Inc. Their survey data are presented in Appendix A.

4.2 SOIL SAMPLING AND ANALYSIS

4.2.1 Lithologic Analysis

The lithology of each core was described by the TtNUS geologist and noted on the boring log. The lithologies observed in the cores were consistent with those noted during previous site investigations, and consisted predominantly of fine-grained soils ranging from a silty clay to a sandy silt. The boring logs are included in Appendix B.

4.2.2 Field Screening

Concurrent with the lithologic analysis, each core was field-screened for VOCs using a PID. These PID readings are recorded on the boring logs. In addition, headspace analyses were conducted for each core at two-foot intervals. To determine the headspace concentrations, a soil sample was placed in a clean glass jar and tightly covered with aluminum foil. The jar was then shaken to thoroughly mix the soil sample with the air in the headspace. After the sample was allowed to equilibrate for a period of 10 minutes, the foil was perforated by the PID and a headspace reading was recorded. The results of the headspace analyses are included in Table 1.

4.2.3 Soil Sampling and Laboratory Analysis

Soil samples were collected every two feet (and preserved on ice) from the entire borehole of each boring. Two soil samples from each boring were selected for VOC analysis at a fixed-base laboratory. At boring 01SB51, one soil sample was taken from the interval displaying the highest headspace PID reading, and one soil sample was taken from the basal soils occurring immediately above the top of bedrock. No PID readings were noted at boring 01SB52, so one sample was taken from the basal soils, and one sample was taken from the midpoint of the boring. The samples were obtained using the closed sampling vessel (EnCore™) sampling technique and in accordance with the sampling procedures described in Appendix B of the work plan.

The samples ultimately selected for VOC analysis are shown in Table 1. The requisite QA/QC samples (including field duplicate, field blank, rinsate blank, and trip blank) were also taken and submitted as prescribed in the work plan. The sample log sheets are included in Appendix C.

The laboratory analyses were performed by Northeast Laboratory Services of Waterville, Maine (a Navy-certified laboratory) using SW-846 Method 8260B. The data were validated to EPA validation level M3 by T1NUS in accordance with EPA's national and regional protocol. The complete set of validated analytical data is presented in Appendix D.

5.0 RESULTS AND DISCUSSION

The analytical data obtained through the EnCore™ sampling method for this current investigation are summarized in Table 2. For comparison, this table also includes the historical analytical data from the corresponding previous borings (see Figure 1 for locations) that were obtained through the now-obsolete sampling methods.

5.1 COMPARISON OF CURRENT AND HISTORICAL ANALYTICAL DATA

Overall, the current analytical data compare favorably with the historical data. Although no statistical comparisons of the data sets were conducted, the level of similarity between the current and historical results indicate that all existing analytical data may be confidently used for the interpretation of site conditions.

Two compounds that were detected at very low levels during the current sampling round were not detected during the 1991 investigation. 2-Butanone was detected at a maximum concentration of 2.8J ug/L, and 4-methyl-2-pentanone was detected at a maximum concentration of 1J ug/L. Each of these concentrations is three to five orders-of-magnitude below its respective benchmark screening concentrations. MTBE was also detected during the current investigation in one sample at a concentration of 0.45J ug/L (also far below its benchmark concentration); MTBE was not on the target compound list in 1991.

Two compounds that were detected at very low levels (two to four orders-of-magnitude below their respective benchmark screening concentration) during the 1991 investigation were not positively detected during the current investigation. Acetone (a common laboratory-introduced artifact) was detected in 5 samples from boring 01SB7 at a maximum concentration of 21 ug/L. For the current investigation, acetone was reported from both borings at a maximum concentration of 3.6B ug/L, but every detection was blank-qualified through the data validation process. Carbon disulfide was positively detected in one sample from boring 01SB7 at a concentration of 1J ug/L. For the current investigation, carbon disulfide was not detected in any samples.

5.2 UPDATED SITE 1 CONCEPTUAL MODEL FOR SOILS

The analytical results of the current sampling event support the existing interpretation of Site 1 soil conditions as presented in the RI report (Tetra Tech NUS, July 2002). No changes to this interpretation are required. The soil data indicate that the Site 1 soils are not significantly impacted by VOCs, and Site 1 is not interpreted to be the source area for the VOCs detected in the NAS JRB Willow Grove potable supply wells.

5.3 SUMMARY AND CONCLUSIONS

The purpose of this investigation was to gather additional analytical data from subsurface soils at selected locations that were sampled during previous investigations. The objective of the resampling was to address regulatory concerns regarding the quality of the historical analytical data for VOCs because of the now-outdated sampling techniques that were used. The current samples were obtained using the EnCore™ sampling method.

New soil samples were obtained from two boring locations where elevated PID readings were previously observed in the field, but no VOCs were subsequently detected during the laboratory analyses. Three VOCs (2-Butanone; 4-methyl-2-pentanone; and MTBE) that were not previously detected were detected during this current investigation, but at very low concentrations that are well below their respective benchmark screening concentrations. None of the VOCs that are most commonly detected in the Site 1 groundwater were detected in the soils.

In summary, the results of this investigation validate the historical data and indicate that all of these results may be used with confidence.

TABLES

TABLE 1

RESULTS OF PHOTOIONIZATION DETECTOR (PID) HEADSPACE SCREENINGS
NAS JRB WILLOW GROVE SITE 1 - PRIVET ROAD COMPOUND

Boring	Depth	Headspace (PID, ppm)
01SB51	0 - 1	0.0
	2 - 3	16.5
	4 - 5**	52.4
	6 - 7	12.8
	8 - 9	3.1
	9 - 10**	21.2
01SB52	0 - 1	0.0
	2 - 3	0.0
	4 - 5**	0.0
	6 - 7	0.0
	8 - 9	0.0
	10 - 11**	0.0

**Interval selected for laboratory analysis

TABLE 2
DATA SUMMARY OF ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS (VOCs) IN SOIL
NAS JRB WILLOW GROVE SITE 1 - PRIVET ROAD COMPOUND

Boring:	01SB51		01SB7					01SB52		01SB13					SCREENING LEVELS	
Date:	2005		1991					2005		1991					EPA SSL	PADEP
Depth (feet):	4 - 5	9 - 10	0 - 2	2 - 4	4 - 6	6 - 7.5	7.5 - 8	4 - 5	10 - 11	0 - 2	2 - 4	6 - 8	10 - 12	12 - 14		
Acetone	2.8B	2.4B	7J	15	11J	21	21	2.2B	3.6B	12U	12U	11B	5B	6B	2200	41000
2-Butanone	2.8J	2.5J	11U	12U	12U	12U	11U	2.1J	10U	12U	12U	12U	11U	11U	29000	54000
4-methyl-2-pentanone	10U	1J	11U	12U	12U	12U	11U	0.71J	0.77J	12U	12U	12U	11U	11U	59000	2900
Carbon Disulfide	10U	10U	5U	6U	6U	1J	6U	10U	10U	6U	6U	6U	6U	6U	19000	160000
MTBE	1U	1U	NA	NA	NA	NA	NA	1U	0.45J	NA	NA	NA	NA	NA	12	280

Notes:

All concentrations are reported in values of ug/KG.

Listed compounds have at least one positive detection in at least one sample. Target compounds with no positive detections are not listed.

EPA benchmarks are the Region 3 Soil Screening Levels (SSLs) for soil-to-groundwater migration at a dilution-attenuation factor (DAF) = 20.

PADEP benchmarks are the soil-to-groundwater generic values for a used, residential aquifer with TDS < 2500.

Concentrations reported for boring 01SB7 (4 - 6) and 01SB52 (10 - 11) are the highest reported concentrations from the field & field duplicate sample pairs.

U = Compound was Undetected at the posted detection limit.

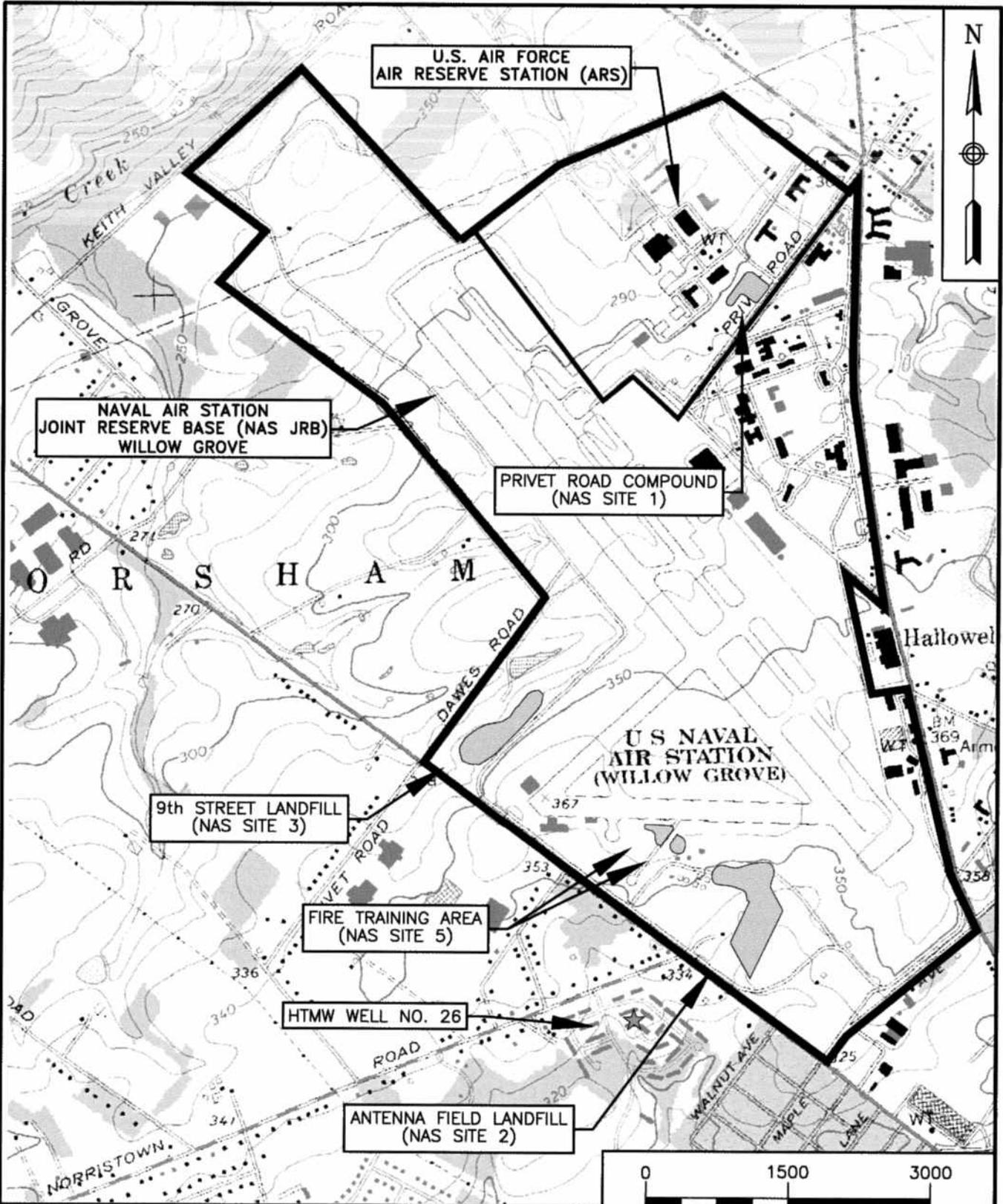
J = The reported concentration is estimated.

B = The reported detection was qualified as blanked through the data validation process.

NA = Not Analyzed

Bolded concentrations represent positive detections.

FIGURES



BASE MAP IS A PORTION OF THE AMBLER, PA U.S.G.S. 7.5 MINUTE QUADRANGLE MAP, DATED 1963, PHOTOREVISED IN 1983.

SCALE IN FEET



TETRA TECHNUS, INC.

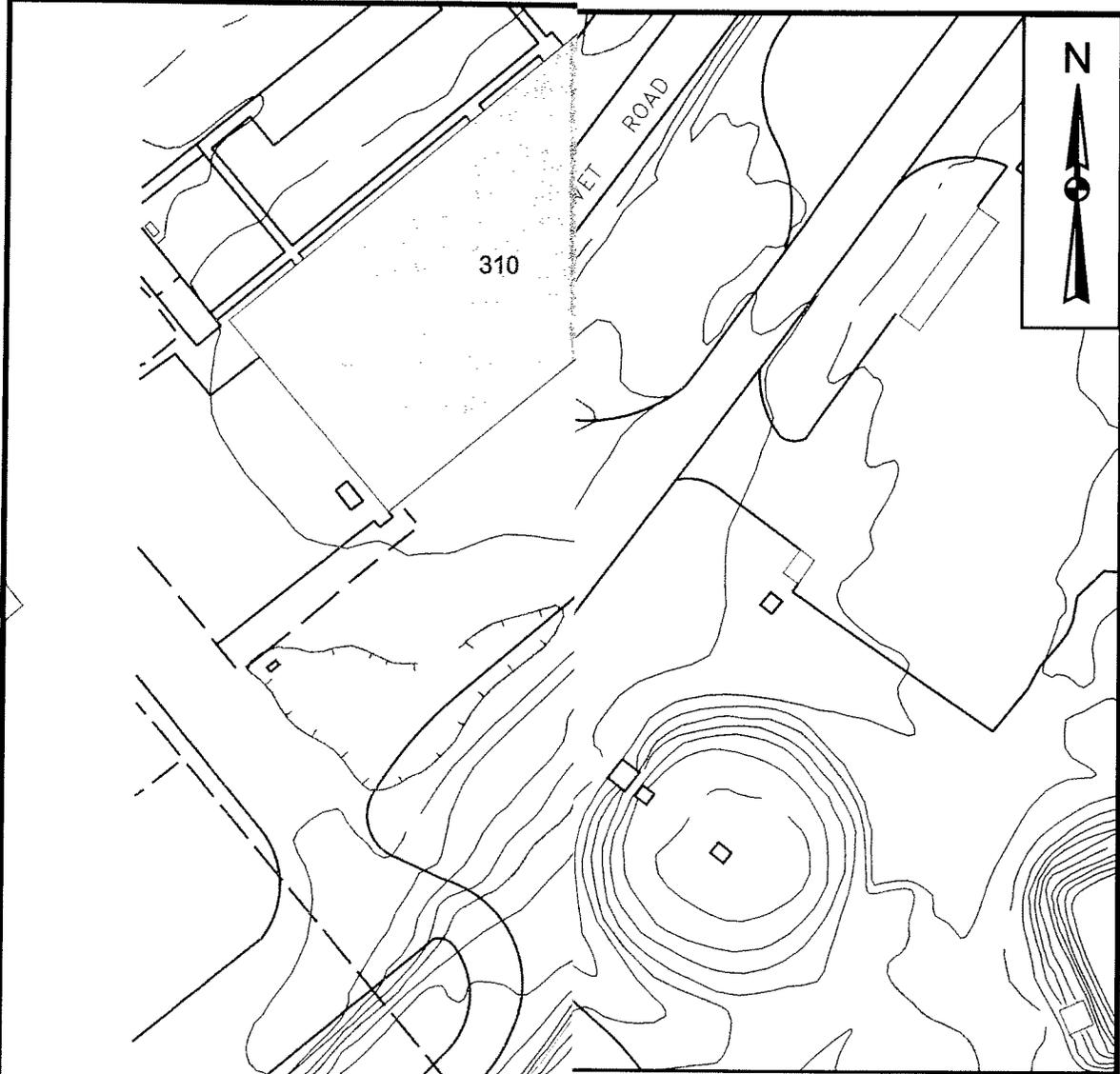
LOCATION OF RI SITES
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

SCALE
AS NOTED

FILE
2192CM01.DWG

REV DATE
0 09/07/05

FIGURE NUMBER
FIGURE 1



LEGEND

- PREVIOUS SOIL SAMPLE LOCATION
 - ◆ CURRENT (2005) SOIL SAMPLE LOCATION
- AREA OF PCB CONTAMINATION SOIL
REMOVAL IN JULY 1999



NO.	DATE	REVISIONS

CONTRACT NUMBER 5466		OWNER NUMBER
APPROVED BY 	DATE 	
APPROVED BY 	DATE 	
DRAWING NO. FIGURE 2	REV 1	

**APPENDIX A
LAND SURVEY**

James M. Stewart, Inc. Land Surveyors

9622 Evans Street Philadelphia, PA 19115

Office 215 969 1577

Fax 215 969 0338

email jmssurveys@comcast.net

Willow Gove Naval Air Station

Site 01 - Bowling Alley

Willow Grove - Pennsylvania

Project #: 3516

October 27, 2005

Horizontal Datum: Pennsylvania State Plane Coordinates NAD 83 - South Zone

Vertical Datum: NAVD 88

Sampling Point #	Elevation in Feet Ground	Coordinates in Feet		Date Of Survey
		Y North	X East	
01SB51	301.1	329493.18	2696206.25	October 27, 2005
01SB52	303.2	329510.38	2696376.34	October 27, 2005

APPENDIX B
BORING LOGS



BORING LOG

PROJECT NAME: NASTRB Willow Grove (04-1)
 PROJECT NUMBER: 2192
 DRILLING COMPANY: Vironex
 DRILLING RIG: Geoprobe

BORING No.: 015B51
 DATE: 10-17-05
 GEOLOGIST: Vince Shickofa
 DRILLER: Jorge Soto

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)			
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**
1021	5-1	1	/			Dark Brn	Silty clay with Grass roots		very moist	0	0	0	0
	2	/	/							0	0	0	0
	3	/	/			Brn	Silty clay with Trace Feo Sand		moist	0	0	0	0
	4	/	47% / 48"							0	0	0	0
1032	5-2	5	/			Red Brn	Silty clay with Trace rock frags		moist	0	0	0	0
	6	/	/							0	0	0	0
	7	/	/			Red Brn	Sandy silt with weathered rock frags		moist to damp	0	0	0	0
	8	/	46% / 46"							0	0	0	0
1053	5-3	9	/							0	0	0	0
	10	/	23% / 24"			Red Brn	Same as above		damp	0	0	0	0
	11	/	/		EOB (refused)								
	12	/	/										
	13	/	/										
	14	/	/										
	15	/	/										
	16	/	/										
17	/	/											
18	/	/											
19	/	/											
20	/	/											
21	/	/											
22	/	/											
23	/	/											
24	/	/											
25	/	/											

* When rock coring, enter rock brokenness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: Direct push sampling using 2" X 4" Acetate sleeves

Drilling Area Background (ppm): 0

Converted to Well: Yes No Well I.D. #: _____



BORING LOG

PROJECT NAME: NASJRB Willow Grove (04-1)
 PROJECT NUMBER: 2192
 DRILLING COMPANY: Viprey
 DRILLING RIG: Georobe

BORING No.: 015852
 DATE: 10-17-05
 GEOLOGIST: Vince Shickora
 DRILLER: Jorge Soto

Time

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION			U S C S	Remarks	PID/FID Reading (ppm)			
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**
1130 S-1	1	/				Dark Brn	Silty Clay and Gravel		moist	0	0	0	0
	2	/								0	0	0	0
	3	/				dry Brn	Silty clay with rock frags		moist	0	0	0	0
	4	/	47"/48"							0	0	0	0
1143 S-2	5	/								0	0	0	0
	6	/				Brn	Clayey silt with rock frags		moist	0	0	0	0
	7	/								0	0	0	0
	8	/	46"/48"			Red Brn	Same as above		moist	0	0	0	0
1155 S-3	9	/								0	0	0	0
	10	/				Red Brn	Sandy silt with highly weathered Rock frags		damp	0	0	0	0
	11	/								0	0	0	0
	12	/		FOB refusal									
	13	/											
	14	/											
	15	/											
	16	/											
	17	/											
	18	/											
	19	/											
	20	/											
	21	/											
	22	/											
	23	/											
	24	/											
	25	/											

* When rock coring, enter rock brokenness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: Direct push sampling using 2" x 4' Acetate sleeves

Drilling Area
 Background (ppm): 0

Converted to Well: Yes No Well I.D. #: _____

APPENDIX C
SOIL SAMPLE LOG SHEETS



QA SAMPLE LOG SHEET

Project Site Name: NASJRB Willow Grove Sample ID Number: TB10170501
 Project Number: 2192 Sampled By: V. Shickora/D. Amate
 Sample Location: Site 1 C.O.C. Number: _____
 QA Sample Type:
 Trip Blank Rinsate Blank
 Source Water Blank Other Blank _____

SAMPLING DATA:

Date: 10-17-05
 Time: 0855
 Method: _____

WATER SOURCE:

Laboratory Prepared Tap
 Purchased Fire Hydrant
 Other _____

**PURCHASED WATER INFORMATION
(If Applicable as Source or Rinsate Water):**

Product Name: _____
 Supplier: _____
 Manufacturer: _____
 Order Number: _____
 Lot Number: _____
 Expiration Date: _____

**RINSATE INFORMATION
(If Applicable):**

Media Type: _____
 Equipment Used: _____
 Equipment Type:
 Dedicated
 Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	3 X 40 ml vials	<u>YES</u> /NO

OBSERVATIONS / NOTES:

Laboratory supplied Trip Blank

Signature(s):



QA SAMPLE LOG SHEET

Project Site Name: NASJRB Willow Grove Sample ID Number: FB10170501
 Project Number: 2192 Sampled By: V.Shickora/D.Amate
 Sample Location: Site 1 C.O.C. Number: _____
 QA Sample Type:
 Trip Blank Rinsate Blank
 Source Water Blank Other Blank Field Blank

SAMPLING DATA:	WATER SOURCE:
Date: <u>10-17-05</u> Time: <u>1215</u> Method: <u>Direct Pour</u>	<input checked="" type="checkbox"/> Laboratory Prepared <input type="checkbox"/> Tap <input type="checkbox"/> Purchased <input type="checkbox"/> Fire Hydrant <input type="checkbox"/> Other _____

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):	RINSATE INFORMATION (If Applicable):
Product Name: _____ Supplier: _____ Manufacturer: _____ Order Number: _____ Lot Number: _____ Expiration Date: _____	Media Type: _____ Equipment Used: _____ Equipment Type: <input type="checkbox"/> Dedicated <input type="checkbox"/> Reusable

SAMPLE COLLECTION INFORMATION:			
Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	3 x 40ml vials	(YES) NO

OBSERVATIONS / NOTES:

Signature(s):




Project Site Name: NASJRB Willow Grove Sample ID Number: RB10170501
 Project Number: 2192 Sampled By: V.Shickora/D.Amate
 Sample Location: Site 1 C.O.C. Number: _____
 QA Sample Type:
 Trip Blank Rinsate Blank
 Source Water Blank Other Blank _____

SAMPLING DATA:	WATER SOURCE:
Date: <u>10-17-05</u> Time: <u>1230</u> Method: <u>(see below)</u>	<input checked="" type="checkbox"/> Laboratory Prepared <input type="checkbox"/> Tap <input type="checkbox"/> Purchased <input type="checkbox"/> Fire Hydrant <input type="checkbox"/> Other _____

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):	RINSATE INFORMATION (If Applicable):
Product Name: _____ Supplier: _____ Manufacturer: _____ Order Number: _____ Lot Number: _____ Expiration Date: _____	Media Type: _____ Equipment Used: _____ Equipment Type: <input type="checkbox"/> Dedicated <input type="checkbox"/> Reusable

SAMPLE COLLECTION INFORMATION:			
Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	3 x 40 ml Vials	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO

OBSERVATIONS / NOTES:

Laboratory supplied water poured through clean Acetate sampling sleeve and Geoprobe sampler head directly into sample bottleware

Signature(s): [Signature]



Project Site Name: NASJRB Willow Grove Site 1
Project No.: 2192

Sample ID No.: 015851-0405
Sample Location: Site 1
Sampled By: V. Shickora/D. Amate
C.O.C. No.: _____

- Surface Soil
- Subsurface Soil
- Sediment
- Other: _____
- QA Sample Type: _____

Type of Sample:
 Low Concentration
 High Concentration

GRAB SAMPLE DATA:

Date:	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
<u>10-17-05</u>	<u>5 Feet</u>	<u>Red-Brown</u>	<u>Silty clay with weathered Rock frags. (moist)</u>
Time: <u>1038</u>			
Method: <u>Direct Push</u>			
Monitor Reading (ppm): <u>52.4</u>			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
<u>NA</u>				
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Preservative
VOAs	5-Gram Encore	<u>3</u>	4°C
Dry Weight	4 oz Glass Jar	<u>1</u>	4°C

OBSERVATIONS / NOTES:

MAP:

Head Space Readings Off Sample - 52.4

(see work plan)

Circle if Applicable:
MS/MSD:
Duplicate ID No.:

Signature(s):
[Signature]



SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NASJRB Willow Grove Site 1
Project No.: 2192

Sample ID No.: 015B51-0910
Sample Location: Site 1
Sampled By: V. Shickora/D. Amate
C.O.C. No.: _____

- Surface Soil
- Subsurface Soil
- Sediment
- Other: _____
- QA Sample Type: _____

Type of Sample:
 Low Concentration
 High Concentration

GRAB SAMPLE DATA:

Date:	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
<u>10-17-05</u>	<u>10 Feet</u>	<u>Red-Brown</u>	<u>Sandy silt with highly weathered rock frags (deep)</u>
Time: <u>1102</u>			
Method: <u>Direct Push</u>			
Monitor Reading (ppm): <u>21.2</u>			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
<u>NA</u>				
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Preservative
VOAs	5-Gram Encore	<u>3</u>	4°C
Dry Weight	4 oz Glass Jar	<u>1</u>	4°C

OBSERVATIONS / NOTES:

MAP:

Head Space Readings Off Sample - 21.2

(see work plan)

Circle if Applicable:

Signature(s):

MS/MSD

Duplicate ID No.:



Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page ___ of ___

Project Site Name: NASJRB Willow Grove Site 1
Project No.: 2192

Sample ID No.: 015852-0405
Sample Location: Site 1
Sampled By: V. Shickora/D. Amate
C.O.C. No.: _____

- Surface Soil
- Subsurface Soil
- Sediment
- Other: _____
- QA Sample Type: _____

Type of Sample:
 Low Concentration
 High Concentration

GRAB SAMPLE DATA:

Date:	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
<u>10-17-05</u>	<u>5 Feet BGS</u>	<u>Brown</u>	<u>Clayey Silt with Rock Fraggs (moist)</u>
Time: <u>1150</u>			
Method: <u>Direct Push</u>			
Monitor Reading (ppm): <u>0.0</u>			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
<u>NA</u>				
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Preservative
VOAs	5-Gram Encore	<u>9</u>	4°C
Dry Weight	4 oz Glass Jar	<u>1</u>	4°C

OBSERVATIONS / NOTES:

MAP:

Head Space Readings Off Sample - 0.0 ppm

(see work plan)

Circle if Applicable:

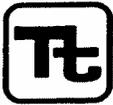
Signature(s):

MS/MSD

Duplicate ID No.:

Ves

W. Amate



SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NASJRB Willow Grove Site 1
Project No.: 2192

Sample ID No.: 015B52-1011
Sample Location: Site 1
Sampled By: V. Shickora/D. Amate
C.O.C. No.: _____

- Surface Soil
- Subsurface Soil
- Sediment
- Other: _____
- QA Sample Type: _____

Type of Sample:
 Low Concentration
 High Concentration

GRAB SAMPLE DATA:

Date:	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
<u>10-17-05</u>	<u>11 feet OGS</u>	<u>Red-Brown</u>	<u>Sandy Silt with highly weathered Rock frags (damp)</u>
Time: <u>1206</u>			
Method: <u>Direct Push</u>			
Monitor Reading (ppm): <u>0.0</u>			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
<u>NA</u>				
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Preservative
VOAs	5-Gram Encore	<u>6</u>	4°C
Dry Weight	4 oz Glass Jar	<u>2</u>	4°C

OBSERVATIONS / NOTES:

MAP:

Head Space Readings Off Sample - 0.0 ppm

(see work Plan)

Circle if Applicable:

Signature(s):

MS/MSD

Duplicate ID No.:

—

Dup-01

LSA

APPENDIX D
DATA SUMMARY OF ANALYTICAL RESULTS

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 1 SOIL SAMPLES
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	01SB51-0405	01SB51-0910	01SB52-0405	01SB52-1011	01SB52-1011-D
Sample Date:	10/17/05	10/17/05	10/17/05	10/17/05	10/17/05
Duplicate Of:				01SB52-1011-D	01SB52-1011
Top Depth (feet):	4.0	9.0	4.0	10.0	10.0
Bottom Depth (feet):	5.0	10.0	5.0	11.0	11.0
VOLATILES	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
1,1,1-Trichloroethane	10 U	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	10 U	1 U	10 U	1 U	1 U
1,1,2-Trichlorotrifluoroethane	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethane	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U	10 U	10 U
1,2,4-Trichlorobenzene	10 U	10 U	10 U	10 U	10 U
1,2-Dibromo-3-chloropropane	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethene (cis)	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethene (trans)	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	2 U	2 U	2 U	2 U	2 U
1,3-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U
2-Butanone	2.8 J	2.5 J	2.1 J	10 U	10 U
2-Hexanone	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-pentanone	10 U	1 J	0.71 J	0.51 J	0.77 J
Acetone	2.8 B	2.4 B	2.2 B	1.4 B	3.6 B
Benzene	2 U	2 U	2 U	2 U	2 U
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U
Bromoform	5 U	5 U	5 U	5 U	5 U
Bromomethane	2 U	2 U	2 U	2 U	2 U
Carbon Disulfide	10 U	10 U	10 U	10 U	10 U
Carbon Tetrachloride	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	10 U	10 U	10 U	10 U	10 U
Chloroethane	2 U	2 U	2 U	2 U	2 U
Chloroform	1 U	1 U	1 U	1 U	1 U
Chloromethane	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U
Cyclohexane	10 U	10 U	10 U	1 U	10 U
Dibromochloromethane	2 U	2 U	2 U	2 U	2 U
Dichlorodifluoromethane	10 U	10 U	10 U	10 U	10 U
Ethylbenzene	10 U	10 U	10 U	10 U	10 U
Isopropylbenzene	10 U	10 U	10 U	10 U	10 U
Methyl Acetate	10 U	10 U	10 U	10 U	10 U
Methyl Cyclohexane	10 U	10 U	10 U	10 U	10 U
Methyl Tert-butyl Ether	1 U	1 U	1 U	1 U	0.45 J
Methylene Chloride	6.6 B	7.1 B	6.7 B	6.2 B	6.2 B
Styrene	10 U	10 U	10 U	10 U	0.65 J
Tetrachloroethene	2 U	2 U	2 U	2 U	2 U
Toluene	10 U	10 U	10 U	10 U	10 U
trans-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U
Trichloroethene	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10 U	1 U	1 U	10 U	10 U
Xylene (Total)	10 U	10 U	10 U	10 U	10 U