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NAS WHITING FIELD
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FINAL FEASIBILITY STUDY ADDENDUM FOR SITE 6 NAS WHITING FIELD FL
8/24/2004
TETRA TECH NUS



TETRA TECH NUS, INC.

800 Oak Ridge Turnpike, A-600 ■ Oak Ridge, Tennessee 37830
(865) 483-9900 ■ FAX: (865) 483-2014 ■ www.tetrattech.com

0804-A079

August 24, 2004

Commander, Southern Division
Naval Facilities Engineering Command
ATTN: Ms. Linda Martin, Code ES31
P.O. Box 190010
2155 Eagle Drive
North Charleston, SC 29419-9010

Reference: CLEAN Contract No. N62467-94-D-0888
Contract Task Order No. 0028

Subject: Final Feasibility Study Addendum, Site 6 (Revision 3)
Naval Air Station, Whiting Field, Milton, Florida

Dear Ms. Martin:

Tetra Tech NUS, Inc. is pleased to submit the final Feasibility Study Addendum (FSA) for Site 6 Surface and Subsurface Soil (Revision 3) in electronic format. We request a reply from all on the distribution list specifying the number of hardcopies required for this final document as well as the other FSAs and Records of Decision (RODs) currently being finalized. Copies of the final FSAs, Proposed Plans and RODs for Sites 3, 6, 30, 32, and 33 will be placed on one CD and submitted under separate cover.

If you have any questions, please contact me at (850) 385-9899.

Sincerely,

A handwritten signature in blue ink that reads "Terry Hansen" with a small flourish at the end.

Terry Hansen
Task Order Manager

TH:ckf

Enclosure

c: Mr. Craig Benedikt, USEPA Region 4 (electronic copy)
Mr. Jim Cason, FDEP (electronic copy)
Ms. Lisa Campbell, Tetra Tech NUS (electronic copy)
Mr. Ron Joyner, NAS Whiting Field (electronic copy)
Mr. Larry Smith, Tetra Tech NUS (cover letter only)
Ms. Amy Twitty, CH2M Hill (electronic copy)
Mr. Mark Perry, Tetra Tech NUS (electronic copy)
Ms. Debra M. Humbert, Tetra Tech NUS (cover letter only)
File/db

Feasibility Study Addendum

for

Site 6, South Transformer Oil Disposal Area Surface and Subsurface Soil

Naval Air Station Whiting Field

Milton, Florida

USEPA ID No. FL2170023244



Southern Division

Naval Facilities Engineering Command

Contract Number N62467-94-D-0888

Contract Task Order 0028

August 2004

**FEASIBILITY STUDY ADDENDUM
FOR
SITE 6, SOUTH TRANSFORMER OIL DISPOSAL AREA
SURFACE AND SUBSURFACE SOIL**

**NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA**

USEPA ID No. FL2170023244

Submitted to:

**Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29406**

Submitted by:

**Tetra Tech NUS, Inc.
661 Andersen Drive
Foster Plaza 7
Pittsburgh, Pennsylvania 15220**

**CONTRACT NO. N62467-94-D-0888
CONTRACT TASK ORDER 0028**

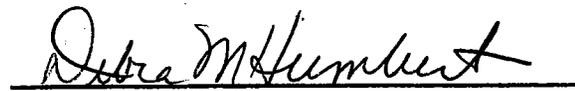
AUGUST 2004

PREPARED UNDER THE SUPERVISION OF:

APPROVED FOR SUBMITTAL BY:



**TERRY HANSEN
TASK ORDER MANAGER
TETRA TECH NUS, INC.
TALLAHASSEE, FLORIDA**



**DEBRA M. HUMBERT
PROGRAM MANAGER
TETRA TECH NUS, INC.
PITTSBURGH, PENNSYLVANIA**

PROFESSIONAL ENGINEER CERTIFICATION

I hereby certify this document, *Feasibility Study Addendum for Site 6, South Transformer Oil Disposal Area, Surface and Subsurface Soil, Naval Air Station Whiting Field, Milton, Florida*, was prepared under my direct supervision in accordance with acceptable standards of engineering practice.

Tetra Tech NUS, Inc.
800 Oak Ridge Turnpike, Suite A-600
Oak Ridge, TN 37830
Certificate of Authorization No. 7988

Lisa (Lisa) R. Campbell
8/20/04

Lisa Campbell, P.E.
Professional Engineer
State of Florida License No. 43887

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ACRONYMS

bls	below land surface
CCI	CH2M HILL Constructors, Inc.
cm ²	centimeters squared
COC	chemical of concern
COPC	chemical of potential concern
ELCR	excess lifetime cancer risk
EPC	exposure point concentration
FDEP	Florida Department of Environmental Protection
FS	Feasibility Study
GIR	General Information Report
HHRA	Human Health Risk Assessment
HQ	Hazard Quotient
mg/kg	milligrams per kilogram
NAS	Naval Air Station
NCEA	National Center for Environmental Assessment
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyls
PRG(s)	Preliminary Remediation Goal(s)
RAGS	Risk Assessment Guidance for Superfund
RBC(s)	Risk-Based Concentration(s)
RfD	reference dose
RI	Remedial Investigation
SCTL	Soil Cleanup Target Level
SVOC	semivolatile organic compounds
TRPH	total recoverable petroleum hydrocarbon
TtNUS	Tetra Tech NUS, Inc.
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound

1.0 INTRODUCTION

Tetra Tech NUS, Inc. (TtNUS), under contract N62467-94-D-0888 to the Department of the Navy, Southern Division, Naval Facilities Engineering Command is submitting this Feasibility Study (FS) Addendum to address changes at Site 6, South Transformer Oil Disposal Area, since the original FS was submitted in March 2001 (TtNUS, 2001). The original FS included six Naval Air Station (NAS) Whiting Field sites: Sites 3, 4, 6, 30, 32, and 33. Surface and subsurface soil at Site 6 was addressed in Section 4 of the FS.

The changed conditions at Site 6 addressed in this FS Addendum include:

- Arsenic was determined to be naturally occurring at Site 6 - Based on additional review of inorganic data from the facility and surrounding area in April 2001, the observed arsenic values were determined to represent naturally occurring levels [Florida Department of Environmental Protection (FDEP), 2001]. In Section 4.1.2 of the FS (TtNUS, 2001), arsenic was identified as one of the primary risk drivers for all receptors. Because the identified human health risks associated with arsenic are now considered to be due to naturally occurring levels, arsenic will not be retained as a chemical of concern (COC) and remediation of arsenic in soil is not required at Site 6.
- Soil Excavation and Removal - On 15 May 2002, contaminated soil from two areas was excavated at Site 6 [CH2M HILL Constructors Inc. (CCI), 2002]. Each area had been predetermined through source delineation sampling and analysis performed in August 2001 (CCI, 2001). Each area measured 10 feet by 10 feet and was approximately 5 feet deep. Approximately 37 cubic yards of nonhazardous soil were removed from the combined areas. The objective of the remedial activities was to perform excavation of soil exceeding residential cleanup goals for benzo(a)pyrene and total recoverable petroleum hydrocarbons (TRPH).
- Additional Soil Data - Two post-removal action sampling events were conducted by CCI. Because of discrepancies in sample coordinates, two additional surface soil samples (plus a duplicate) were collected from the site in September 2003 (CCI, 2003). The sample from the 6SB03 area was analyzed for the full suite of polynuclear aromatic hydrocarbons (PAHs). The sample from the 6SB04 area was analyzed for TRPH and polychlorinated biphenyls (PCBs). The results of the September 2003 sampling event indicated no exceedances of the residential cleanup goals for PAHs in the 6SB03 area sample, and no exceedances of the residential cleanup goals for TRPH or the PCB Arochlor-1260 in the 6SB04 area sample. To confirm subsurface soil did not exceed the residential cleanup goals for PAHs, additional soil samples

were collected from the area of the 6SB03 soil boring location in January 2004 (CCI, 2004) and analyzed for the full suite of PAHs. Four samples (plus a duplicate) were collected from 5 to 7 feet below land surface (bls) in the area of 6SB03 soil boring location. The sample results indicated no exceedances of the residential cleanup goals for PAHs.

- Change in Screening Criteria - Over the course of the investigations at this site, United States Environmental Protection Agency (USEPA) Region IV changed its screening criteria for evaluation of hazardous waste-related sites from USEPA Region III risk-based concentrations (RBCs) to USEPA Region IX Preliminary Remediation Goals (PRGs) (USEPA, 2002); therefore, analytical results are now compared to the USEPA Region IX PRGs and FDEP Soil Cleanup Target Levels (SCTLs) (FDEP, 1999).
- The individual metal constituents, aluminum, iron, manganese and vanadium, have no direct evidence of site-related use at Site 6 and the process and procedures at this site did not likely contribute to the presence of these inorganic analytes in surface or subsurface soil. Additionally, the site-specific values for these inorganics are within the range of levels found at NAS Whiting Field and of naturally occurring levels throughout the southeastern United States. The Remedial Investigation (RI) for NAS Whiting Field Site 40, Basewide Groundwater, contains the appendix "Inorganics in Soil at NAS Whiting Field" presenting the technical basis for this determination. Considering the information presented above, aluminum, iron, manganese and vanadium are not considered chemicals of potential concern (COPCs) for Site 6 surface and subsurface soils.

1.1 PURPOSE

The purpose of this FS Addendum is to evaluate the impact of the above changed conditions on the surface and subsurface soil at Site 6. The specific items to be evaluated include:

- New soil analytical data collected in August 2001 for source delineation prior to soil excavation
- Excavation and removal of contaminated soil in May 2002
- Post-removal soil analytical data collected in September 2003 and January 2004
- Soil screening criteria changed to USEPA Region IX PRGs
- Revised Human Health Risk Assessment (HHRA)

1.2 REPORT ORGANIZATION

This FS Addendum is organized into three chapters. Chapter 1.0 presents the purpose of the FS Addendum. Chapter 2.0 discusses environmental conditions at the site including the revised HHRA. Chapter 3.0 presents conclusions and recommendations.

This addendum also includes the following Appendix.

Appendix A Interim Removal Action Data

2.0 ENVIRONMENTAL CONDITIONS

Site 6 is located southeast of the Midfield Maintenance Hangar, Building 1454 (Figure 2-1). At Site 6, from the 1940s until 1964, transformers were reportedly drained into the grassed ditch located southeast of Building 1454. It is likely the dielectric fluid from the transformers contained PCBs. Runoff from the grassed ditch drains in a northeasterly direction eventually into Big Coldwater Creek, located approximately 2.3 miles east of the disposal site (Geraghty and Miller, 1984).

The source of chemicals in the surface and subsurface soils at Site 6 can be attributed to the release of transformer oil into the drainage ditch located southeast of Building 1454; however, semivolatile organic compounds (SVOCs) and PCBs were infrequently detected in the surface and subsurface soils. Other chemicals detected in the surface and subsurface soils include volatile organic compounds (VOCs), TRPH and inorganic constituents.

Environmental conditions at Site 6 are described in detail in the RI Report (TtNUS, 1999) and the FS (TtNUS, 2001). Only interim removal activities including post-removal soil sampling and analysis, and the associated revised HHRA for Site 6 are discussed in the following sections.

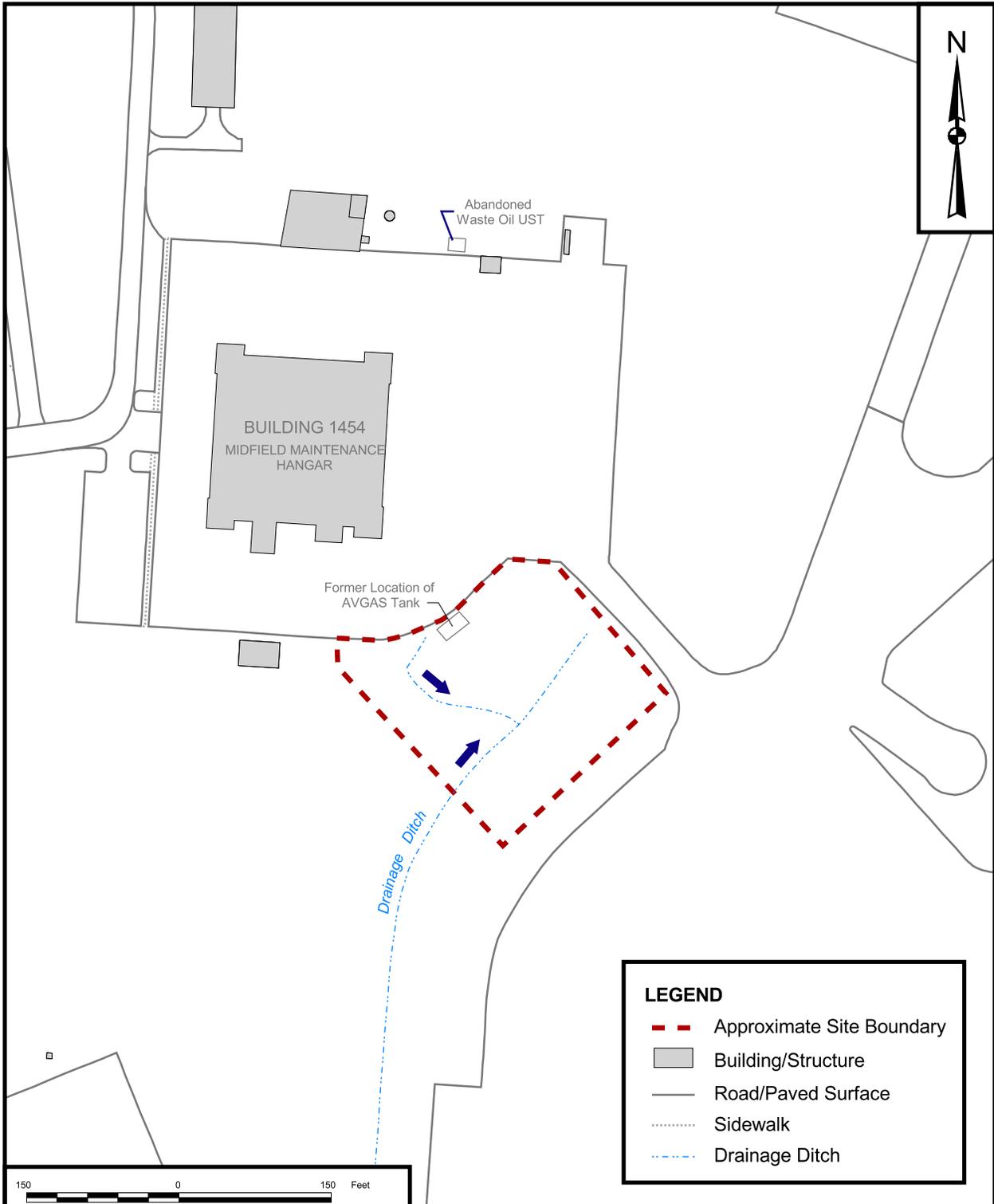
2.1 REMOVAL ACTIVITIES

Source Delineation

On 9 August 2001, additional surface and subsurface samples were collected in the vicinity sample locations 6SB03 and 6SB04 (Figure 2-2) to further delineate of benzo(a)pyrene and TRPH, respectively. A complete summary of the soil delineation is presented in the Data Transfer Memorandum, Results of Additional Soil Sampling at Site 6 (CCI, 2001). Based on the exceedances of benzo(a)pyrene and TRPH (both above industrial SCTLs) found during RI activities, and the delineation performed in August 2001, an area measuring 10 feet by 10 feet and approximately 5 feet deep was recommended for excavation at both sample locations 6SB03 and 6SB04.

Soil Excavation

The intent of the limited excavation was to remove contaminated soil exceeding the associated cleanup criteria for benzo(a)pyrene and TRPH. Removal activities are described in detail in the Project Completion Report (CCI, 2002). The project scope included excavation; removal, transportation and disposal of contaminated soil; collection and analysis of confirmatory soil samples; placement and compaction of clean backfill soil in excavation areas; and site restoration.



LEGEND

- - - Approximate Site Boundary
- Building/Structure
- Road/Paved Surface
- Sidewalk
- - - - - Drainage Ditch

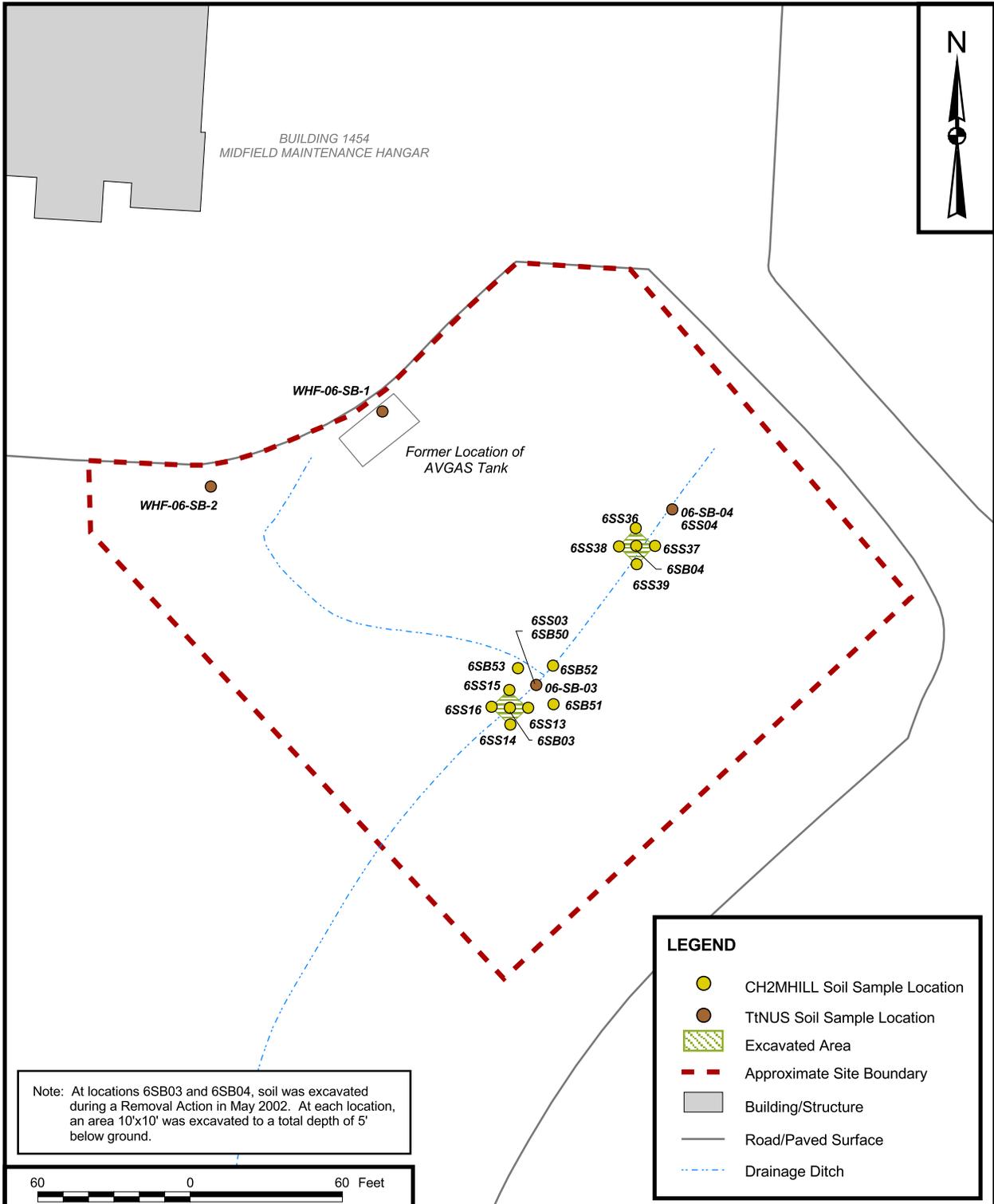


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SITE 6 - SITE PLAN
FEASIBILITY STUDY ADDENDUM
NAS WHITING FIELD, MILTON, FLORIDA

CONTRACT NUMBER 0052	
APPROVED BY	DATE
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				REV 0	
SITE 6 SOIL SAMPLE LOCATIONS FEASIBILITY STUDY ADDENDUM NAS WHITING FIELD, MILTON, FLORIDA					

Site 6 excavation activities began on 15 May 2002 and were completed that day. The excavated soil was loaded directly into transport vehicles as it was being excavated. Because the extent of the excavation was both vertically and horizontally predetermined, no confirmation samples were collected from the sidewalls or bottom of the excavation. Approximately 37 cubic yards of contaminated soil were removed and disposed as nonhazardous waste. A figure showing the areal extent of the excavation as reported in the Project Completion Report (CCI, 2002) is included in Appendix A.

Post-Removal Soil Sampling

Post-removal soil sampling was performed in September 2003 and in January 2004 to confirm contaminated soil was no longer present at the site after the May 2002 removal activities. The September 2003 sampling event included collection of two surface soil samples plus a duplicate. These sample locations are identified on Figure 2-2 as 6SS03 and 6SS04. Analytical results show the TRPH concentrations for sample 6SS04 (0 to 2 feet bls) and its duplicate were 9 and 9.6 milligrams per kilogram (mg/kg), respectively. For sample 6SS03 (0 to 2 feet bls), the PAH analysis showed a benzo(a)pyrene concentration of 11.5 micrograms per kilogram ($\mu\text{g}/\text{kg}$). These values are well below the Florida SCTL and the USEPA Region IX PRG for direct contact exposure (residential). A copy of the analytical data is included in Appendix A.

In January 2004 additional samples were collected and analyzed to confirm no PAHs remained in the soil in the 5 to 7 foot interval at sample location 6SS03 (CCI, 2004). The sample locations are identified on Figure 2-2 as 6SB50, 6SB51, 6SB52, and 6SB53. The duplicate sample was collected from 6SB53. Analytical results indicate no exceedances above the FDEP SCTLs or the USEPA Region IX PRGs for direct contact exposure (residential). A copy of the analytical results is included in Appendix A.

2.2 REVISED HHRA

This section presents the revised HHRA using analytical data for soils from 0 to 15 feet bls. The revised HHRA conservatively estimates the potential risk to human health considering historic analytical data, source delineation analytical data collected in August 2001 prior to removal activities, recent post-removal analytical data (September 2003 and January 2004), and arsenic, aluminum, iron, manganese, and vanadium being present at naturally occurring concentrations at Site 6. The original HHRA was included in the RI Report (TtNUS, 1999).

The first step of the re-evaluation was to determine a revised list of COPCs. The re-evaluation will consider exposure to surface and subsurface soil by hypothetical future residents. FDEP SCTLs and USEPA Region III RBCs were used to select COPCs in the original risk assessment. However, USEPA

Region IV currently requires the use of USEPA Region IX PRGs to select COPCs, therefore, FDEP SCTLs and USEPA's Region IX PRGs were used in this analysis to select COPCs in surface and subsurface soil for this evaluation.

Arsenic concentrations at NAS Whiting Field have been determined to be naturally occurring (FDEP, 2001). The individual metal constituents aluminum, iron, manganese and vanadium have no direct evidence site-related use at Site 6 and the process and procedures at this site did not likely contribute to the presence of these inorganic analytes in surface or subsurface soil. Additionally, the site-specific values for these inorganics are within the range of levels found at NAS Whiting Field and of naturally occurring levels throughout the southeastern United States. Documentation included in the RI for NAS Whiting Field Site 40, Basewide Groundwater, presents the technical basis for this determination. This reference, titled "Inorganics in Soil at NAS Whiting Field", is an Appendix to the Site 40 RI.

Considering the information presented above, aluminum, arsenic, iron, manganese and vanadium are not considered chemicals of potential concern (COPCs) for Site 6 surface and subsurface soils and are not considered in this revised risk assessment.

The steps employed in the RI baseline HHRA have been used in this revised HHRA. The steps include:

- Selection of COPCs – Section 2.2.1
- Exposure assessment – Section 2.2.2
- Toxicity assessment – Section 2.2.3
- Risk characterization – Section 2.2.4
- Uncertainty analysis – Section 2.2.6

The risk screening for human health uses the Florida SCTLs (FDEP, 1999) and the USEPA Region IX PRGs (USEPA, 2002) to conservatively assess exposure and toxicity. The five steps for performing the risk screening are described in detail in the following sections.

2.2.1 Selection of COPCs

The following factors are considered in the selection of COPCs for human receptors:

- 1) Occurrence and distribution of chemicals in the environmental media
- 2) Individual chemical toxicity
- 3) Adjustment for multiple chemical exposures
- 4) Comparisons of site-specific concentrations with corresponding background concentrations

All soil samples collected from 0 to 15 feet bls at Site 6 were evaluated for COPC selection. Only those chemicals detected in at least one sample were screened against the lesser of the USEPA Region IX PRG or the FDEP SCTL for direct residential exposure.

The USEPA Region IX PRGs are screening levels corresponding to fixed levels of risk, either an excess lifetime cancer risk (ELCR) of one in a million (1.0E-06) or a noncancer hazard quotient (HQ) of 1 or more. The USEPA Region IX PRGs consider the most sensitive receptor, a residential child, for chemicals associated with noncancer toxicity. For carcinogenic chemicals, exposure is based upon the assumption of cumulative exposure for a residential child and a residential adult. The Florida residential SCTLs are risk-based screening levels based on either cancer risk or noncancer toxicity, using the lower of values protective against ELCR of 1.0E-06 or a noncancer HQ of 1. Like the Region IX PRGs, the Florida SCTLs account for exposure to chemicals in soil via incidental ingestion, dermal contact, inhalation of volatiles, and inhalation of particulate dusts. To account for possible additivity of noncarcinogenic effects, screening levels for noncarcinogenic chemicals were divided by 10.

As described in the RI (TtNUS, 1999), some chemicals did not have PRGs or RBCs and, therefore, surrogate screening values were selected. Essential nutrients (calcium, magnesium, potassium, and sodium) were not considered COPCs. Inorganic analytes were screened against background concentrations but all chemicals selected as COPCs had maximum concentrations above background values.

Chemicals detected in soils were retained as COPCs if the maximum detected concentrations exceeded the adjusted screening levels and twice the mean of the background concentration. The development of the background concentrations for Whiting Field, Florida is presented in the General Information Report (GIR), NAS Whiting Field (ABB-ES, 1998). Additional information regarding site-specific background concentrations for arsenic, aluminum, iron, manganese and vanadium at NAS Whiting Field has been discussed previously in this FS addendum.

As shown in Table 2-1, no constituents were identified as COPCs for surface soil and subsurface soil at Site 6.

2.2.2 Exposure Assessment

No COPCs were identified for surface and subsurface soils. Therefore, an exposure assessment is not required for this revised HHRA for Site 6.

TABLE 2-1

SELECTION OF CHEMICALS OF POTENTIAL CONCERN IN SURFACE SOIL
SITE 6
NAS WHITING FIELD, MILTON, FLORIDA
PAGE 1 OF 2

Scenario Time Frame:	Current/Future
Medium:	Soil
Exposure Medium:	Soil (0 to 15 feet)
Exposure Point:	Site 6

CAS Number	Chemical	Minimum Detected Concentration	Maximum Concentration	Units	Detection Frequency	Concentration Used for Screening	Background Value ⁽¹⁾	Screening Toxicity Value			COPC Flag	Rationale for ⁽⁴⁾ Contaminant Deletion or Selection
								Region IX ⁽²⁾		Florida ⁽³⁾		
								Soil Residential	Soil ⁽⁵⁾ Basis	Soil Residential		
Volatiles												
78933	2-Butanone	0.004	0.004	mg/kg	1/9	0.004	NA	730	N	310	No	BSL
Semivolatiles												
83329	Acenaphthene	0.0772	0.0772	mg/kg	1/12	0.0772	NA	368	N	190	No	BSL
120127	Anthracene	0.11	0.11	mg/kg	1/12	0.11	NA	2190	N	1800	No	BSL
56553	Benzo(a)anthracene	0.0068	0.0068	mg/kg	1/12	0.0068	NA	0.62	C	1.4	No	BSL
50328	Benzo(a)pyrene	0.0115	0.29	mg/kg	2/12	0.29	NA	0.062	C	0.1	No	BSL
205992	Benzo(b)fluoranthene	0.0044	0.29	mg/kg	2/12	0.29	NA	0.62	C	1.4	No	BSL
191242	Benzo(g,h,i)perylene	0.16	0.16	mg/kg	1/12	0.16	NA	56	N	230	No	BSL
207089	Benzo(k)fluoranthene	0.0058	0.29	mg/kg	3/12	0.29	NA	6.2	C	15	No	BSL
117817	Bis-2 (ethylhexyl) phthalate	0.054	1.3	mg/kg	3/9	1.3	NA	35	C	76	No	BSL
218019	Chrysene	0.0042	0.34	mg/kg	2/12	0.34	NA	62.1	C	140	No	BSL
53703	Dibenzo(a,h)anthracene	0.005	0.005	mg/kg	1/12	0.005	NA	0.062	C	0.1	No	BSL
132649	Dibenzofuran	0.057	0.057	mg/kg	1/9	0.057	NA	29	N	28	No	BSL
206440	Fluoranthene	0.0077	0.75	mg/kg	3/12	0.75	NA	230	N	390	No	BSL
86737	Fluorene	0.0044	0.057	mg/kg	2/12	0.057	NA	275	N	220	No	BSL
193395	Indeno(1,2,3cd)Pyrene	0.0089	0.2	mg/kg	2/12	0.2	NA	0.62	C	1.5	No	BSL
85013	Phenanthrene	0.0049	0.51	mg/kg	2/12	0.51	NA	56 ⁽⁶⁾	N	200	No	BSL
129000	Pyrene	0.0348	0.59	mg/kg	3/12	0.59	NA	230	N	220	No	BSL
Pesticides/PCBs												
72548	4,4'DDD	0.13	0.13	mg/kg	1/9	0.13	NA	2.4	C	4.5	No	BSL
72559	4,4'DDE	0.024	0.024	mg/kg	1/9	0.024	NA	1.7	C	3.3	No	BSL
60571	Dieldrin	0.013	0.03	mg/kg	1/9	0.03	NA	0.03	C	0.07	No	BSL
Inorganics												
7429905	Aluminum	2250	2910	mg/kg	9/9	2910	15848	7600	N	7200	No	NOIC
7440382	Arsenic	0.99	3.5	mg/kg	9/9	3.5	3.2	0.39	C	0.8	No	NOIC
7440393	Barium	2	19.4	mg/kg	9/9	19.4	23.2	540	N	110	No	BSL
7440417	Beryllium	0.18	0.37	mg/kg	4/9	0.37	0.36	15	N	12	No	BSL
7440439	Cadmium	0.4	2.1	mg/kg	8/9	2.1	0.58	3.7	N	75	No	BSL
7440702	Calcium	101	664	mg/kg	9/9	664	396	NA			No	NUT
7440473	Chromium	8.7	65	mg/kg	9/9	65	11	210 ⁽⁷⁾	C	210 ⁽⁸⁾	No	BSL
7440484	Cobalt	1.9	1.9	mg/kg	1/6	1.9	3	900	C	470	No	BSL
7440508	Copper	1.8	50.5	mg/kg	9/9	50.5	9.4	310	N	110	No	BSL
7439896	Iron	9840	17500	mg/kg	9/9	17500	8832	2300	N	2300	No	NOIC
7439921	Lead	3.7	252	mg/kg	9/9	252	11.4	400 ⁽⁹⁾		400	No	BSL
7439954	Magnesium	23	145	mg/kg	9/9	145	268	NA		NA	No	NUT
7439965	Manganese	13.7	180	mg/kg	9/9	180	392	180	N	160	No	BSL
7439976	Mercury	0.03	0.13	mg/kg	5/9	0.13	0.12	2.3 ⁽¹⁰⁾	N	0.34	No	BSL

TABLE 2-1

SELECTION OF CHEMICALS OF POTENTIAL CONCERN IN SURFACE SOIL
SITE 6
NAS WHITING FIELD, MILTON, FLORIDA
PAGE 2 OF 2

CAS Number	Chemical	Minimum Detected Concentration	Maximum Concentration	Units	Detection Frequency	Concentration Used for Screening	Background Value ⁽¹⁾	Screening Toxicity Value			COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁴⁾
								Region IX ⁽²⁾		Florida ⁽³⁾		
								Soil Residential	Soil ⁽⁵⁾ Basis	Soil Residential		
Inorganics (Continued)												
7440020	Nickel	2	3.1	mg/kg	4/9	3.1	7.2	160	N	110	No	BSL
7440097	Potassium	43.6	130	mg/kg	6/9	130	177	NA		NA	No	NUT
7782492	Selenium	0.16	0.16	mg/kg	1/9	0.16	0.46	39	N	39	No	BSL
7440224	Silver	0.69	0.69	mg/kg	1/9	0.69	0.7	39	N	39	No	BSL
7440235	Sodium	162	247	mg/kg	9/9	247	406	NA		NA	No	NUT
7440280	Thallium	0.17	0.35	mg/kg	4/9	0.35	1.16	0.52	N	NA	No	BSL
7440622	Vanadium	28.4	48.9	mg/kg	9/9	48.9	21.8	55	N	15	No	NOIC
7440666	Zinc	4.5	162	mg/kg	9/9	162	15.4	2300	N	2300	No	BSL
Petroleum Hydrocarbons												
	Total Petroleum Hydrocarbons	7.1	24.1	mg/kg	4/8	24.1	NA	NA		340 ⁽¹¹⁾	No	BSL

Notes:

- (1) Troup Loamy Soil (Table 39), General Information Report (GIR), Remedial Investigation and Feasibility Study, ABB, January, 1998.
Background screening value for inorganics is two times the mean detected concentration.
- (2) Region IX PRG Table, 2002 (note: 1/10th PRG value used for noncarcinogens).
- (3) Table 2, Soil Cleanup Target Levels, Technical Report: Development of Soil Cleanup Target Levels (SCTLs) for Chapter 62-777, F.A.C., May 1999. (Note: 1/10th SCTL value used for noncarcinogens). Values for vanadium are based on acute toxicity; therefore, vanadium screening values are not multiplied by 1/10th.)
- (4) Rationale codes:
Selection or Deletion Reason:
Above Screening Level (ASL)
If one cPAH is a COPC, all cPAHs are COPCs. (PAH)
Essential Nutrient (NUT)
Below Screening Level (BSL)
Naturally Occurring Inorganic Chemical (NOIC)
- (5) Soil basis codes: N - noncarcinogen C - carcinogen
- (6) Value is for naphthalene.
- (7) Value is for total chromium. Hexavalent chromium is not known to have been used at NASWF.
- (8) Value is for hexavalent chromium, only SCTL given for chromium.
- (9) Screening level for lead, "Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities", OSWER Directive #9355.412.
- (10) Value is for mercuric chloride.
- (11) Value is for Total Recoverable Petroleum Hydrocarbons.

Chemicals exceeding criteria are bolded.

COPC = Chemical of Potential Concern

mg/kg = milligram per kilogram

NA = not applicable

2.2.3 Toxicity Assessment

No COPCs were identified for surface and subsurface soils. Therefore, a toxicity assessment is not required for this revised HHRA for Site 6.

2.2.4 Risk Characterization

No risk characterization was required because no COPCs have been identified at Site 6.

2.2.5 Results

No COPCs were identified in surface or subsurface soil at Site 6. Therefore, no carcinogenic or non-carcinogenic risks were identified for Site 6.

2.2.6 Uncertainty Analysis

General uncertainties associated with the risk estimation process and site-specific uncertainties are discussed or referenced in the RI.

3.0 CONCLUSIONS AND RECOMMENDATIONS

The preceding sections of this FS Addendum described the human health risk from exposure to surface and subsurface soil at Site 6, South Transformer Oil Disposal Area. Conclusions and recommendations based on this HHRA information are presented in the following sections.

3.1 CONCLUSIONS

The conclusions of the FS Addendum are summarized below.

- No COPCs were identified in surface and subsurface soil at Site 6.
- No carcinogenic or noncarcinogenic human health risks have been identified for Site 6.

3.2 RECOMMENDATIONS

No further action for surface and subsurface soil is recommended at Site 6 due to the following reasons:

- No carcinogenic or noncarcinogenic human health risks have been identified for surface or subsurface soil at Site 6.

REFERENCES

ABB-ES (ABB Environmental Services, Inc.), 1998. *Remedial Investigation and Feasibility Study, General Information Report, NAS, Whiting Field, Milton, Florida*. Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina.

CCI, (CH2M Hill Constructors, Inc.), 2001. *Final Data Transfer Memorandum: Results of Additional Soil Sampling at Site 6 – South Transformer Oil Disposal Area, Revision 01*. December.

CCI, 2002. *Project Completion Report, Interim Removal Actions at Sites 6, 16, and 32, Naval Air Station, Whiting Field, Milton Florida*. December.

CCI, 2003. *Results of Additional Soil Sampling-Site 6, Naval Air Station Whiting Field*. December.

CCI, 2004. *Results of January 2004 Additional Soil Sampling, Site 6, NAS Whiting Field*. March.

FDEP (Florida Department of Environmental Protection), 1999. *Technical Report for the Development of Soil Cleanup Target Levels, Chapter 62-777, F.A.C., Final Report*. May 26.

FDEP, 2001. Letter from James Cason, FDEP, to James Holland, NAS Whiting Field, April 11.

Geraghty and Miller, 1984. *Hydrogeologic Assessment and Groundwater Monitoring Plan, NAS Whiting Field, Melton, Florida*. Final Report. Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina.

TtNUS (Tetra Tech NUS), 1999. *Remedial Investigation for Surface and Subsurface Soil at Sites 3, 4, 6, 30, 32, and 33, Naval Air Station Whiting Field, Milton, Florida*. Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina. September.

TtNUS, 2001. *Feasibility Study for Surface and Subsurface Soil at Sites 3, 4, 6, 30, 32, and 33, Naval Air Station Whiting Field, Milton, Florida*. Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina. March.

USEPA, 2002. *Region IX Preliminary Remediation Goals Table 2002 update*. USEPA Region IX, San Francisco, CA. October.

APPENDIX A
INTERIM REMOVAL ACTION DATA

LEGEND

Phase IIA soil sample and designation ▲ 6SB01
Additional grid soil sample •

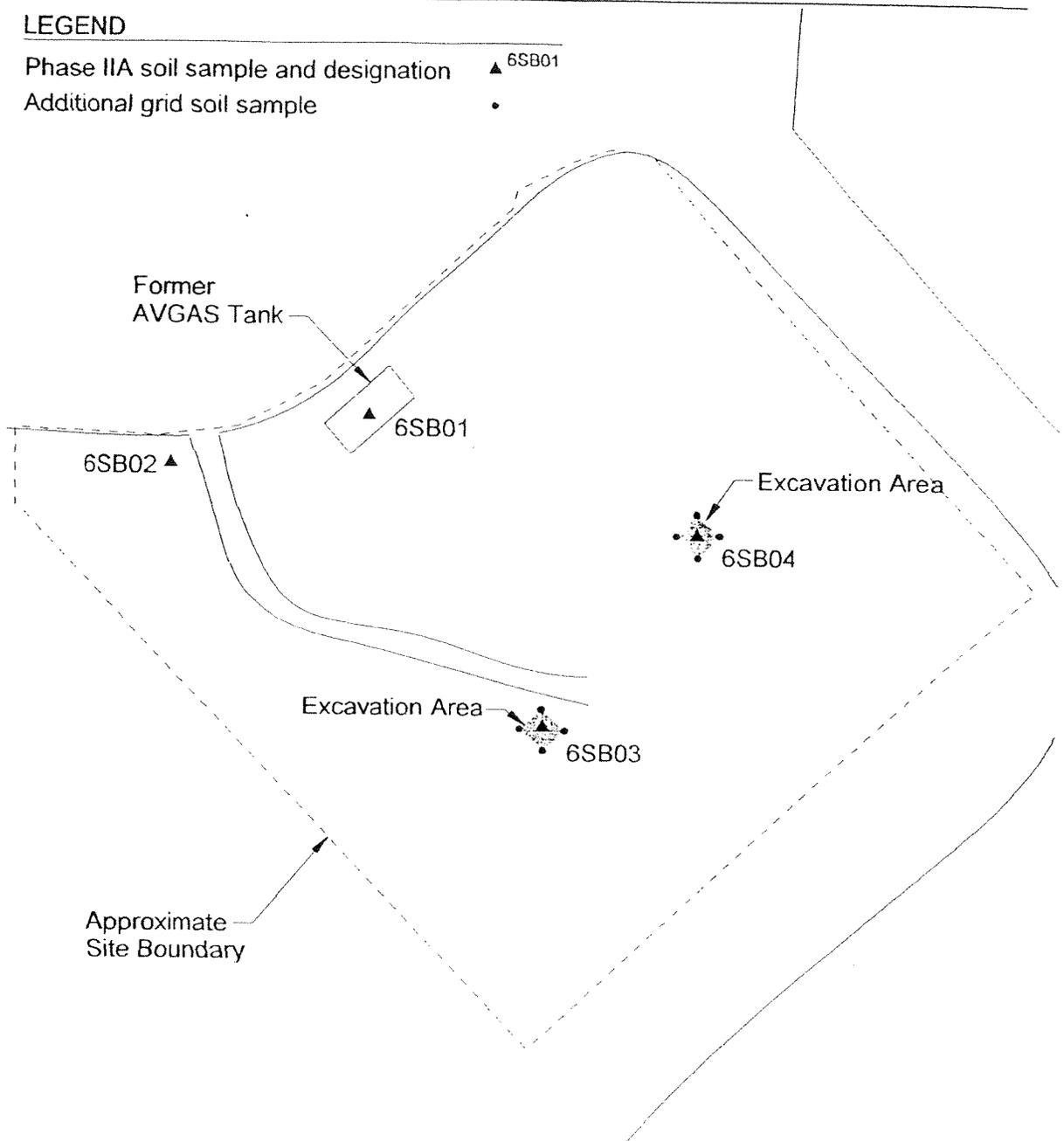


FIGURE 3-2

Excavation Area for Site 6

Project Completion Report, NAS Whiting Field

pcr_06f03.dlv
04-JUN-2002

1

PAH ORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL Laboratories, Inc. Contract: CTO-11 NAS Whiti 011-6SS0302-0912-03

Lab Code: PEL Case No. _____ SAS No: _____ SDG No.: 2309032

Matrix: Soil Lab Sample ID: 230903202 Lab File ID: 032-2.D

Sample wt/vol: 33.12 Units: G Date Received: 09/13/03

Concentrated Extract Volume: 1 Date Extracted: 09/15/03

Level:(low/med) LOW Date Analyzed: 09/17/03 Time: 0245

Percent Solids: 88.9 decanted: _____ Dilution Factor: 1

Extraction: SONC Station ID: _____ Method: 8310

GPC Cleanup: (Y/N) N pH: _____

Column(1): Vydac 201TP54 ID: 4.6 (mm)

CONCENTRATION UNITS: UG/KG

CAS NO.	ANALYTE	RESULT	Q
91-20-3	Naphthalene	6.8	U
208-96-8	Acenaphthylene	4	U
90-12-0	1-Methylnaphthalene	3.4	U
91-57-6	2-Methylnaphthalene	3.4	U
83-32-9	Acenaphthene	77.2	
86-73-7	Fluorene	4.4	
85-01-8	Phenanthrene	4.9	
120-12-7	Anthracene	3.4	U
206-44-0	Fluoranthene	7.7	
129-00-0	Pyrene	34.8	
56-55-3	Benzo(a)anthracene	6.8	
218-01-9	Chrysene	4.2	
205-99-2	Benzo(b)fluoranthene	4.4	
207-08-9	Benzo(k)fluoranthene	5.8	
50-32-8	Benzo(a)pyrene	11.5	
53-70-3	Dibenz(a,h)anthracene	5	
191-24-2	Benzo(g,h,i)perylene	3.4	U
193-39-5	Indeno(1,2,3-cd)pyrene	8.9	

FL-PRO ORGANIC ANALYSIS DATA SHEET

Lab Name: PEL Laboratories, Inc. Contract: CTO-11 NAS Whiti EPA Sample No. 011-6SS0402-0912-03
Lab Code: PEL Case No. _____ SAS No: _____ SDG No.: 2309032
Matrix: Soil Lab Sample ID: 230903203 Lab File ID: 32-03.D
Sample wt/vol: 25.49 Units: G Date Received: 09/13/03
Concentrated Extract Volume: 2 Date Extracted: 09/16/03
Level:(low/med) LOW Date Analyzed: 09/18/03 Time: 1817
PercentSolids: 89.3 decanted: _____ Dilution Factor: 1
Extraction: SONC Station ID: _____ Method: FL-PRO
GPC Cleanup : (Y/N) N pH: _____
Column(1): RTX-5 ID: 0.53 (mm)
CONCENTRATION UNITS: MG/KG

CAS NO.	ANALYTE	RESULT	Q
5289290-40-0	TPH	9	JB

FL-PRO ORGANIC ANALYSIS DATA SHEET

Lab Name: PEL Laboratories, Inc. Contract: CTO-11 NAS Whiti EPA Sample No. 011-6SSDUP02-0912-03
 Lab Code: PEL Case No. _____ SAS No: _____ SDG No.: 2309032
 Matrix: Soil Lab Sample ID: 230903204 Lab File ID: 32-04.D
 Sample wt/vol: 25.26 Units: G Date Received: 09/13/03
 Concentrated Extract Volume: 2 Date Extracted: 09/16/03
 Level:(low/med) LOW Date Analyzed: 09/18/03 Time: 1847
 PercentSolids: 89.3 decanted: _____ Dilution Factor: 1
 Extraction: SONC Station ID: _____ Method: FL-PRO
 GPC Cleanup : (Y/N) N pH: _____
 Column(1): RTX-5 ID: 0.53 (mm)
 CONCENTRATION UNITS: MG/KG

CAS NO.	ANALYTE	RESULT	Q
5289290-40-0	TPH	9.6	JB

PCB ORGANIC ANALYSIS DATA SHEET

Lab Name: PEL Laboratories, Inc. Contract: CT0-11 NAS WHIT EPA Sample No. 011-6550402-0912-03
 Lab Code: PEL Case No. _____ SAS No: _____ SDG No.: 2309139
 Matrix: SOIL Lab Sample ID: 230913901 Lab File ID: 139-01.D
 Sample wt/vol: 33.02 Units: G Date Received: 09/25/03
 Concentrated Extract Volume: 10 Date Extracted: 09/25/03
 Level:(low/med) LOW Date Analyzed: 10/08/03 Time: 2224
 Percent Solids: 89.8 decanted: _____ Dilution Factor: 1
 Extraction: SONC Station ID: _____ Method: 8082
 GPC Cleanup : (Y/N) N pH: _____
 Column(1): STX-CLP1 ID: 0.32 (mm)
 CONCENTRATION UNITS: UG/KG

CAS NO.	ANALYTE	RESULT	Q
12674-11-2	Aroclor-1016	33	U
11096-82-5	Aroclor-1260	33	U
11104-28-2	Aroclor-1221	330	U
11141-16-5	Aroclor-1232	330	U
53469-21-9	Aroclor-1242	330	U
12672-29-6	Aroclor-1248	330	U
11097-69-1	Aroclor-1254	330	U

PAH ORGANIC ANALYSIS DATA SHEET

EPA Sample No. 011-8SB50-S-07

Lab Name: PEL Laboratories, Inc. Contract: NAS Whiting Field/ Site 6

Lab Code: PEL Case No. _____ SAS No. _____ SDG No.: 2401177

Matrix: SOIL Lab Sample ID: 240117702 Lab File ID: 177-2.D

Sample wt/vol: 33.02 Units: G Date Received: 01/23/04

Concentrated Extract Volume: 1 Date Extracted: 01/26/04

Level:(low/med) LOW Date Analyzed: 01/26/04 Time: 2040

Percent Solids: 86.5 decanted: _____ Dilution Factor: 1

Extraction: SONG Station ID: Site 6 Original Method: 8310

GPC Cleanup: (Y/N) N pH: _____

Column(1): Vydac 201TP54 ID: 4.6 (mm)

CONCENTRATION UNITS: UG/KG

GAS NO.	ANALYTE	RESULT	Q	01	02
91-20-3	Naphthalene	7	U	UR	L
208-96-8	Acenaphthylene	4.2	U		
90-12-0	1-Methylnaphthalene	3.5	U		
91-57-6	2-Methylnaphthalene	3.5	U		
83-32-9	Acenaphthene	3.5	U		
86-73-7	Fluorene	3.5	U	UR	L
85-01-8	Phenanthrene	3.5	U	UR	L
120-12-7	Anthracene	3.5	U		
208-44-0	Fluoranthene	3.5	U		
128-00-0	Pyrene	3.5	U		
56-55-3	Benzo(a)anthracene	3.5	U		
218-01-8	Chrysene	3.5	U		
205-99-2	Benzo(b)fluoranthene	3.5	U		
207-08-9	Benzo(k)fluoranthene	3.5	U		
50-32-8	Benzo(a)pyrene	3.5	U		
53-70-3	Dibenz(a,h)anthracene	3.5	U		
191-24-2	Benzo(g,h,i)perylene	3.5	U		
193-39-5	Indeno(1,2,3-cd)pyrene	3.5	U		

01 - Raw Data
02 - Qual Code

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RESUBMITTED

1
PAH ORGANIC ANALYSIS DATA SHEET

EPA Sample No. **011-65851-9-07**

Lab Name: PEL Laboratories, Inc. Contract: NAS Whiting Field/ Site 6

Lab Code: PEL Case No. _____ SAS No: _____ SDG No.: 2401177

Matrix: SOIL Lab Sample ID: 240117703 Lab File ID: 177-3-D

Sample w/vol: 33 Units: G Date Received: 01/23/04

Concentrated Extract Volume: 1 Date Extracted: 01/26/04

Level:(low/med) LOW Date Analyzed: 01/26/04 Time: 2115

Percent Solids: 87.8 decanted: _____ Dilution Factor: 1

Extraction: SONC Station ID: Site 6 Original Method: 8310

GPC Cleanup: (Y/N) N pH: _____

Column(1): Vydac 201TP54 ID: 4.8 (mm)

CONCENTRATION UNITS: UG/KG

CAS NO.	ANALYTE	RESULT	0	01	02
91-20-3	Naphthalene	6.9	U	WR	LR
208-96-8	Acenaphthylene	4.1	U		
90-12-0	1-Methylnaphthalene	3.4	U		
91-57-6	2-Methylnaphthalene	3.4	U	WJ	LR
83-32-9	Acenaphthene	3.4	U	WR	LR
86-73-7	Fluorene	3.4	U	WR	LR
85-01-8	Phenanthrene	3.4	U		
120-12-7	Anthracene	3.4	U		
206-44-0	Fluoranthene	3.4	U		
129-00-0	Pyrene	3.4	U		
58-55-3	Benzo(a)anthracene	3.4	U	WJ	PP
218-01-9	Chrysene	3.4	U	WJ	PP
205-99-2	Benzo(b)fluoranthene	3.4	U		
207-08-9	Benzo(k)fluoranthene	3.4	U	WJ	PP
50-32-8	Benzo(a)pyrene	3.4	U		
53-70-3	Dibenz(a,h)anthracene	3.4	U		
191-24-2	Benzo(g,h,i)perylene	3.4	U		
193-39-5	Indeno(1,2,3-cd)pyrene	3.4	U		

01 - RevQual
02 - Qual Code

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CL 2/13/04
RESUBMITTED

PAH ORGANIC ANALYSIS DATA SHEET

EPA Sample No. 011-65B52-S-07

Lab Name: PEL Laboratories, Inc. Contract: NAS Whiting Field/ Site 6

Lab Code: PEL Case No. _____ SAS No: _____ SDG No.: 2401177

Matrix: SOIL Lab Sample ID: 240117704 Lab File ID: 177-4.D

Sample wt/vol: 33.06 Units: G Date Received: 01/23/04

Concentrated Extract Volume: 1 Date Extracted: 01/26/04

Level:(low/med) LOW Date Analyzed: 01/26/04 Time: 2150

Percent Solids: 88.4 decanted: _____ Dilution Factor: 1

Extraction: SONC Station ID: Site 8 Original Method: 8310

GPC Cleanup: (Y/N) N pH: _____

Column(1): Vydac 201TP54 ID: 4.6 (mm)

CONCENTRATION UNITS: UG/KG

CAS NO.	ANALYTE	RESULT	Q	O1	O2
91-20-3	Naphthalene	6.9	U	WR	L
208-96-8	Acenaphthylene	4.1	U		
90-12-0	1-Methylnaphthalene	3.4	U		
91-57-6	2-Methylnaphthalene	3.4	U		
83-32-9	Acenaphthene	3.4	U		
88-73-7	Fluorene	3.4	U	WR	L
85-01-8	Phenanthrene	3.4	U	WR	L
120-12-7	Anthracene	3.4	U		
208-44-0	Fluoranthene	3.4	U		
129-00-0	Pyrene	3.4	U		
56-55-3	Benzo(a)anthracene	3.4	U		
218-01-9	Chrysene	3.4	U		
205-99-2	Benzo(b)fluoranthene	3.4	U		
207-08-9	Benzo(k)fluoranthene	3.4	U		
50-32-8	Benzo(a)pyrene	3.4	U		
53-70-3	Dibenz(a,h)anthracene	3.4	U		
191-24-2	Benzo(g,h,i)perylene	3.4	U		
193-39-5	Indeno(1,2,3-cd)pyrene	3.4	U		

O1 = Rev Qual
O2 = Qual code



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PAH ORGANIC ANALYSIS DATA SHEET

EPA Sample No.
011-88853-S-07

Lab Name: PEL Laboratories, Inc. Contract: NAS Whiting Field/ Site 8

Lab Code: PEL Case No. _____ SAS No: _____ SDG No.: 2401177

Matrix: SOIL Lab Sample ID: 240117705 Lab File ID: 177-5.D

Sample wt/Vol: 33.18 Units: G Date Received: 01/23/04

Concentrated Extract Volume: 1 Date Extracted: 01/26/04

Level:(low/med) LOW Date Analyzed: 01/28/04 Time: 2224

Percent Solids: 87.4 decanted: _____ Dilution Factor: 1

Extraction: SONC Station ID: Site 8 Original Method: 8310

GPC Cleanup: (Y/N) N pH: _____

Column(1): Vydac 201TP54 ID: 4.6 (mm)

CONCENTRATION UNITS: UG/KG

CAS NO.	ANALYTE	RESULT	Q	01	02
91-20-3	Naphthalene	8.9	U	WR	L
208-96-8	Acenaphthylene	4.1	U		
90-12-0	1-Methylnaphthalene	3.4	U		
91-57-6	2-Methylnaphthalene	3.4	U		
83-32-9	Acenaphthene	3.4	U		
86-73-7	Fluorene	3.4	U	WR	L
85-01-8	Phenanthrene	3.4	U	WR	L
120-12-7	Anthracene	3.4	U		
208-44-0	Fluoranthene	3.4	U		
129-00-0	Pyrene	3.4	U		
56-55-3	Benzo(a)anthracene	3.4	U		
218-01-9	Chrysene	3.4	U		
205-99-2	Benzo(b)fluoranthene	3.4	U		
207-08-9	Benzo(k)fluoranthene	3.4	U		
50-32-8	Benzo(a)pyrene	3.4	U		
53-70-3	Dibenz(a,h)anthracene	3.4	U		
191-24-2	Benzo(g,h,i)perylene	3.4	U		
193-39-5	Indeno(1,2,3-cd)pyrene	3.4	U		

01 = Raw Qual
02 = Qual Code

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RESUBMITTED

PAH ORGANIC ANALYSIS DATA SHEET

EPA Sample No.
011-DUP-S-01

Lab Name: PEL Laboratories, Inc. Contract: NAS Whiting Field/ Site 6

Lab Code: PEL Case No. _____ SAS No: _____ SDG No.: 2401177

Matrix: SOIL Lab Sample ID: 240117706 Lab File ID: 177-8.D

Sample wt/vol: 33.07 Units: G Date Received: 01/23/04

Concentrated Extract Volume: 1 Date Extracted: 01/26/04

Level:(low/med) LOW Date Analyzed: 01/26/04 Time: 2259

Percent Solids: 87.7 decanted: _____ Dilution Factor: 1

Extraction: SONC Station ID: Duplicate Method: 8310

GPC Cleanup: (Y/N) N pH: _____

Column(1): Vydac 201TP54 ID: 4.8 (mm)

CONCENTRATION UNITS: UG/KG

CAS NO.	ANALYTE	RESULT	0	01	02
91-20-3	Naphthalene	6.9	U	UR	L
208-96-8	Acenaphthylene	4.1	U		
90-12-0	1-Methylnaphthalene	3.4	U		
91-57-6	2-Methylnaphthalene	3.4	U		
83-32-9	Acenaphthene	3.4	U		
88-73-7	Fluorene	3.4	U	UR	L
85-01-8	Phenanthrene	3.4	U	UR	L
120-12-7	Anthracene	3.4	U		
206-44-0	Fluoranthene	3.4	U		
129-00-0	Pyrene	3.4	U		
56-55-3	Benzo(a)anthracene	3.4	U		
218-01-9	Chrysene	3.4	U		
205-99-2	Benzo(b)fluoranthene	3.4	U		
207-08-9	Benzo(k)fluoranthene	3.4	U		
50-32-8	Benzo(a)pyrene	3.4	U		
53-70-3	Dibenz(a,h)anthracene	3.4	U		
191-24-2	Benzo(g,h,i)perylene	3.4	U		
193-39-5	Indeno(1,2,3-cd)pyrene	3.4	U		

01 = Rev Qual
02 = Qual Code

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