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NAS WHITING FIELD  
5090.3a

FINAL DATA TRANSFER MEMORANDUM RESULTS OF ADDITIONAL SOIL SAMPLING AT  
SITE 16 NAS WHITING FIELD FL  
12/19/2001  
CH2M HILL



**CH2M HILL**  
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December 19, 2001

Ms. Linda Martin (Code ES318)  
Southern Division, Naval Facilities Engineering Command  
P.O. Box 190010  
North Charleston, SC 29419-9010

Subject: Contract No. N62467-98-D-0095  
Contract Task Order 0011 - Naval Air Station (NAS) Whiting Field - Milton,  
Florida  
Final Data Transfer Memorandum: Results of Additional Soil Sampling at Site 16 -  
Open Disposal and Burning Area, Revision 01

Dear Ms. Martin:

CH2M HILL Constructors (CCI) is pleased to provide one (1) set of replacement pages, report cover and CD of the Final Data Transfer Memorandum: Results of Additional Soil Sampling at Site 16 - Open Disposal and Burning Area , NAS Whiting Field, Revision 01.

Please contact me (850.939.8300, ext. 17) if you have any questions or comments regarding this material.

Sincerely,

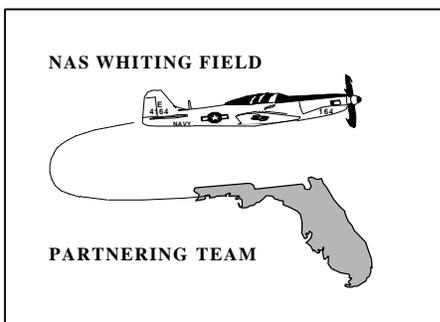
CH2M HILL

A handwritten signature in black ink, appearing to read "Amy Twitty".

Amy Twitty, P.G.  
Project Manager

cc: Mark Shull/NTR NAS Pensacola (CD only)  
Craig Benedikt/EPA (1 set of insert pages + 1 CD)  
Jim Cason/FDEP (1 set of insert pages + 1 CD)  
Terry Hansen/TtNUS (CD only)  
Larry Smith/TtNUS (CD only)  
Jim Holland/NASWF (1 set of insert pages + 1 CD + 1 full hard copy for Library)  
Ron Stabler (CD only)  
Phillip Ottinger/TtNUS (1 set of insert pages + 1 CD + 1 full hard copy for AR)  
CCI Project File No. 151168

## Results of Additional Soil Sampling at Site 16



PREPARED FOR: NAS Whiting Field Partnering Team

PREPARED BY: Amy Twitty, P.G.

DATE: December 19, 2001

### Background

Site 16 is located in the southwest area of Naval Air Station (NAS) Whiting Field, directly west of the South Airfield ([Figure 1](#)). The site is rectangular in shape, currently forested with planted pine trees, and covers approximately 12 acres. The site was used as the primary waste disposal area for NAS Whiting Field from 1943 to 1965. Two large pits located on this site were used for disposal of general refuse plus waste from aircraft operations and maintenance at an estimated annual disposal volume of 3,000 to 4,000 tons. To reduce the volume, diesel fuel was used to ignite the waste, which included paints, solvents, waste oil, hydraulic fluid, and wastewater from paint stripping and other operations. Dielectric fluids containing polychlorinated biphenyls (PCBs) may also have been disposed of at this site. A small, shallow ephemeral wetland (less than 0.1 acre and less than 2 feet deep) is located along the site's eastern boundary. The land surface slopes to the west at an average grade of five percent (Harding Lawson Associates, 2000).

A surface soil assessment was conducted during the Remedial Investigation (RI) of Site 16. During Phase IIA, three surface soil samples (16-SL-01 through 16-SL-03) were collected, and during Phase IIB, 17 surface soil samples were collected (16SO0101 through 16SO1701). Surface soil samples were collected from 0 to 12 inches below land surface (bls). [Figure 2](#) presents the RI sample locations.

Five subsurface soil samples were collected during the excavation of 10 test pits at Site 16 during Phase IIA investigations. The samples were collected from depths ranging from 2 to 10.5 feet bls. The samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, PCBs, metals, and cyanide. Eight analytes (calcium, chromium, iron, manganese, potassium, vanadium, zinc, and cyanide) were detected at concentrations exceeding the background screening values. However, none exceeded industrial standards for either the Florida Department of Environmental Protection (FDEP) soil cleanup target levels (SCTLs) or the U.S. Environmental Protection Agency (USEPA) Region III risk-based concentrations (RBCs). Arsenic was detected in all five subsurface soil samples. Three of the five samples and the duplicate sample exceeded the industrial FDEP SCTL and USEPA Region III RBC for arsenic. Based on recent FDEP

guidance, analysis of soil at NAS Whiting Field Outlying Landing Fields, and the absence of site-related factors, arsenic levels at Site 16 are comparable to naturally occurring concentrations and do not require further consideration (FDEP, 2001).

Lead was also detected in all five subsurface soil samples and exceeded the USEPA Region III residential RBC in two of the samples but was below the associated industrial criteria. Pesticides were detected at concentrations below the residential FDEP SCTLs and USEPA Region III industrial RBCs. No PCBs were detected in the subsurface soil samples (Harding Lawson Associates, 2001).

All surface soil samples were analyzed for VOCs, SVOCs, pesticides, PCBs, and target analyte list inorganics. Of the three Phase IIA surface soil samples, only one analyte in one sample location exceeded criteria. Dieldrin was detected above leachability standards, but below residential and industrial criteria. Phase IIB surface soil samples exhibited concentrations of various polynuclear aromatic hydrocarbons (PAHs) and other inorganics above USEPA Region III RBCs and /or FDEP residential SCTLs. Exceedances included benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, antimony, arsenic, barium, copper, iron, lead, and vanadium. One pesticide, dieldrin, was above the residential and leachability standards but below the industrial cleanup value. Of the analytes detected, only two PAHs, benzo(a)pyrene and dibenzo(a,h)anthracene, were found at concentrations above industrial standards. These exceedances were detected at former Phase IIB sample location 16SO0601 (Harding Lawson Associates, 2000). Therefore, one area at Site 16 in the vicinity of sample 16SO0601 required further investigation/delineation.

## Soil Investigation

Twenty-two native surface soil samples and associated quality assurance/quality control (QA/QC) samples were collected on August 7, 2001, in the vicinity of Phase IIB sample location 16SO0601 for the source delineation of PAH constituents. A 75-foot by 75-foot sampling grid was set up around the location of the original sample with sample locations on 25-foot centers. Additionally, four samples were collected from 10-foot centers immediately surrounding the original Phase IIB sample location. Initially only the four samples immediately surrounding the original location were analyzed for PAHs. The decision on whether to proceed with analyzing the grid samples for PAHs was based on the analytical results of the initial samples.

All samples were collected from the land surface to approximately 2-feet bls using decontaminated stainless steel hand augers. Soil was placed into stainless steel bowls, thoroughly mixed using stainless steel spoons, and placed in glass jars. CH2M HILL Constructors, Inc. (CCI) personnel described the soil using the Unified Soil Classification System and recorded their observations in a logbook. All sampling was conducted in accordance with CCI's Basewide Work Plan for NAS Whiting Field (CCI, 1999), FDEP Standard Operating Procedures, and the USEPA Region IV Environmental Investigation Standard Operating Procedures and Quality Assurance Manual (EISOPQAM) dated May 1996, revised 1997.

All samples were shipped to PEL Laboratories in Tampa, Florida (a Navy-approved laboratory). The four initial samples were analyzed on a 48-hour turnaround time (TAT). The surface soil samples were analyzed for PAHs using EPA Method 8310.

## Results

Over the course of investigations at this site, USEPA Region IV has switched the criteria they use for hazardous waste related site evaluations from USEPA Region III RBCs to USEPA Region IX preliminary remediation goals (PRGs). Therefore, analytical results were compared to the USEPA Region IX PRGs and the FDEP SCTLs. Of the four initial samples collected and analyzed for PAHs, the two southernmost samples (16SO3601 and 16SO3701) exhibited benzo(a)pyrene concentrations above the associated industrial USEPA Region IX PRGs and the FDEP residential SCTL. One sample (16SO3601) was also above the FDEP industrial SCTL. The southeastern sample (16SO3601) exhibited dibenz(a,h)anthracene above the USEPA residential criteria but below industrial criteria. Based on these preliminary analytical results, seven additional samples were analyzed. The results of these additional samples indicated two of the seven samples exhibited concentrations of benzo(a)pyrene above residential criteria but below the industrial criteria. The duplicate from one of these two sample locations (16SO2701D) exceeded industrial criteria. No other samples exceeded the associated criteria. Since the goal of the investigation was to determine the extent of contamination above industrial criteria, no other sampling or analysis was performed. **Table 1** presents a summary of the results, and **Figure 3** depicts the sample locations and results. The analytical report is included in **Attachment A**.

The Data Quality Evaluation (DQE) performed for the analytical results is presented in **Attachment B**. Survey coordinates for the soil sample locations are presented in **Attachment C**.

## Conclusions

In the vicinity of RI Phase IIB surface soil sample location 16SO0601, four of the 11 additional surface soil samples analyzed for PAHs exhibited benzo(a)pyrene concentrations above the associated USEPA Region IX residential PRG of 62 µg/kg. Three of the four exceeded the USEPA Region IX industrial PRG of 290 µg/kg. One of these four sample results also exceeded the FDEP industrial SCTL of 500 µg/kg.

Based on the results of the RI and this investigation, PAH contamination above residential extends over an area measuring 45 by 20 feet and approximately 2 feet deep around former Phase IIB sample location 16SO0601. This area should be remediated by covering with two feet of clean fill or by excavating the area (FS Alternatives 3 and 4 [Harding Lawson Associates, 2001]). The area is heavily vegetated; therefore, cover may be more feasible. Land Use Controls will be placed on the site regardless due to the nature of the site and the existence of other contaminants above residential standards. CCI will prepare a remedial action work plan outlining the proposed work.

## Works Cited

CH2M HILL Constructors, Inc. *Basewide Work Plan, NAS Whiting Field, Milton, Florida*. 1999.

U.S. Environmental Protection Agency. *EPA Region IV Environmental Investigation Standard Operating Procedures and Quality Assurance Manual*. May 1996.

FDEP. *Letter RE: Analysis of Soil for Arsenic at Outlying Landing Fields*. April 11, 2001.

Harding Lawson Associates. *Remedial Investigation Report, Site 16, Open Disposal and Burning Area, Naval Air Station Whiting Field, Milton, Florida*. January 2000.

Harding Lawson Associates. *Feasibility Study Report, Site 16 Open Disposal and Burning Area, Naval Air Station Whiting Field, Milton, Florida*. March 2001.

**This Data Transfer Memorandum for Site 16 at Naval Air Station Whiting Field was prepared under the direction of a Registered Professional Geologist.**

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**Amy T. Twitty, P.G. No. 1703**

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**Date**

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# **TABLES**

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**Table 1**

August 7, 2001

Soil Sample Analytical Results

Site 16, NAS Whiting Field

Sample ID No.				16SO2401	16SO2501	16SO2601	16SO2701	16SO3801 (Duplicate of 16SO2701)	16SO2801
Depth									
Lab Analyses	Units	Regulatory Guidelines		0-2'	0-2'	0-2'	0-2'	0-2'	0-2'
		USEPA Region IX PRGs Residential/Industrial	SCTL for Florida Residential/Industrial/ Leachability						
<b>PAH (8310)</b>									
Naphthalene	ug/kg	56,000/190,000	40,000/270,000/1,700	7.6 U	27	7.1 U	11 U	12 U	11 U
Acenaphthylene	ug/kg	NA	1,100,000/11,000,000/27,000	7.6 U	7 U	7.1 U	11 U	12 U	11 U
1-Methyl naphthalene	ug/kg	NA	68,000/470,000/2,200	41	10 U	11 U	14 J	24 U	22 U
2-Methyl naphthalene	ug/kg	NA	80,000/560,000/6,100	10 U	9.8 U	10 U	154	24 U	22 U
Acenaphthene	ug/kg	3,700,000/38,000,000	1,900,00/18,000,000/2,100	7.6 U	7 U	7.1 U	532	12 U	11 U
Fluorene	ug/kg	2,600,000/33,000,000	2,200,000/28,000,000/160,000	7.6 U	7 U	7.1 U	11 U	12 U	11 U
Phenanthrene	ug/kg	NA	2,000,000/30,000,000/250,000	14	7 U	34	59	36	20
Anthracene	ug/kg	22,000,000/100,000,000	18,000,000/260,000,000/2,500,000	7.6 U	7 U	7.1 U	60	25	11 U
Fluoranthene	ug/kg	2,300,000/30,000,000	2,900,000/48,000,000/1,200,000	39	18	169	236	213	11
Pyrene	ug/kg	2,300,000/54,000,000	2,200,000/37,000,000/880,000	20	5.9 J	93	128	181	15
Benzo(a)anthracene	ug/kg	620/2900	1,400/5,000/3,200	36	24	185	156	204	7.8 J
Chrysene	ug/kg	62,000/290,000	140,000/450,000/77,000	42	25	159	227	219	7.2 J
Benzo(b)fluoranthene	ug/kg	620/2900	1,400/4,800/10,000	60	57	226	291	381	14
Benzo(k)fluoranthene	ug/kg	6200/29,000	15,000/52,000/25,000	20	26	102	143	184	7.7 J
Benzo(a)pyrene	ug/kg	62/290	100/500/8,000	57	47	217	275	372	19
Dibenz(a,h)anthracene	ug/kg	62/290	100/500/30,000	7.6 U	7 U	7.1 U	9.8 J	25	11 U
Benzo(g,h,i)perylene	ug/kg	NA	2,300,000/41,000,000/32,000,000	50	74	214	291	331	17
Ideno(1,2,3-cd)pyrene	ug/kg	620/2900	1,500/5,300/28,000	48	38	199	343	289	15

NA = Not Available

PRG = Preliminary Remedial Goal

SCTL = Soil Cleanup Target Level

J = Estimated Value

U = Below Detection Limit

ug/kg micrograms per kilogram

USEPA = United States Environmental Protection Agency

**Table 1**

August 7, 2001

Soil Sample Analytical Results

Site 16, NAS Whiting Field

				Sample ID No.	16SO3201	16SO3301	16SO3401	16SO3501	16SO3601	16SO3701
				Depth						
Lab Analyses	Units	Regulatory Guidelines		0-2'	0-2'	0-2'	0-2'	0-2'	0-2'	0-2'
		USEPA Region IX PRGs Residential/Industrial	SCTL for Florida Residential/Industrial/ Leachability							
<b>PAH (8310)</b>										
Naphthalene	ug/kg	56,000/190,000	40,000/270,000/1,700	7.1 U	7.3 U	12 U	12 U	12 U	12 U	12 U
Acenaphthylene	ug/kg	NA	1,100,000/11,000,000/27,000	7.1 U	7.3 U	12 U	12 U	12 U	12 U	12 U
1-Methyl naphthalene	ug/kg	NA	68,000/470,000/2,200	11 U	11 U	24 U	23 U	24 U	25 U	25 U
2-Methyl naphthalene	ug/kg	NA	80,000/560,000/6,100	9.9 U	10 U	24 U	23 U	24 U	25 U	25 U
Acenaphthene	ug/kg	3,700,000/38,000,000	1,900,00/18,000,000/2,100	7.1 U	7.3 U	12 U	12 U	12 U	12 U	12 U
Fluorene	ug/kg	2,600,000/33,000,000	2,200,000/28,000,000/160,000	7.1 U	7.3 U	12 U	12 U	12 U	12 U	12 U
Phenanthrene	ug/kg	NA	2,000,000/30,000,000/250,000	4.9 J	7.3 U	4.6 J	12 U	66	31	31
Anthracene	ug/kg	22,000,000/100,000,000	18,000,000/260,000,000/2,500,000	7.1 U	7.3 U	12 U	12 U	107	31	31
Fluoranthene	ug/kg	2,300,000/30,000,000	2,900,000/48,000,000/1,200,000	12	11	12 U	12 U	556	213	213
Pyrene	ug/kg	2,300,000/54,000,000	2,200,000/37,000,000/880,000	5.3 J	24	12 U	12 U	390	152	152
Benzo(a)anthracene	ug/kg	620/2900	1,400/5,000/3,200	18	14	3.2 J	3.3 J	599	172	172
Chrysene	ug/kg	62,000/290,000	140,000/450,000/77,000	9.3	6.3 J	12 U	4.4 J	638	215	215
Benzo(b)fluoranthene	ug/kg	620/2900	1,400/4,800/10,000	8.4	7 J	12 U	12 U	1030	336	336
Benzo(k)fluoranthene	ug/kg	6200/29,000	15,000/52,000/25,000	7.1 U	7.3 U	12 U	12 U	476	165	165
Benzo(a)pyrene	ug/kg	62/290	100/500/8,000	7.1 U	7.3 U	12 U	5.3 J	991	304	304
Dibenz(a,h)anthracene	ug/kg	62/290	100/500/30,000	7.1 U	7.3 U	12 U	12 U	88	51	51
Benzo(g,h,i)perylene	ug/kg	NA	2,300,000/41,000,000/32,000,000	7.1 U	14	4.7 J	6 J	880	244	244
Ideno(1,2,3-cd)pyrene	ug/kg	620/2900	1,500/5,300/28,000	11	8.1	4.5 J	5.8 J	780	276	276

NA = Not Available

PRG = Preliminary Remedial Goal

SCTL = Soil Cleanup Target Level

J = Estimated Value

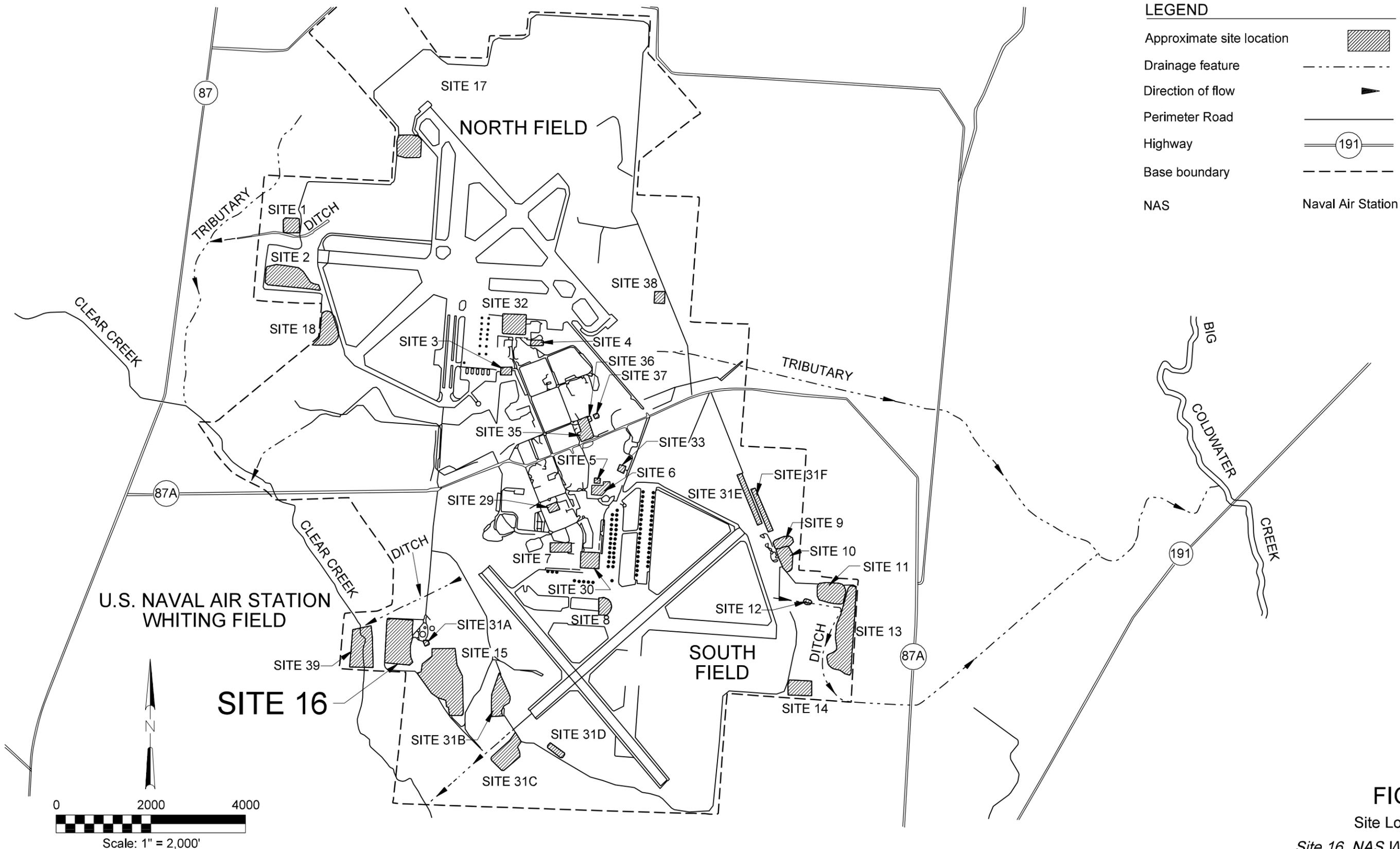
U = Below Detection Limit

ug/kg micrograms per kilogram

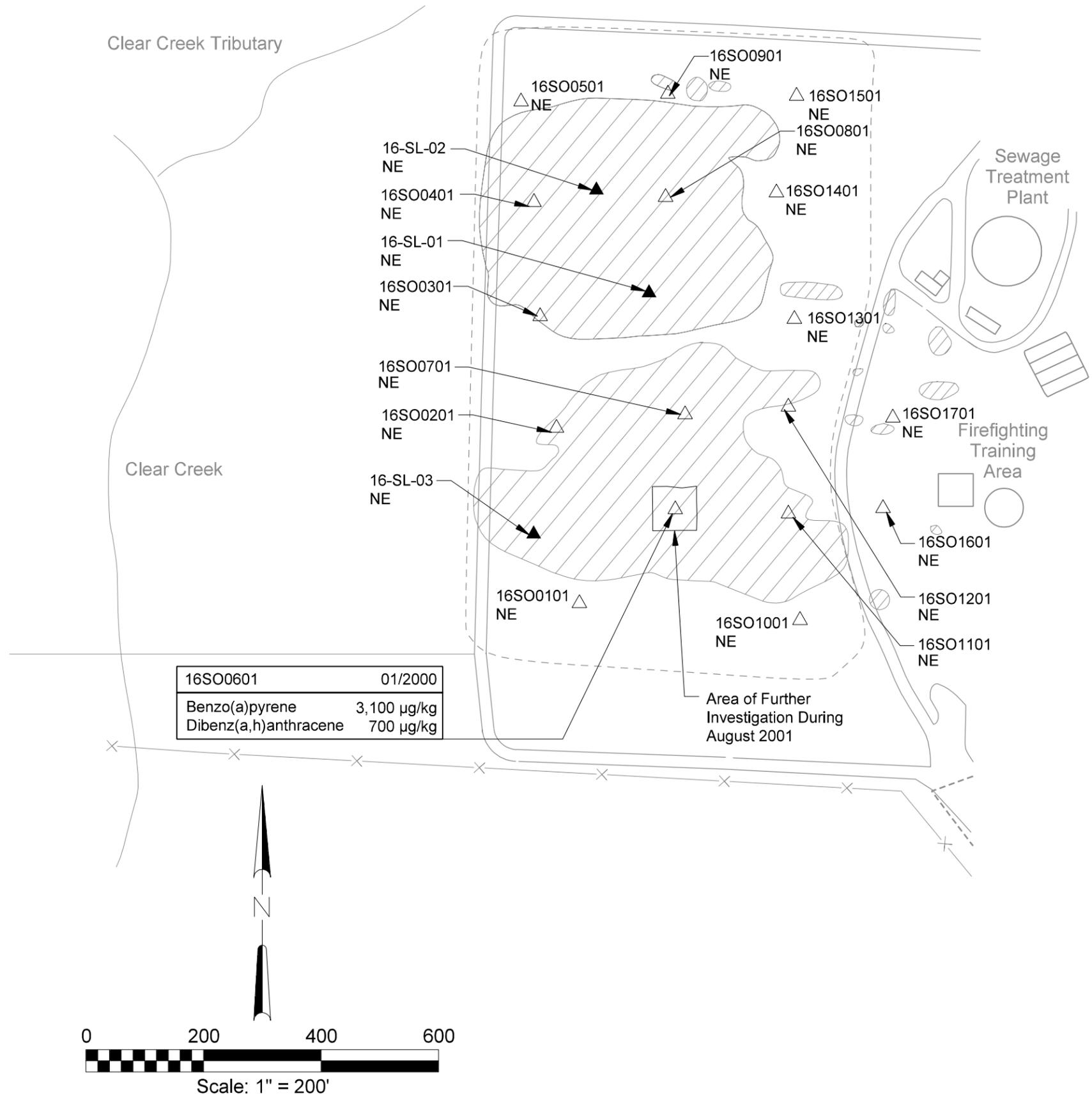
USEPA = United States Environmental Protection Agency

# FIGURES

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**FIGURE 1**  
 Site Location Map  
 Site 16, NAS Whiting Field  
**CH2MHILL**



**LEGEND**

- Phase IIA surface soil sample and designation ▲ 16-SL-01
- Phase IIB surface soil sample and designation △ 16SO0101
- Interpreted landfill areas ▨
- Approximate site boundary - - - -
- Base boundary / fence - x - x -

**Notes:**

1. All soil samples collected from 0-1' below land surface (bls).
2. The applicable residential/industrial soil criteria for Site 16 are :
 

	EPA	FDEP
	PRG	SCTL
Benzo(a)pyrene (µg/kg)	62/290	100/500
Dibenz(a,h)anthracene (µg/kg)	62/290	100/500
3. PRG = EPA Region IX Preliminary Remedial Goal
4. SCTL = Soil Cleanup Target Level
5. NE = No exceedance of applicable criteria

**FIGURE 2**  
 Phase IIA and Phase IIB Surface Soil Sample Locations  
 and Industrial Soil Criteria Exceedances  
*Site 16, NAS Whiting Field*

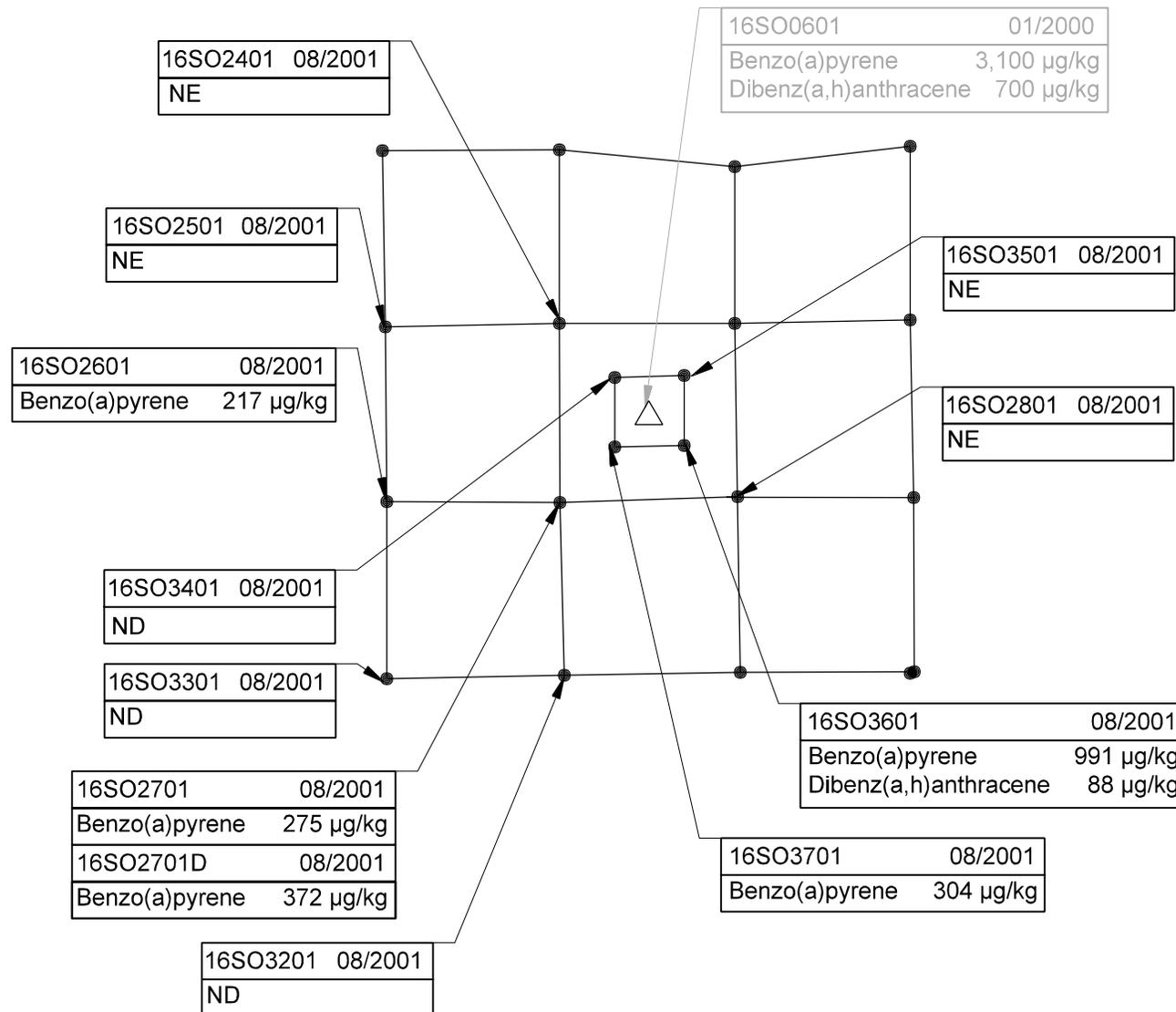
**LEGEND**

Phase IIB surface soil sample and designation 16SO0601 

Additional grid surface soil sample and designation 16SO3401 

**Notes:**

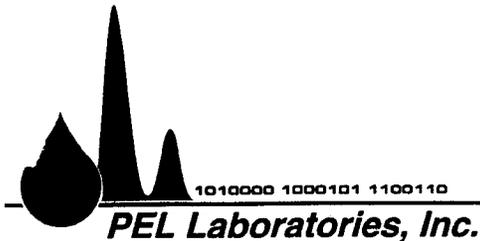
1. EPA Region IX Residential and Industrial Soil Preliminary Remedial Goals (PRGs) for benzo(a)pyrene and dibenz(a,h)anthracene are 62 µg/kg and 290 µg/kg, respectively.
2. FDEP Direct Exposure Residential and Industrial Soil Cleanup Target Levels (SCTLs) for benzo(a)pyrene and dibenz(a,h)anthracene are 100 µg/kg and 500 µg/kg respectively.
3. NE = No exceedance of applicable criteria  
ND = Non-detect



**FIGURE 3**  
Grid Layout Surrounding Phase IIB Soil Sample 16SO0601  
Site 16, NAS Whiting Field

**ATTACHMENT A**  
**Laboratory Analytical Reports**

---



**Customer Name:** CH2MHILL  
**Date & Time Received:** 8-8-01; 10:25 AM  
**Date Reported:** 8-24-01  
**PEL Submission Number:** 2108033  
**Project:** Whiting Field (Site 16)

**Samples:** The submission consisted of 7 samples with sample identification shown in the attached data tables.

**Tests:** The samples were analyzed for EPA method: 8310.

**Results:** See the attached data tables for results.

**Distribution of Reports:**

1-CH2MHILL

Attn: Amy Twitty

Phone: (850) 939-8300

2-CH2MHILL

Attn: Jeff Wilmoth

Phone: (770) 604-9182

Respectfully Submitted,

Brian Spann

Laboratory Manager

PEL Laboratories, Inc.

**Note:** Submitted material will be retained for 30 days unless otherwise requested by client or consumed in analysis. PEL letters and reports are for the exclusive use of the client to whom they are addressed. Our letters and reports apply to the sample tested and are not necessarily indicative of the qualities of apparently identical or similar materials.

4420 Pendola Point Road • Tampa, Florida 33619  
(813) 247-2805 • FAX: (813) 248-1537

## Cross-Reference sheet for SDG 2108033-Whiting Fld

	SDG	FieldID	SampleType	LabSampleID	SampleDescription
Whiting Fld	2108033	0808ABLK	MB	44836	0808ABLK
Whiting Fld	2108033	0808ABLKMS	BS	44838	0808ABLK
Whiting Fld	2108033	0808ABLKSD	BD	44839	0808ABLK
Whiting Fld	2108033	0808ALCS	BS	44837	0808ALCS
Whiting Fld	2108033	0808SBLK	MB	44830	0808SBLK
Whiting Fld	2108033	0808SBLKMS	BS	44832	0808SBLK
Whiting Fld	2108033	0808SBLKSD	BD	44833	0808SBLK
Whiting Fld	2108033	0808SLCS	BS	44831	0808SLCS
Whiting Fld	2108033	0815SBLK	MB	45504	0815SBLK
Whiting Fld	2108033	0815SBLKMS	BS	45506	0815SBLK
Whiting Fld	2108033	0815SBLKSD	BD	45507	0815SBLK
Whiting Fld	2108033	0815SLCS	BS	45505	0815SLCS
Whiting Fld	2108033	2701S080701	N	210803309	011-16-2701-S-080701
Whiting Fld	2108033	2701S080701MS	MS	210803310	011-16-2701-S-080701
Whiting Fld	2108033	2701S080701SD	SD	210803311	011-16-2701-S-080701
Whiting Fld	2108033	2801S080701	N	210803308	011-16-2801-S-080701
Whiting Fld	2108033	3401S080701	N	210803301	011-16-3401-S-080701
Whiting Fld	2108033	3401S080701MS	MS	44834S	3401S080701
Whiting Fld	2108033	3401S080701SD	SD	44834D	3401S080701
Whiting Fld	2108033	3501S080701	N	210803302	011-16-3501-S-080701
Whiting Fld	2108033	3601S080701	N	210803303	011-16-3601-S-080701
Whiting Fld	2108033	3701S080701	N	210803304	011-16-3701-S-080701
Whiting Fld	2108033	3801S080701	N	210803305	011-16-3801-S-080701
Whiting Fld	2108033	PostEBEB080701	EB	210803307	011-16-PostEBEB080701
Whiting Fld	2108033	PREEBEB080701	EB	210803306	011-16-PREEBEB080701

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Level 3

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# Organics

## Organic Data Qualifiers

- U Indicates the compound was analyzed for but not detected. The number adjacent to the "U" qualifier indicates the reporting limit for the compound. The reporting limit can vary from sample to sample depending on the dilution factors or the percent moisture adjustment when indicated.
- J Indicates estimated value. It is used when the data indicates the presence of a compound above the MDL yet lower than the reporting limit.
- B Indicates the analyte was found in the associated blank as well as in the sample. The notation indicates possible contamination of the sample.
- E Indicates the value reported is above the highest calibration standard for that compound. The sample should be analyzed at an appropriate dilution. "E" qualified values are estimations and the diluted result will be reported on another Form 1.
- D Indicates the analyte has been identified in a dilution reanalysis. "D" qualifiers are used for samples that have been analyzed at a lesser dilution that required for accurate quantitation.
- C The "C" flag indicates the presence of this compound has been confirmed by GC/MS analysis.
- P This qualifier is used for pesticide / Aroclor target analytes where there is greater than 25% difference for the detected concentrations between the two GC columns. The lower of the two values is reported on the Form 1 with a "P" code.
- N This qualifier indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds, where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, such as chlorinated hydrocarbon, the "N" qualifier is not used.
- A This qualifier indicates that a YIC is suspected aldol-condensation product.
- M This qualifier indicates that the compound is reported as a summation of analyte isomers.
- X Data flagged as rejected by analyst utilizing analytical judgment.

## Organic Sample ID Qualifiers

The qualifiers that may be appended to the lab sample ID and/or the client sample ID for organic analysis is defined below:

- DL Diluted reanalysis. Indicates that the results of the original analysis of the sample contained compounds that exceeded the calibration range. The sample was diluted and reanalyzed. May be followed by a digit to indicate multiple dilutions of the sample. The results of more than one diluted reanalysis may be reported.
- R Reanalysis. The extract was reanalyzed without re-extraction. The "R" is not used if the sample was also re-extracted. May be followed by a digit to indicate multiple reanalysis of the sample at the same dilution.
- RE Re-extracted. The extract was reanalyzed with re-extraction. May be followed by a digit to indicate multiple re-extraction of the same sample at the same dilution.
- MS Matrix spike (may be followed by a digit to indicate multiple matrix within a sample set).
- SD Matrix spike duplicate (may be followed by a digit to indicate multiple matrix spike duplicate within a sample set).

**HPLC PAH ORGANICS**  
**METHOD 8310**

**CASE NARRATIVE  
HPLC SEMIVOLATILE ORGANICS**

PEL Lab Reference No./SDG: 2108033

Client: CH2MHILL

**I. RECEIPT**

No exceptions were encountered unless a Sample Receipt Exception Report is attached to the Chain-of-Custody or a communication form is included in the addendum with this data package.

**II. HOLDING TIMES**

A. **Sample Preparation:** All holding times were met.

B. **Sample Analysis:** All holding times were met.

**III. METHODS**

SW846/EPA 8310

**IV. PREPARATION**

Soil samples were prepared by SW846 EPA 3550 for 8310 semi-volatiles analysis.  
Water samples were prepared by SW846 EPA 3510 for 8310 semi-volatiles analysis.

**V. ANALYSIS**

A. **Calibration:**

All acceptance criteria were met.

Initial calibration criteria is stated in SW-846 EPA method 8310. All analytes have a maximum percent RSD of 20. As per SW-846 EPA method 8000; Section 7.5.1.2 and 7.5.1.2.1, if one or more of the analytes exceed the maximum percent RSD the average percent RSD may be used provided the average is less than or equal to 15. In those instances, the average will be calculated and cited on the calibration forms.

Calibration verification criteria is stated in SW-846 EPA method 8000. All analytes have a maximum percent D of 15. As per SW-846 EPA method 8000; Section 7.7, if one or more of the analytes exceed the maximum percent D the average percent D may be used provided the average is less than or equal to 15. In those instances, the average will be calculated and cited on the calibration forms.

B. **Blanks:**

There was one blank analyzed with each soil sample extraction batch, which were non-detect for target parameters.

There was one blank analyzed associated with the water samples and was non-detect for target parameters.

**CASE NARRATIVE  
HPLC SEMIVOLATILE ORGANICS**

PEL Lab Reference No./SDG: 2108033

**C. Surrogates:**

All surrogate recoveries met acceptable criteria for the soil samples.  
All surrogate recoveries met acceptable criteria for the water samples.

**D. Spikes:**

**Laboratory Control Spikes (LCS)**

Two LCSs, 0808SLCS and 0815SLCS, were analyzed with the soil samples where all criteria were met.

One LCS, 0808ALCS, was analyzed with the water samples where all criteria were met.

**Matrix Spike/Matrix Spike Duplicate Samples (MS/SD)**

Two client requested MS/SD samples were analyzed with the soil samples on samples 2701S080701 and 3401S080701. Sample 3401S080701 did not meet percent recovery criteria for 2-Methyl Naphthalene and Acenaphthene in the MS and all analytes met criteria for relative percent difference. Sample 2701S080701 did not meet percent recovery criteria for 7 out of 36 analytes and all analytes met criteria for relative percent difference.

Two sets of reagent MS/SD samples were analyzed with the soil samples where all criteria were met for percent recovery with the exception of Acenaphthene, which slightly exceeded criteria in 0808SBLKSD. All criteria were met for relative percent difference.

One set of reagent MS/SD samples were analyzed with the water samples where all criteria were met for percent recovery and relative percent difference.

**E. Internal standards:**

All internal standard criteria were met for the soil samples.  
All internal standard criteria were met for the water samples.

**F. Samples:**

Sample analysis proceeded normally. Lowest calibration standard level RLs were used per client request.

The following analytes were quantified by the VWD detector: Acenaphthylene, Acenaphthene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, Chrysene, Dibenz(a,h)anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, 1-Methyl Naphthalene, 2-Methyl Naphthalene, Phenanthrene, Pyrene, and Terphenyl-d14.

The following analytes were quantified by the ADC detector: Anthracene, Naphthalene, and Dibenz(a,h)anthracene.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and PEL, both technically and for completeness except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

SIGNED:  DATE: 8-24-01

## PAH ORGANIC CROSS REFERENCE TABLE

Lab Name: PEL Laboratories, Inc. Contract: Whiting Fld  
Lab Code: PEL Case No. \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 2108033  
Method: 8310

EPA Sample No	Lab Sample ID
<u>3401S080701</u>	<u>210803301</u>
<u>3501S080701</u>	<u>210803302</u>
<u>3601S080701</u>	<u>210803303</u>
<u>3701S080701</u>	<u>210803304</u>
<u>3801S080701</u>	<u>210803305</u>
<u>PREEBEB080701</u>	<u>210803306</u>
<u>PostEBEB080701</u>	<u>210803307</u>
<u>2801S080701</u>	<u>210803308</u>
<u>2701S080701</u>	<u>210803309</u>

**Sample Data:**

2000 1000

## PAH ORGANIC ANALYSIS DATA SHEET

Lab Name: PEL Laboratories, Inc. Contract: Whiting Fld EPA Sample No. 3401S080701  
 Lab Code: PEL Case No. \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 2108033  
 Matrix: SOIL Lab Sample ID 210803301 Lab File ID 33-1.D  
 Sample wt/vol: 33.01 Units: G Date Received: 08/08/01  
 Concentrated Extract Volume: 1 Date Extracted: 08/08/01  
 Level:(low/med) LOW Date Analyzed: 08/09/01 Time: 0353  
 PercentSolids: 85 decanted: \_\_\_\_\_ Dilution Factor: 1  
 Extraction: SONC Station ID 16SO3401 Method: 8310  
 GPC Cleanup: (Y/N) N pH: \_\_\_\_\_  
 Column: Vydac 201TP54 ID: 4.6 (mm)

CONCENTRATION UNITS: *ug/Kg*

CAS NO.	ANALYTE	RESULT	Q
91-20-3	Naphthalene	12	U
208-96-8	Acenaphthylene	12	U
90-12-0	1-Methylnaphthalene	24	U
91-57-6	2-Methylnaphthalene	24	U
83-32-9	Acenaphthene	12	U
86-73-7	Fluorene	12	U
85-01-8	Phenanthrene	4.6	J
120-12-7	Anthracene	12	U
206-44-0	Fluoranthene	12	U
129-00-0	Pyrene	12	U
56-55-3	Benzo(a)anthracene	3.2	J
218-01-9	Chrysene	12	U
205-99-2	Benzo(b)fluoranthene	12	U
207-08-9	Benzo(k)fluoranthene	12	U
50-32-8	Benzo(a)pyrene	12	U
53-70-3	Dibenz(a,h)anthracene	12	U
191-24-2	Benzo(g,h,i)perylene	4.7	J
193-39-5	Indeno(1,2,3-cd)pyrene	4.5	J

## PAH ORGANIC ANALYSIS DATA SHEET

Lab Name: PEL Laboratories, Inc. Contract: Whiting Fid EPA Sample No. 3501S080701  
 Lab Code: PEL Case No. \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 2108033  
 Matrix: SOIL Lab Sample ID 210803302 Lab File ID 33-2.D  
 Sample wt/vol: 33.01 Units: G Date Received: 08/08/01  
 Concentrated Extract Volume: 1 Date Extracted: 08/08/01  
 Level:(low/med) LOW Date Analyzed: 08/09/01 Time: 0428  
 PercentSolids: 86 decanted : \_\_\_\_\_ Dilution Factor: 1  
 Extraction: SONC Station ID 16SO3501 Method: 8310  
 GPC Cleanup : ( Y/N ) N pH: \_\_\_\_\_  
 Column: Vydac 201TP54 ID: 4.6 (mm)

CONCENTRATION UNITS: *ug/Kg*

CAS NO.	ANALYTE	RESULT	Q
91-20-3	Naphthalene	12	U
208-96-8	Acenaphthylene	12	U
90-12-0	1-Methylnaphthalene	23	U
91-57-6	2-Methylnaphthalene	23	U
83-32-9	Acenaphthene	12	U
86-73-7	Fluorene	12	U
85-01-8	Phenanthrene	12	U
120-12-7	Anthracene	12	U
206-44-0	Fluoranthene	12	U
129-00-0	Pyrene	12	U
56-55-3	Benzo(a)anthracene	3.3	J
218-01-9	Chrysene	4.4	J
205-99-2	Benzo(b)fluoranthene	12	U
207-08-9	Benzo(k)fluoranthene	12	U
50-32-8	Benzo(a)pyrene	5.3	J
53-70-3	Dibenz(a,h)anthracene	12	U
191-24-2	Benzo(g,h,i)perylene	6	J
193-39-5	Indeno(1,2,3-cd)pyrene	5.8	J

## PAH ORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL Laboratories, Inc. Contract: Whiting Fld 3601S080701  
 Lab Code: PEL Case No. \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 2108033  
 Matrix: SOIL Lab Sample ID 210803303 Lab File ID 33-3.D  
 Sample wt/vol: 33.13 Units: G Date Received: 08/08/01  
 Concentrated Extract Volume: 1 Date Extracted: 08/08/01  
 Level:(low/med) LOW Date Analyzed: 08/09/01 Time: 0502  
 PercentSolids: 85 decanted: \_\_\_\_\_ Dilution Factor: 1  
 Extraction: SONC Station ID 16SO3601 Method: 8310  
 GPC Cleanup : ( Y/N ) N pH: \_\_\_\_\_  
 Column: Vydac 201TP54 ID: 4.6 (mm)

CONCENTRATION UNITS: *ug/Kg*

CAS NO.	ANALYTE	RESULT	Q
91-20-3	Naphthalene	12	U
208-96-8	Acenaphthylene	12	U
90-12-0	1-Methylnaphthalene	24	U
91-57-6	2-Methylnaphthalene	24	U
83-32-9	Acenaphthene	12	U
86-73-7	Fluorene	12	U
85-01-8	Phenanthrene	66	
120-12-7	Anthracene	107	
206-44-0	Fluoranthene	556	
129-00-0	Pyrene	390	
56-55-3	Benzo(a)anthracene	599	
218-01-9	Chrysene	638	
205-99-2	Benzo(b)fluoranthene	1030	
207-08-9	Benzo(k)fluoranthene	476	
50-32-8	Benzo(a)pyrene	991	
53-70-3	Dibenz(a,h)anthracene	88	
191-24-2	Benzo(g,h,i)perylene	880	
193-39-5	Indeno(1,2,3-cd)pyrene	780	

## PAH ORGANIC ANALYSIS DATA SHEET

EPA Sample No.  
3701S080701

Lab Name: PEL Laboratories, Inc. Contract: Whiting Fld

Lab Code: PEL Case No. \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 2108033

Matrix: SOIL Lab Sample ID 210803304 Lab File ID 33-4.D

Sample wt/vol: 33 Units: G Date Received: 08/08/01

Concentrated Extract Volume: 1 Date Extracted: 08/08/01

Level:(low/med) LOW Date Analyzed: 08/09/01 Time: 0537

PercentSolids: 82 decanted: \_\_\_\_\_ Dilution Factor: 1

Extraction: SONC Station ID 16SO3701 Method: 8310

GPC Cleanup: ( Y/N ) N pH: \_\_\_\_\_

Column: Vydac 201TP54 ID: 4.6 (mm)

CONCENTRATION UNITS: *ug/Kg*

CAS NO.	ANALYTE	RESULT	Q
91-20-3	Naphthalene	12	U
208-96-8	Acenaphthylene	12	U
90-12-0	1-Methylnaphthalene	25	U
91-57-6	2-Methylnaphthalene	25	U
83-32-9	Acenaphthene	12	U
86-73-7	Fluorene	12	U
85-01-8	Phenanthrene	31	
120-12-7	Anthracene	31	
206-44-0	Fluoranthene	213	
129-00-0	Pyrene	152	
56-55-3	Benzo(a)anthracene	172	
218-01-9	Chrysene	215	
205-99-2	Benzo(b)fluoranthene	336	
207-08-9	Benzo(k)fluoranthene	165	
50-32-8	Benzo(a)pyrene	304	
53-70-3	Dibenz(a,h)anthracene	51	
191-24-2	Benzo(g,h,i)perylene	244	
193-39-5	Indeno(1,2,3-cd)pyrene	276	

## PAH ORGANIC ANALYSIS DATA SHEET

Lab Name: PEL Laboratories, Inc. Contract: Whiting Fld EPA Sample No. 3801S080701  
 Lab Code: PEL Case No. \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 2108033  
 Matrix: SOIL Lab Sample ID 210803305 Lab File ID 33-5.D  
 Sample wt/vol: 33.15 Units: G Date Received: 08/08/01  
 Concentrated Extract Volume: 1 Date Extracted: 08/08/01  
 Level:(low/med) LOW Date Analyzed: 08/09/01 Time: 0612  
 PercentSolids: 85 decanted: \_\_\_\_\_ Dilution Factor: 1  
 Extraction: SONC Station ID 16SO3801 Method: 8310  
 GPC Cleanup: ( Y/N ) N pH: \_\_\_\_\_  
 Column: Vydac 201TP54 ID: 4.6 (mm)

CONCENTRATION UNITS: *ug/Kg*

CAS NO.	ANALYTE	RESULT	Q
91-20-3	Naphthalene	12	U
208-96-8	Acenaphthylene	12	U
90-12-0	1-Methylnaphthalene	24	U
91-57-6	2-Methylnaphthalene	24	U
83-32-9	Acenaphthene	12	U
86-73-7	Fluorene	12	U
85-01-8	Phenanthrene	36	
120-12-7	Anthracene	25	
206-44-0	Fluoranthene	213	
129-00-0	Pyrene	181	
56-55-3	Benzo(a)anthracene	204	
218-01-9	Chrysene	219	
205-99-2	Benzo(b)fluoranthene	381	
207-08-9	Benzo(k)fluoranthene	184	
50-32-8	Benzo(a)pyrene	372	
53-70-3	Dibenz(a,h)anthracene	25	
191-24-2	Benzo(g,h,i)perylene	331	
193-39-5	Indeno(1,2,3-cd)pyrene	289	

## PAH ORGANIC ANALYSIS DATA SHEET

Lab Name: PEL Laboratories, Inc. Contract: Whiting Fid EPA Sample No. PREEBEB080701  
 Lab Code: PEL Case No. \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 2108033  
 Matrix: WATER Lab Sample ID 210803306 Lab File ID 33-6.D  
 Sample wt/vol: 990 Units: ML Date Received: 08/08/01  
 Concentrated Extract Volume: 1 Date Extracted: 08/08/01  
 Level:(low/med) LOW Date Analyzed: 08/08/01 Time: 2242  
 PercentSolids: 0 decanted: \_\_\_\_\_ Dilution Factor: 1  
 Extraction: SEPF Station ID Pre-EB Method: 8310  
 GPC Cleanup: ( Y/N ) N pH: \_\_\_\_\_  
 Column: Vydac 201TP54 ID: 4.6 (mm)

CONCENTRATION UNITS: ug/L

CAS NO.	ANALYTE	RESULT	Q
91-20-3	Naphthalene	0.22	U
208-96-8	Acenaphthylene	0.26	U
90-12-0	1-Methylnaphthalene	0.32	U
91-57-6	2-Methylnaphthalene	0.4	U
83-32-9	Acenaphthene	0.42	U
86-73-7	Fluorene	0.2	U
85-01-8	Phenanthrene	0.24	U
120-12-7	Anthracene	0.34	U
206-44-0	Fluoranthene	0.28	U
129-00-0	Pyrene	0.26	U
56-55-3	Benzo(a)anthracene	0.2	U
218-01-9	Chrysene	0.24	U
205-99-2	Benzo(b)fluoranthene	0.2	U
207-08-9	Benzo(k)fluoranthene	0.2	U
50-32-8	Benzo(a)pyrene	0.2	U
53-70-3	Dibenz(a,h)anthracene	0.22	U
191-24-2	Benzo(g,h,i)perylene	0.32	U
193-39-5	Indeno(1,2,3-cd)pyrene	0.2	U

## PAH ORGANIC ANALYSIS DATA SHEET

Lab Name: PEL Laboratories, Inc. Contract: Whiting Fld EPA Sample No. PostEBEB080701  
 Lab Code: PEL Case No. \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 2108033  
 Matrix: WATER Lab Sample ID 210803307 Lab File ID 33-7.D  
 Sample wt/vol: 990 Units: ML Date Received: 08/08/01  
 Concentrated Extract Volume: 1 Date Extracted: 08/08/01  
 Level:(low/med) LOW Date Analyzed: 08/08/01 Time: 2316  
 PercentSolids: 0 decanted: \_\_\_\_\_ Dilution Factor: 1  
 Extraction: SEPF Station ID Post-EB Method: 8310  
 GPC Cleanup: ( Y/N ) N pH: \_\_\_\_\_  
 Column: Vydac 201TP54 ID: 4.6 (mm)

CONCENTRATION UNITS: *ug/L*

CAS NO.	ANALYTE	RESULT	Q
91-20-3	Naphthalene	0.22	U
208-96-8	Acenaphthylene	0.26	U
90-12-0	1-Methylnaphthalene	0.32	U
91-57-6	2-Methylnaphthalene	0.4	U
83-32-9	Acenaphthene	0.42	U
86-73-7	Fluorene	0.2	U
85-01-8	Phenanthrene	0.24	U
120-12-7	Anthracene	0.34	U
206-44-0	Fluoranthene	0.28	U
129-00-0	Pyrene	0.26	U
56-55-3	Benzo(a)anthracene	0.2	U
218-01-9	Chrysene	0.24	U
205-99-2	Benzo(b)fluoranthene	0.2	U
207-08-9	Benzo(k)fluoranthene	0.2	U
50-32-8	Benzo(a)pyrene	0.2	U
53-70-3	Dibenz(a,h)anthracene	0.22	U
191-24-2	Benzo(g,h,i)perylene	0.32	U
193-39-5	Indeno(1,2,3-cd)pyrene	0.2	U

## PAH ORGANIC ANALYSIS DATA SHEET

Lab Name: PEL Laboratories, Inc. Contract: Whiting Fid EPA Sample No. 2801S080701  
 Lab Code: PEL Case No. \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 2108033  
 Matrix: SOIL Lab Sample ID 210803308 Lab File ID 33-8.D  
 Sample wt/vol: 33.18 Units: G Date Received: 08/08/01  
 Concentrated Extract Volume: 1 Date Extracted: 08/14/01  
 Level:(low/med) LOW Date Analyzed: 08/15/01 Time: 2216  
 PercentSolids: 90 decanted: \_\_\_\_\_ Dilution Factor: 1  
 Extraction: SONC Station ID 16SO2801 Method: 8310  
 GPC Cleanup : ( Y/N ) N pH: \_\_\_\_\_  
 Column: Vydac 201TP54 ID: 4.6 (mm)

CONCENTRATION UNITS: *ug/Kg*

CAS NO.	ANALYTE	RESULT	Q
91-20-3	Naphthalene	11	U
208-96-8	Acenaphthylene	11	U
90-12-0	1-Methylnaphthalene	22	U
91-57-6	2-Methylnaphthalene	22	U
83-32-9	Acenaphthene	11	U
86-73-7	Fluorene	11	U
85-01-8	Phenanthrene	20	
120-12-7	Anthracene	11	U
206-44-0	Fluoranthene	11	
129-00-0	Pyrene	15	
56-55-3	Benzo(a)anthracene	7.8	J
218-01-9	Chrysene	7.2	J
205-99-2	Benzo(b)fluoranthene	14	
207-08-9	Benzo(k)fluoranthene	7.7	J
50-32-8	Benzo(a)pyrene	19	
53-70-3	Dibenz(a,h)anthracene	11	U
191-24-2	Benzo(g,h,i)perylene	17	
193-39-5	Indeno(1,2,3-cd)pyrene	15	

## PAH ORGANIC ANALYSIS DATA SHEET

EPA Sample No.  
2701S080701

Lab Name: PEL Laboratories, Inc. Contract: Whiting Fld

Lab Code: PEL Case No.            SAS No:            SDG No.: 2108033

Matrix: SOIL Lab Sample ID 210803309 Lab File ID 33-9.D

Sample wt/vol: 33.03 Units: G Date Received: 08/08/01

Concentrated Extract Volume: 1 Date Extracted: 08/14/01

Level:(low/med) LOW Date Analyzed: 08/15/01 Time: 2251

PercentSolids: 90 decanted :            Dilution Factor: 1

Extraction: SONC Station ID 16SO2701 Method: 8310

GPC Cleanup : ( Y/N ) N pH:           

Column: Vydac 201TP54 ID: 4.6 (mm)

CONCENTRATION UNITS: ug/Kg

CAS NO.	ANALYTE	RESULT	Q
91-20-3	Naphthalene	11	U
208-96-8	Acenaphthylene	11	U
90-12-0	1-Methylnaphthalene	14	J
91-57-6	2-Methylnaphthalene	154	
83-32-9	Acenaphthene	532	
86-73-7	Fluorene	11	U
85-01-8	Phenanthrene	59	
120-12-7	Anthracene	60	
206-44-0	Fluoranthene	236	
129-00-0	Pyrene	128	
56-55-3	Benzo(a)anthracene	156	
218-01-9	Chrysene	227	
205-99-2	Benzo(b)fluoranthene	291	
207-08-9	Benzo(k)fluoranthene	143	
50-32-8	Benzo(a)pyrene	275	
53-70-3	Dibenz(a,h)anthracene	9.8	J
191-24-2	Benzo(g,h,i)perylene	291	
193-39-5	Indeno(1,2,3-cd)pyrene	343	

# **Chain of Custody Documentation**







115 Perimeter Center Place, Suite 700  
Atlanta, GA 30346-1278  
Tel No: (770) 604-9182  
Fax No: (770) 604-9282

# CHAIN-OF-CUSTODY RECORD

COC NUMBER:

151168-010807-01

2108-033

CLIENT NAME: Hitting Field	PROJECT NUMBER: 151168	LAB NAME AND CONTACT: PEL Laboratories, 4420 Pendola Point Rd. Tampa, FL 33619	FAX AND MAIL REPORTS/EDD TO: RECIPIENT 1 (Name and Company) Amy Twitty	RECIPIENT 1 (Address, Tel No., and Fax No.): 1766 Sea Lark Lane, Navarre, FL 32566 850-939-8300 (phone), 850-939-0035 (fax)
PHASE/SITE/TASK:	CTO OR DO NUMBER: CTO-0011	LAB PO NUMBER:	FAX AND MAIL REPORTS/EDD TO: RECIPIENT 2 (Name and Company) Jeff Wilmoth, CH2M Hill, Constructors, Inc.	RECIPIENT 2 (Address, Tel No., and Fax No.): 115 Perimeter Center Place, NE, Suite 700, Atlanta, Ga. 30346 Phone=770-604-9182 Fax=770.604.9181
CONTACT: twitty	PROJECT TEL NO AND FAX NO: 850-989-8300 ext 17	LAB TEL NO AND FAX NO: (813) 247-2805 phone 248-1537 fax	FAX AND MAIL REPORTS/EDD TO: RECIPIENT 3 (Name and Company) Lisa Schwan	RECIPIENT 3 (Address, Tel No., and Fax No.): 115 Perimeter Center Place, NE, Suite 700, Atlanta, Ga. 30346 Phone=770-604-9182 Fax=770.604.9181

SAMPLE IDENTIFIER	SAMPLE DESCRIPTION/LOCATION	MATRIX (see codes on SOP)	DATE COLLECTED	TIME COLLECTED	DATA PKG LEVEL (see codes on SOP)	TAT (calendar days)	SWR310	ANALYSES REQUIRED (Include Method Numbers)										SAMPLE TYPE (see codes on SOP)	COMMENTS/ SCREENING READINGS	LAB ID (for lab's use)
								1	2	3	4	5	6	7	8	9	10			
011-16-1801-S-0807-01	16SO1801	S	08/07/01	15:25	III	H	X											N	0-2'; Hold analysis	
011-16-1901-S-0807-01	16SO1901	S	08/07/01	13:00	III	H	X											N	0-2'; Hold analysis	
011-16-2001-S-0807-01	16SO2001	S	08/07/01	10:05	III	H	X											N	0-2'; Hold analysis	
011-16-2101-S-08076-01	16SO2101	S	08/07/01	11:15	III	H	X											N	0-2'; Hold analysis	
011-16-2201-S-0876-01	16SO2201	S	08/07/01	11:05	III	H	X											N	0-2'; Hold analysis	
011-16-2301-S-0876-01	16SO2301	S	08/07/01	10:30	III	H	X											N	0-2'; Hold analysis	
011-16-2401-S-0807-01	16SO2401	S	08/07/01	14:05	III	H	X											N	0-2'; Hold analysis	
011-16-2501-S-0807-01	16SO2501	S	08/07/01	15:15	III	H	X											N	0-2'; Hold analysis	
011-16-2601-S-0807-01	16SO2601	S	08/07/01	14:15	III	H	X											N	0-2'; Hold analysis	
011-16-2701-S-0807-01	16SO2701	S	08/07/01	13:50	III	H	X											N	0-2'; Hold analysis MS/MSD	(09)

LEADER(S) AND COMPANY: (please print) Dunbar, CH2M Hill Constructors, Inc.

COURIER AND SHIPPING NUMBER: Fed-Ex. Air Bill No.829354381619

SAMPLES TEMPERATURE AND CONDITION UPON RECEIPT (for lab's use):

RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME
Name and Signature: T Dunbar	8-7-01	1800	Printed Name and Signature: Fed-Ex		
Name and Signature: Fed Ex			Printed Name and Signature: M. Kuley	8/8/01	10:20

# PEL LAB SAMPLE LOG IN SHEET

Client Information

Project # 2108-033

Client: <u>CHAM Hill</u>	Date Recd: <u>8/8/01</u>
Project: <u>NAS Whiting Field</u>	Due Date: <u>8/17/01</u>
Log In Tech: <u>ZJK</u>	Recd Via: Client <u>Crosstown</u> <u>FedEx</u>
Comments:	Other:

### SAMPLE VERIFICATION

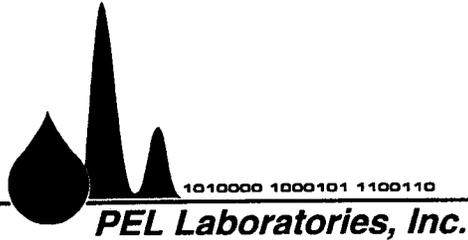
	YES	NO		YES	NO
Samples/Cooler Secure	✓		All Smpls. on COC Accounted For	✓	
Samples Received on Ice	✓		All Samples Received Intact	✓	
Temperature WNL	✓		Sample Vol. Sufficient For Analysis	✓	
Temperature of Samples (°C)	4		Samples Received W/I Hold Time	✓	
pH verified	N/A		Are All Samples to be Analyzed	✓	
pH WNL	N/A		Correct Sample Containers	✓	
Soil Origin Domestic	✓		Soil Origin Foreign		✓

### COC VERIFICATION

	YES	NO		YES	NO
Site Location/Project on COC	✓		Samplers Initials on COC	✓	
Client Project # on COC	✓		Sample Time/Date Indicated	✓	
Project Mgr. Indicated on COC	✓		TAT requested: <u>STND/RUSH</u>		
COC Relinquished/Dated by Client	✓		Client Requests Verbal Results	✓	
COC Received/Dated by PEL	✓		Client Requests FAX Results	✓	
			* PEL to Conduct All Analysis	✓	
			* Specific Subcontract Indicated		

### \* SUBCONTRACTED ANALYSIS

Subcontractor:	Subcontractor:	Subcontractor:
Due Date:	Due Date:	Due Date:
Parameter:	Parameter:	Parameter:
Via: <u>Crosstown</u> <u>FedEx</u>	Via: <u>Crosstown</u> <u>FedEx</u>	Via: <u>Crosstown</u> <u>FedEx</u>
Tracking #:	Tracking #:	Tracking #:



**Customer Name:** CH2MHILL  
**Date & Time Received:** 8-20-01; 16:30 PM  
**Date Reported:** 8-30-01  
**PEL Submission Number:** 2108134  
**Project:** Whiting Field (Site 16)

**Samples:** The submission consisted of 5 samples with sample identification shown in the attached data tables.

**Tests:** The samples were analyzed for EPA method: 8310.

**Results:** See the attached data tables for results.

Distribution of Reports:

1-CH2MHILL  
Attn: Amy Twitty  
Phone: (850) 939-8300

2-CH2MHILL  
Attn: Jeff Wilmoth  
Phone: (770) 604-9182

Respectfully Submitted

Brian Spann  
Laboratory Manager  
PEL Laboratories, Inc.

Note: Submitted material will be retained for 30 days unless otherwise requested by client or consumed in analysis. PEL letters and reports are for the exclusive use of the client to whom they are addressed. Our letters and reports apply to the sample tested and are not necessarily indicative of the qualities of apparently identical or similar materials.

4420 Pendola Point Road • Tampa, Florida 33619  
(813) 247-2805 • FAX: (813) 248-1537

## Cross-Reference sheet for SDG 2108134-Whiting Fld

	<b>SDG</b>	<b>FieldID</b>	<b>SampleType</b>	<b>LabSampleID</b>	<b>SampleDescription</b>
Whiting Fld	2108134	011-16-2401-S-0807-	N	210813401	011-16-2401-S-0807-0
Whiting Fld	2108134	011-16-2501-S-0807-	N	210813402	011-16-2501-S-0807-0
Whiting Fld	2108134	011-16-2601-S-0807-	N	210813403	011-16-2601-S-0807-0
Whiting Fld	2108134	011-16-3201-S-0807-	N	210813404	011-16-3201-S-0807-0
Whiting Fld	2108134	011-16-3301-S-0807-	N	210813405	011-16-3301-S-0807-0
Whiting Fld	2108134	0821SBik	MB	46235	0821SBik
Whiting Fld	2108134	0821SBikMS	BS	46237	0821SBik
Whiting Fld	2108134	0821SBikSD	BD	46238	0821SBik
Whiting Fld	2108134	0821SLCS	BS	46236	0821SLCS

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PEL Lab Reference No.: 2108134 WHITING FIELD  
Level 3

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# Organics

## Organic Data Qualifiers

- U Indicates the compound was analyzed for but not detected. The number adjacent to the "U" qualifier indicates the reporting limit for the compound. The reporting limit can vary from sample to sample depending on the dilution factors or the percent moisture adjustment when indicated.
- J Indicates estimated value. It is used when the data indicates the presence of a compound above the MDL yet lower than the reporting limit.
- B Indicates the analyte was found in the associated blank as well as in the sample. The notation indicates possible contamination of the sample.
- E Indicates the value reported is above the highest calibration standard for that compound. The sample should be analyzed at an appropriate dilution. "E" qualified values are estimations and the diluted result will be reported on another Form 1.
- D Indicates the analyte has been identified in a dilution reanalysis. "D" qualifiers are used for samples that have been analyzed at a lesser dilution that required for accurate quantitation.
- C The "C" flag indicates the presence of this compound has been confirmed by GC/MS analysis.
- P This qualifier is used for pesticide / Aroclor target analytes where there is greater than 25% difference for the detected concentrations between the two GC columns. The lower of the two values is reported on the Form 1 with a "P" code.
- N This qualifier indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds, where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, such as chlorinated hydrocarbon, the "N" qualifier is not used.
- A This qualifier indicates that a YIC is suspected aldol-condensation product.
- M This qualifier indicates that the compound is reported as a summation of analyte isomers.
- X Data flagged as rejected by analyst utilizing analytical judgment.

## Organic Sample ID Qualifiers

The qualifiers that may be appended to the lab sample ID and/or the client sample ID for organic analysis is defined below:

- DL Diluted reanalysis. Indicates that the results of the original analysis of the sample contained compounds that exceeded the calibration range. The sample was diluted and reanalyzed. May be followed by a digit to indicate multiple dilutions of the sample. The results of more than one diluted reanalysis may be reported.
- R Reanalysis. The extract was reanalyzed without re-extraction. The "R" is not used if the sample was also re-extracted. May be followed by a digit to indicate multiple reanalysis of the sample at the same dilution.
- RE Re-extracted. The extract was reanalyzed with re-extraction. May be followed by a digit to indicate multiple re-extraction of the same sample at the same dilution.
- MS Matrix spike (may be followed by a digit to indicate multiple matrix within a sample set).
- SD Matrix spike duplicate (may be followed by a digit to indicate multiple matrix spike duplicate within a sample set).

**HPLC PAH ORGANICS**  
**METHOD 8310**

**CASE NARRATIVE  
HPLC SEMIVOLATILE ORGANICS**

PEL Lab Reference No./SDG: 2108134

Client: CH2MHILL

**I. RECEIPT**

No exceptions were encountered unless a Sample Receipt Exception Report is attached to the Chain-of-Custody or a communication form is included in the addendum with this data package.

**II. HOLDING TIMES**

A. **Sample Preparation:** All holding times were met.

B. **Sample Analysis:** All holding times were met.

**III. METHODS**

SW846/EPA 8310

**IV. PREPARATION**

Soil samples were prepared by SW846 EPA 3550 for 8310 semi-volatiles analysis.

**V. ANALYSIS**

**A. Calibration:**

All acceptance criteria were met.

Initial calibration criteria is stated in SW-846 EPA method 8310. All analytes have a maximum percent RSD of 20. As per SW-846 EPA method 8000; Section 7.5.1.2 and 7.5.1.2.1, if one or more of the analytes exceed the maximum percent RSD the average percent RSD may be used provided the average is less than or equal to 15. In those instances, the average will be calculated and cited on the calibration forms.

Calibration verification criteria is stated in SW-846 EPA method 8000. All analytes have a maximum percent D of 15. As per SW-846 EPA method 8000; Section 7.7, if one or more of the analytes exceed the maximum percent D the average percent D may be used provided the average is less than or equal to 15. In those instances, the average will be calculated and cited on the calibration forms.

**B. Blanks:**

There was one blank analyzed with the soil samples, which was non-detect for target parameters.

**CASE NARRATIVE  
HPLC SEMIVOLATILE ORGANICS**

PEL Lab Reference No./SDG: 2108134

**C. Surrogates:**

All surrogate recoveries met acceptable criteria for the soil samples.

**D. Spikes:**

**Laboratory Control Spikes (LCS)**

One LCS, 0821SLCS, was analyzed with the soil samples where all criteria were met.

**Matrix Spike/Matrix Spike Duplicate Samples (MS/SD)**

One reagent MS/SD set was analyzed with the soil samples where all criteria were met for percent recovery and relative percent difference.

**E. Internal standards:**

All internal standard criteria were met for the soil samples.

**F. Samples:**

Sample analysis proceeded normally. Lowest calibration standard level RLs were used per client request.

The following analytes were quantified by the VWD detector: Acenaphthylene, Acenaphthene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, Chrysene, Dibenz(a,h)anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, 1-Methyl Naphthalene, 2-Methyl Naphthalene, Phenanthrene, Pyrene, and Terphenyl-d14.

The following analytes were quantified by the ADC detector: Anthracene, Naphthalene, and Dibenz(a,h)anthracene.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and PEL, both technically and for completeness except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

SIGNED: Lara Keene DATE: 8/30/01

## PAH ORGANIC CROSS REFERENCE TABLE

Lab Name: PEL Laboratories, Inc. Contract: Whiting Fid  
Lab Code: PEL Case No. \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 2108134  
Method: 8310

### EPA Sample No

### Lab Sample ID

011-16-2401-S-0807-

210813401

011-16-2501-S-0807-

210813402

011-16-2601-S-0807-

210813403

011-16-3201-S-0807-

210813404

011-16-3301-S-0807-

210813405

.....

.....	.....	.....	.....	.....
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....

.....

## Sample Data

## PAH ORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL Laboratories, Inc. Contract: Whiting Fld 011-16-2401-S-0807-  
 Lab Code: PEL Case No.            SAS No:            SDG No.: 2108134  
 Matrix: SOIL Lab Sample ID 210813401 Lab File ID 134-1.D  
 Sample wt/vol: 33.1 Units: G Date Received: 08/08/01  
 Concentrated Extract Volume: 1 Date Extracted: 08/21/01  
 Level:(low/med) LOW Date Analyzed: 08/22/01 Time: 0300  
 PercentSolids: 80 decanted:            Dilution Factor: 1  
 Extraction: SONC Station ID 16SO02401 Method: 8310  
 GPC Cleanup : ( Y/N ) N pH:             
 Column: Vydac 201TP54 ID: 4.6 (mm)

CONCENTRATION UNITS: *ug/Kg*

CAS NO.	ANALYTE	RESULT	Q
91-20-3	Naphthalene	7.6	U
208-96-8	Acenaphthylene	7.6	U
90-12-0	1-Methylnaphthalene	41	
91-57-6	2-Methylnaphthalene	10	U
83-32-9	Acenaphthene	7.6	U
86-73-7	Fluorene	7.6	U
85-01-8	Phenanthrene	14	
120-12-7	Anthracene	7.6	U
206-44-0	Fluoranthene	39	
129-00-0	Pyrene	20	
56-55-3	Benzo(a)anthracene	36	
218-01-9	Chrysene	42	
205-99-2	Benzo(b)fluoranthene	60	
207-08-9	Benzo(k)fluoranthene	20	
50-32-8	Benzo(a)pyrene	57	
53-70-3	Dibenz(a,h)anthracene	7.6	U
191-24-2	Benzo(g,h,i)perylene	50	
193-39-5	Indeno(1,2,3-cd)pyrene	48	

## PAH ORGANIC ANALYSIS DATA SHEET

EPA Sample No.

011-16-2501-S-0807-

Lab Name: PEL Laboratories, Inc. Contract: Whiting Fld

Lab Code: PEL Case No.            SAS No:            SDG No.: 2108134

Matrix: SOIL Lab Sample ID 210813402 Lab File ID 134-2.D

Sample wt/vol: 34 Units: G Date Received: 08/08/01

Concentrated Extract Volume: 1 Date Extracted: 08/21/01

Level:(low/med) LOW Date Analyzed: 08/22/01 Time: 0335

PercentSolids: 84 decanted:            Dilution Factor: 1

Extraction: SONC Station ID 16SO02501 Method: 8310

GPC Cleanup : ( Y/N ) N pH:           

Column: Vydac 201TP54 ID: 4.6 (mm)

CONCENTRATION UNITS: ug/Kg

CAS NO.	ANALYTE	RESULT	Q
91-20-3	Naphthalene	27	
208-96-8	Acenaphthylene	7	U
90-12-0	1-Methylnaphthalene	10	U
91-57-6	2-Methylnaphthalene	9.8	U
83-32-9	Acenaphthene	7	U
86-73-7	Fluorene	7	U
85-01-8	Phenanthrene	7	
120-12-7	Anthracene	7	U
206-44-0	Fluoranthene	18	
129-00-0	Pyrene	5.9	J
56-55-3	Benzo(a)anthracene	24	
218-01-9	Chrysene	25	
205-99-2	Benzo(b)fluoranthene	57	
207-08-9	Benzo(k)fluoranthene	26	
50-32-8	Benzo(a)pyrene	47	
53-70-3	Dibenz(a,h)anthracene	7	U
191-24-2	Benzo(g,h,i)perylene	74	
193-39-5	Indeno(1,2,3-cd)pyrene	38	

## PAH ORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL Laboratories, Inc. Contract: Whiting Fld 011-16-2601-S-0807-  
 Lab Code: PEL Case No. \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 2108134  
 Matrix: SOIL Lab Sample ID 210813403 Lab File ID 134-3.D  
 Sample wt/vol: 33.4 Units: G Date Received: 08/08/01  
 Concentrated Extract Volume: 1 Date Extracted: 08/21/01  
 Level:(low/med) LOW Date Analyzed: 08/22/01 Time: 0409  
 PercentSolids: 84 decanted: \_\_\_\_\_ Dilution Factor: 1  
 Extraction: SONC Station ID 16SO02501 Method: 8310  
 GPC Cleanup : ( Y/N ) N pH: \_\_\_\_\_  
 Column: Vydac 201TP54 ID: 4.6 (mm)

CONCENTRATION UNITS: *ug/Kg*

CAS NO.	ANALYTE	RESULT	Q
91-20-3	Naphthalene	7.1	U
208-96-8	Acenaphthylene	7.1	U
90-12-0	1-Methylnaphthalene	11	U
91-57-6	2-Methylnaphthalene	10	U
83-32-9	Acenaphthene	7.1	U
86-73-7	Fluorene	7.1	U
85-01-8	Phenanthrene	34	
120-12-7	Anthracene	7.1	U
206-44-0	Fluoranthene	169	
129-00-0	Pyrene	93	
56-55-3	Benzo(a)anthracene	185	
218-01-9	Chrysene	159	
205-99-2	Benzo(b)fluoranthene	226	
207-08-9	Benzo(k)fluoranthene	102	
50-32-8	Benzo(a)pyrene	217	
53-70-3	Dibenz(a,h)anthracene	7.1	U
191-24-2	Benzo(g,h,i)perylene	214	
193-39-5	Indeno(1,2,3-cd)pyrene	199	

## PAH ORGANIC ANALYSIS DATA SHEET

EPA Sample No.  
011-16-3201-S-0807-

Lab Name: PEL Laboratories, Inc. Contract: Whiting Fld

Lab Code: PEL Case No.                      SAS No:                      SDG No.: 2108134

Matrix: SOIL Lab Sample ID 210813404 Lab File ID 134-4.D

Sample wt/vol: 34.1 Units: G Date Received: 08/08/01

Concentrated Extract Volume: 1 Date Extracted: 08/21/01

Level:(low/med) LOW Date Analyzed: 08/22/01 Time: 0444

PercentSolids: 83 decanted:                      Dilution Factor: 1

Extraction: SONC Station ID 16SO03201 Method: 8310

GPC Cleanup : ( Y/N ) N pH:                     

Column: Vydac 201TP54 ID: 4.6 (mm)

CONCENTRATION UNITS: *ug/Kg*

CAS NO.	ANALYTE	RESULT	Q
91-20-3	Naphthalene	7.1	U
208-96-8	Acenaphthylene	7.1	U
90-12-0	1-Methylnaphthalene	11	U
91-57-6	2-Methylnaphthalene	9.9	U
83-32-9	Acenaphthene	7.1	U
86-73-7	Fluorene	7.1	U
85-01-8	Phenanthrene	4.9	J
120-12-7	Anthracene	7.1	U
206-44-0	Fluoranthene	12	
129-00-0	Pyrene	5.3	J
56-55-3	Benzo(a)anthracene	18	
218-01-9	Chrysene	9.3	
205-99-2	Benzo(b)fluoranthene	8.4	
207-08-9	Benzo(k)fluoranthene	7.1	U
50-32-8	Benzo(a)pyrene	7.1	U
53-70-3	Dibenz(a,h)anthracene	7.1	U
191-24-2	Benzo(g,h,i)perylene	7.1	U
193-39-5	Indeno(1,2,3-cd)pyrene	11	

## PAH ORGANIC ANALYSIS DATA SHEET

EPA Sample No.  
011-16-3301-S-0807-

Lab Name: PEL Laboratories, Inc. Contract: Whiting Fld

Lab Code: PEL Case No. \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 2108134

Matrix: SOIL Lab Sample ID 210813405 Lab File ID 134-5.D

Sample wt/vol: 33.4 Units: G Date Received: 08/08/01

Concentrated Extract Volume: 1 Date Extracted: 08/21/01

Level:(low/med) LOW Date Analyzed: 08/22/01 Time: 0518

PercentSolids: 82 decanted : \_\_\_\_\_ Dilution Factor: 1

Extraction: SONC Station ID 16SO03301 Method: 8310

GPC Cleanup : ( Y/N ) N pH: \_\_\_\_\_

Column: Vydac 201TP54 ID: 4.6 (mm)

CONCENTRATION UNITS: ug/Kg

CAS NO.	ANALYTE	RESULT	Q
91-20-3	Naphthalene	7.3	U
208-96-8	Acenaphthylene	7.3	U
90-12-0	1-Methylnaphthalene	11	U
91-57-6	2-Methylnaphthalene	10	U
83-32-9	Acenaphthene	7.3	U
86-73-7	Fluorene	7.3	U
85-01-8	Phenanthrene	7.3	U
120-12-7	Anthracene	7.3	U
206-44-0	Fluoranthene	11	
129-00-0	Pyrene	24	
56-55-3	Benzo(a)anthracene	14	
218-01-9	Chrysene	6.3	J
205-99-2	Benzo(b)fluoranthene	7	J
207-08-9	Benzo(k)fluoranthene	7.3	U
50-32-8	Benzo(a)pyrene	7.3	U
53-70-3	Dibenz(a,h)anthracene	7.3	U
191-24-2	Benzo(g,h,i)perylene	14	
193-39-5	Indeno(1,2,3-cd)pyrene	8.1	

# **Chain of Custody Documentation**





# PEL LAB SAMPLE LOG IN SHEET

Client Information

Project # 2108-134

Client: <u>CH2MHILL</u>	Date Recd: <u>08-08-01</u>
Project: <u>151106</u>	Due Date: <u>09-03-01</u>
Log In Tech: <u>[Signature]</u>	Recd Via: Client Crosstown <u>FedEx</u>
Comments:	Other:

### SAMPLE VERIFICATION

	YES	NO		YES	NO
Samples/Cooler Secure	✓		All Smpls. on COC Accounted For	✓	
Samples Received on Ice	✓		All Samples Received Intact	✓	
Temperature WNL	✓		Sample Vol. Sufficient For Analysis	✓	
Temperature of Samples (°C)	✓		Samples Received W/ Hold Time	✓	
pH verified <u>NA</u>		✓	Are All Samples to be Analyzed	✓	
pH WNL <u>NA</u>		✓	Correct Sample Containers	✓	
Soil Origin Domestic	✓		Soil Origin Foreign		✓

### COC VERIFICATION

	YES	NO		YES	NO
Site Location/Project on COC	✓		Samplers Initials on COC	✓	
Client Project # on COC	✓		Sample Time/Date Indicated	✓	
Project Mgr. Indicated on COC	✓		TAT requested: <u>STND / RUSH</u>	✓	
COC Relinquished/Dated by Client	✓		Client Requests Verbal Results	✓	
COC Received/Dated by PEL	✓		Client Requests FAX Results	✓	
			* PEL to Conduct All Analysis	✓	
			* Specific Subcontract Indicated		✓

### \* SUBCONTRACTED ANALYSIS

Subcontractor:	Subcontractor:	Subcontractor:
Due Date:	Due Date:	Due Date:
Parameter:	Parameter:	Parameter:
Via: Crosstown FedEx	Via: Crosstown FedEx	Via: Crosstown FedEx
Tracking #:	Tracking #:	Tracking #:

**ATTACHMENT B**  
**Data Quality Evaluation**

---

Approved for Quality Assurance Release by:  
 Rev. 0 Date 10/11/01  
*C. Cristella*

Table 1-1 Samples For Data Validation Review  
 NAS Whiting Field (CTO-11)  
 Sites 6, 16 & 38  
 August 2001 Sampling  
 PEL Laboratories Sample Delivery Group 2108033

SAMPLE I.D.	LABORATORY I.D.	DATE COLLECTED	MATRIX	ANALYSES PERFORMED		
				PAH	PEST	TRPH
011-16-3701-S-0807-01	21083304	8/7/2001	SOIL	X		
011-16-3601-S-0807-01	21083303	8/7/2001	SOIL	X		
011-16-3501-S-0807-01	21083302	8/7/2001	SOIL	X		
011-16-3401-S-0807-01	21083301	8/7/2001	SOIL	X		
011-16-2801-S-0807-01	21083308	8/7/2001	SOIL	X		
011-16-3801-S-0807-01	21083305	8/7/2001	SOIL	X		
011-16-2701-S-080701	21083309	8/7/2001	SOIL	X		
011-16-PREEBEB-0807-01	21083306	8/7/2001	EQUIPMENT BLANK	X		
011-16-PostEBE0807-01	21083307	8/7/2001	EQUIPMENT BLANK	X		

PAH Polynuclear Aromatic Hydrocarbons  
 PEST Pesticide Compounds  
 TRPH Total Petroleum Hydrocarbons

**Project:** NAS Whiting Field (CTO-11)  
**Laboratory:** PEL Laboratories, Inc., Tampa, Florida  
**Sample Delivery Group:** 2108033  
**Matrix:** Solid and Aqueous  
**Report Date:** 9/13/2001

This analytical quality assurance report is based upon a review of analytical data generated for soil samples and associated equipment blanks. The sample locations, laboratory identification numbers, sample collection dates, sample matrix, and analyses performed are presented in Table 1.

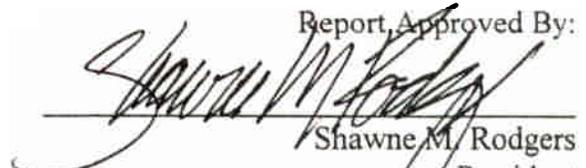
The samples were analyzed for polynuclear aromatic hydrocarbons. The sample analyses were performed in accordance with the procedures outlined in "Test Methods for Evaluating Solid Wastes", SW-846, third edition, Promulgated Updates II, IIA, and III, June 1997.

All sample analyses have undergone an analytical quality assurance review to ensure adherence to the required protocols. Results have been validated or qualified according to general guidance provided in the Region IV modifications to "Laboratory Data Validation Functional Guidelines for Validating Organic Analyses", USEPA 9/94. This document specifies procedures for validating data generated for CLP analyses. Therefore, the quality control requirements specified in the methods and associated acceptance criteria were also used to evaluate the non-CLP data. The parameters presented on the following page were evaluated.

- 
- X • Data Completeness
  - X • Chain of Custody Documentation
  - X • Holding Times
  - X • Instrument Performance
  - X • Summaries of Initial and Continuing Calibrations
  - X • Summaries of Laboratory and Field Blank Analysis Results
  - X • Summaries of Surrogate Compound Recoveries
  - X • Summaries of Matrix Spike/Matrix Spike Duplicate Recoveries and  
Reproducibility
    - Field Duplicate Analysis Results
  - X • Summaries of Laboratory Control Sample Results
  - X • Summaries of Internal Standard Performance
    - Qualitative Identification
  - X • Reporting Limits
- 

X - Denotes parameter evaluated.

It is recommended that the data only be used according to the qualifiers presented, and discussed in this report. All other data should be considered qualitatively and quantitatively valid as reported by the laboratory, based on the items evaluated.

Report Approved By:  
  
\_\_\_\_\_  
Shawne M. Rodgers  
President  
  
9/13/2001  
\_\_\_\_\_  
Date

**1.0 DATA COMPLETENESS**

**2.0 CHAIN OF CUSTODY DOCUMENTATION**

All chain of custody documentation was complete.

**3.0 HOLDING TIMES**

All holding times were met.

**4.0 INITIAL AND CONTINUING CALIBRATIONS**

All criteria were met. No qualifiers were applied.

**5.0 LABORATORY AND FIELD BLANK ANALYSIS RESULTS**

All criteria were met. No qualifiers were applied.

**6.0 SURROGATE COMPOUNDS**

All criteria were met. No qualifiers were applied.

**7.0 MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERIES AND REPRODUCIBILITY**

All criteria were met. No qualifiers were applied.

**8.0 FIELD DUPLICATE RESULTS**

All criteria were met. No qualifiers were applied.

**9.0**                    ***LABORATORY CONTROL SAMPLE RESULTS***

All criteria were met. No qualifiers were applied.

**10.0**                   ***INTERNAL STANDARD PERFORMANCE***

All criteria were met. No qualifiers were applied.

**11.0**                   ***REPORTING LIMITS***

As required by USEPA protocol, all compounds, which were qualitatively identified at concentrations below their respective Quantitation Limits (QLs), have been marked with "J" qualifiers to indicate that they are quantitative estimates.

## METHODOLOGY REFERENCES

Analysis	Reference
Pesticide Compounds	Method 8081A, "Test Methods for Evaluating Solid Wastes", SW-846, third edition, Promulgated Updates II, IIA, and III, June 1997
Total Petroleum Hydrocarbons	Method FL PRO

## PAH ORGANIC ANALYSIS DATA SHEET

Lab Name: PEL Laboratories, Inc. Contract: Whiting Fid EPA Sample No. 3401S080701  
 Lab Code: PEL Case No. \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 2108033  
 Matrix: SOIL Lab Sample ID 210803301 Lab File ID 33-1.D  
 Sample wt/vol: 33.01 Units: G Date Received: 08/08/01  
 Concentrated Extract Volume: 1 Date Extracted: 08/08/01  
 Level:(low/med) LOW Date Analyzed: 08/09/01 Time: 0353  
 PercentSolids: 85 decanted: \_\_\_\_\_ Dilution Factor: 1  
 Extraction: SONC Station ID 16SQ3401 Method: 8310  
 GPC Cleanup : ( Y/N ) N pH: \_\_\_\_\_  
 Column: Vydac 201TP54 ID: 4.6 (mm)

CONCENTRATION UNITS: ug/Kg

CAS NO.	ANALYTE	RESULT	Q
91-20-3	Naphthalene	12	U
208-96-8	Acenaphthylene	12	U
90-12-0	1-Methylnaphthalene	24	U
91-57-6	2-Methylnaphthalene	24	U
83-32-9	Acenaphthene	12	U
86-73-7	Fluorene	12	U
85-01-8	Phenanthrene	4.6	J
120-12-7	Anthracene	12	U
208-44-0	Fluoranthene	12	U
129-00-0	Pyrene	12	U
56-55-3	Benzo(a)anthracene	3.2	J
218-01-9	Chrysene	12	U
205-99-2	Benzo(b)fluoranthene	12	U
207-08-9	Benzo(k)fluoranthene	12	U
50-32-8	Benzo(a)pyrene	12	U
53-70-3	Dibenz(a,h)anthracene	12	U
191-24-2	Benzo(g,h,i)perylene	4.7	J
193-39-5	Indeno(1,2,3-cd)pyrene	4.5	J

SMX  
9/11/2001

## PAH ORGANIC ANALYSIS DATA SHEET

Lab Name: PEL Laboratories, Inc. Contract: Whiting Fld EPA Sample No. 3501S080701  
 Lab Code: PEL Case No. \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 2108033  
 Matrix: SOIL Lab Sample ID 210803302 Lab File ID 33-2.D  
 Sample wt/vol: 33.01 Units: G Date Received: 08/08/01  
 Concentrated Extract Volume: 1 Date Extracted: 08/08/01  
 Level:(low/med) LOW Date Analyzed: 08/09/01 Time: 0428  
 PercentSolids: 86 decanted: \_\_\_\_\_ Dilution Factor: 1  
 Extraction: SONC Station ID 16SO3501 Method: 6310  
 GPC Cleanup: (Y/N) N pH: \_\_\_\_\_  
 Column: Vydac 201TP54 ID: 4.6 (mm)

CONCENTRATION UNITS: ug/Kg

CAS NO.	ANALYTE	RESULT	Q
91-20-3	Naphthalene	12	U
208-96-8	Acenaphthylene	12	U
90-12-0	1-Methylnaphthalene	23	U
91-57-6	2-Methylnaphthalene	23	U
83-32-9	Acenaphthene	12	U
86-73-7	Fluorene	12	U
85-01-8	Phenanthrene	12	U
120-12-7	Anthracene	12	U
206-44-0	Fluoranthene	12	U
129-00-0	Pyrene	12	U
56-55-3	Benzo(a)anthracene	3.3	J
218-01-9	Chrysene	4.4	J
205-99-2	Benzo(b)fluoranthene	12	U
207-08-9	Benzo(k)fluoranthene	12	U
50-32-8	Benzo(a)pyrene	5.3	J
53-70-3	Dibenz(a,h)anthracene	12	U
191-24-2	Benzo(g,h,i)perylene	6	J
193-39-5	Indeno(1,2,3-cd)pyrene	5.8	J

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 9/11/2001

## PAH ORGANIC ANALYSIS DATA SHEET

Lab Name: PEL Laboratories, Inc. Contract: Whiting Fld EPA Sample No. 3601S080701  
 Lab Code: PEL Case No. \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 2108033  
 Matrix: SOIL Lab Sample ID 210803303 Lab File ID 33-3.D  
 Sample wt/vol: 33.13 Units: G Date Received: 08/08/01  
 Concentrated Extract Volume: 1 Date Extracted: 08/08/01  
 Level:(low/med) LOW Date Analyzed: 08/09/01 Time: 0502  
 Percent Solids: 85 decanted: \_\_\_\_\_ Dilution Factor: 1  
 Extraction: SONC Station ID 16SO3601 Method: 8310  
 GPC Cleanup: (Y/N) N pH: \_\_\_\_\_  
 Column: Vydac 201TP54 ID: 4.6 (mm)

CONCENTRATION UNITS: ug/Kg

CAS NO.	ANALYTE	RESULT	Q
91-20-3	Naphthalene	12	U
208-96-8	Acenaphthylene	12	U
90-12-0	1-Methylnaphthalene	24	U
91-57-6	2-Methylnaphthalene	24	U
83-32-9	Acenaphthene	12	U
86-73-7	Fluorene	12	U
85-01-8	Phenanthrene	66	
120-12-7	Anthracene	107	
208-44-0	Fluoranthene	558	
129-00-0	Pyrene	390	
56-55-3	Benzo(a)anthracene	599	
218-01-9	Chrysene	638	
205-99-2	Benzo(b)fluoranthene	1030	
207-08-9	Benzo(k)fluoranthene	476	
50-32-8	Benzo(a)pyrene	991	
53-70-3	Dibenz(a,h)anthracene	88	
191-24-2	Benzo(g,h,i)perylene	880	
193-39-5	Indeno(1,2,3-cd)pyrene	780	

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 9/11/2001

## PAH ORGANIC ANALYSIS DATA SHEET

Lab Name: PEL Laboratories, Inc. Contract: Whiting Fld EPA Sample No. 3701S080701  
 Lab Code: PEL Case No. \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 2108033  
 Matrix: SOIL Lab Sample ID 210803304 Lab File ID 33-4.D  
 Sample wt/vol: 33 Units: G Date Received: 08/08/01  
 Concentrated Extract Volume: 1 Date Extracted: 08/08/01  
 Level:(low/med) LOW Date Analyzed: 08/09/01 Time: 0537  
 PercentSolids: 82 decanted: \_\_\_\_\_ Dilution Factor: 1  
 Extraction: SONC Station ID 16SO3701 Method: 8310  
 GPC Cleanup : ( Y/N ) N pH: \_\_\_\_\_  
 Column: Vydac 201TP54 ID: 4.6 (mm)

CONCENTRATION UNITS: ug/Kg

CAS NO.	ANALYTE	RESULT	Q
91-20-3	Naphthalene	12	U
208-96-8	Acenaphthylene	12	U
90-12-0	1-Methylnaphthalene	25	U
91-57-6	2-Methylnaphthalene	25	U
83-32-9	Acenaphthene	12	U
86-73-7	Fluorene	12	U
85-01-8	Phenanthrene	31	
120-12-7	Anthracene	31	
206-44-0	Fluoranthene	213	
129-00-0	Pyrene	152	
56-55-3	Benzo(a)anthracene	172	
218-01-9	Chrysene	215	
205-99-2	Benzo(b)fluoranthene	336	
207-08-9	Benzo(k)fluoranthene	165	
50-32-8	Benzo(a)pyrene	304	
53-70-3	Dibenz(a,h)anthracene	51	
191-24-2	Benzo(g,h,i)perylene	244	
193-39-5	Indeno(1,2,3-cd)pyrene	276	

SIMK  
 9/11/2001  
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## PAH ORGANIC ANALYSIS DATA SHEET

Lab Name: PEL Laboratories, Inc. Contract: Whiting Fld EPA Sample No. 3801S080701  
 Lab Code: PEL Case No. \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 2108033  
 Matrix: SOIL Lab Sample ID 210803305 Lab File ID 33-5.D  
 Sample wt/vol: 33.15 Units: G Date Received: 08/08/01  
 Concentrated Extract Volume: 1 Date Extracted: 08/08/01  
 Level:(low/med) LOW Date Analyzed: 08/09/01 Time: 0612  
 PercentSolids: 85 decanted: \_\_\_\_\_ Dilution Factor: 1  
 Extraction: SONC Station ID 16SO3801 Method: 8310  
 GPC Cleanup: ( Y/N ) N pH: \_\_\_\_\_  
 Column: Vydac 201TP54 ID: 4.6 (mm)

CONCENTRATION UNITS: *ug/Kg*

CAS NO.	ANALYTE	RESULT	Q
91-20-3	Naphthalene	12	U
208-96-8	Acenaphthylene	12	U
90-12-0	1-Methylnaphthalene	24	U
91-57-6	2-Methylnaphthalene	24	U
83-32-9	Acenaphthene	12	U
86-73-7	Fluorene	12	U
85-01-8	Phenanthrene	36	
120-12-7	Anthracene	25	
206-44-0	Fluoranthene	213	
129-00-0	Pyrene	181	
56-55-3	Benzo(a)anthracene	204	
218-01-9	Chrysene	219	
205-99-2	Benzo(b)fluoranthene	381	
207-08-9	Benzo(k)fluoranthene	184	
50-32-8	Benzo(a)pyrene	372	
53-70-3	Dibenz(a,h)anthracene	25	
191-24-2	Benzo(g,h,i)perylene	331	
193-39-5	Indeno(1,2,3-cd)pyrene	289	

## PAH ORGANIC ANALYSIS DATA SHEET

Lab Name: PEL Laboratories, Inc. Contract: Whiting Fld EPA Sample No. PREEBEB080701  
 Lab Code: PEL Case No. \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 2108033  
 Matrix: WATER Lab Sample ID 210803306 Lab File ID 33-6.D  
 Sample wt/vol: 990 Units: ML Date Received: 08/08/01  
 Concentrated Extract Volume: 1 Date Extracted: 08/08/01  
 Level:(low/med) LOW Date Analyzed: 08/08/01 Time: 2242  
 PercentSolids: 0 decanted : \_\_\_\_\_ Dilution Factor: 1  
 Extraction: SEPF Station ID Pre-EB Method: 8310  
 GPC Cleanup : ( Y/N ) N pH: \_\_\_\_\_  
 Column: Vydac 201TP54 ID: 4.6 (mm)

CONCENTRATION UNITS: ug/L

CAS NO.	ANALYTE	RESULT	Q
91-20-3	Naphthalene	0.22	U
208-96-8	Acenaphthylene	0.26	U
90-12-0	1-Methylnaphthalene	0.32	U
91-57-6	2-Methylnaphthalene	0.4	U
83-32-9	Acenaphthene	0.42	U
86-73-7	Fluorene	0.2	U
85-01-8	Phenanthrene	0.24	U
120-12-7	Anthracene	0.34	U
206-44-0	Fluoranthene	0.28	U
129-00-0	Pyrene	0.26	U
56-55-3	Benzo(a)anthracene	0.2	U
218-01-9	Chrysene	0.24	U
205-99-2	Benzo(b)fluoranthene	0.2	U
207-08-9	Benzo(k)fluoranthene	0.2	U
50-32-8	Benzo(a)pyrene	0.2	U
53-70-3	Dibenz(a,h)anthracene	0.22	U
191-24-2	Benzo(g,h,i)perylene	0.32	U
193-39-5	Indeno(1,2,3-cd)pyrene	0.2	U

## PAH ORGANIC ANALYSIS DATA SHEET

Lab Name: PEL Laboratories, Inc. Contract: Whiting Fld EPA Sample No. PostEBEB080701  
 Lab Code: PEL Case No.                      SAS No:                      SDG No.: 2108033  
 Matrix: WATER Lab Sample ID 210803307 Lab File ID 33-7.D  
 Sample wt/vol: 990 Units: ML Date Received: 08/08/01  
 Concentrated Extract Volume: 1 Date Extracted: 08/08/01  
 Level:(low/med) LOW Date Analyzed: 08/08/01 Time: 2316  
 PercentSolids: 0 decanted:                      Dilution Factor: 1  
 Extraction: SEPF Station ID Post-EB Method: 8310  
 GPC Cleanup: ( Y/N ) N pH:                       
 Column: Vydac 201TP54 ID: 4.6 (mm)

CONCENTRATION UNITS: *ug/L*

CAS NO.	ANALYTE	RESULT	Q
91-20-3	Naphthalene	0.22	U
208-96-8	Acenaphthylene	0.26	U
90-12-0	1-Methylnaphthalene	0.32	U
91-57-6	2-Methylnaphthalene	0.4	U
83-32-9	Acenaphthene	0.42	U
86-73-7	Fluorene	0.2	U
85-01-8	Phenanthrene	0.24	U
120-12-7	Anthracene	0.34	U
206-44-0	Fluoranthene	0.28	U
129-00-0	Pyrene	0.26	U
58-55-3	Benzo(a)anthracene	0.2	U
218-01-9	Chrysene	0.24	U
205-99-2	Benzo(b)fluoranthene	0.2	U
207-08-9	Benzo(k)fluoranthene	0.2	U
50-32-8	Benzo(a)pyrene	0.2	U
53-70-3	Dibenz(a,h)anthracene	0.22	U
191-24-2	Benzo(g,h,i)perylene	0.32	U
193-39-5	Indeno(1,2,3-cd)pyrene	0.2	U

PAH ORGANIC ANALYSIS DATA SHEET

Lab Name: PEL Laboratories, Inc. Contract: Whiting Fld EPA Sample No. 2801S080701  
 Lab Code: PEL Case No. \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 2108033  
 Matrix: SOIL Lab Sample ID 210803308 Lab File ID 33-8.D  
 Sample wt/vol: 33.18 Units: G Date Received: 08/08/01  
 Concentrated Extract Volume: 1 Date Extracted: 08/14/01  
 Level:(low/med) LOW Date Analyzed: 08/15/01 Time: 2216  
 PercentSolids: 90 decanted: \_\_\_\_\_ Dilution Factor: 1  
 Extraction: SONC Station ID 15SO2801 Method: 8310  
 GPC Cleanup: (Y/N) N pH: \_\_\_\_\_  
 Column: Vydac 201TP54 ID: 4.6 (mm)

CONCENTRATION UNITS: *ug/Kg*

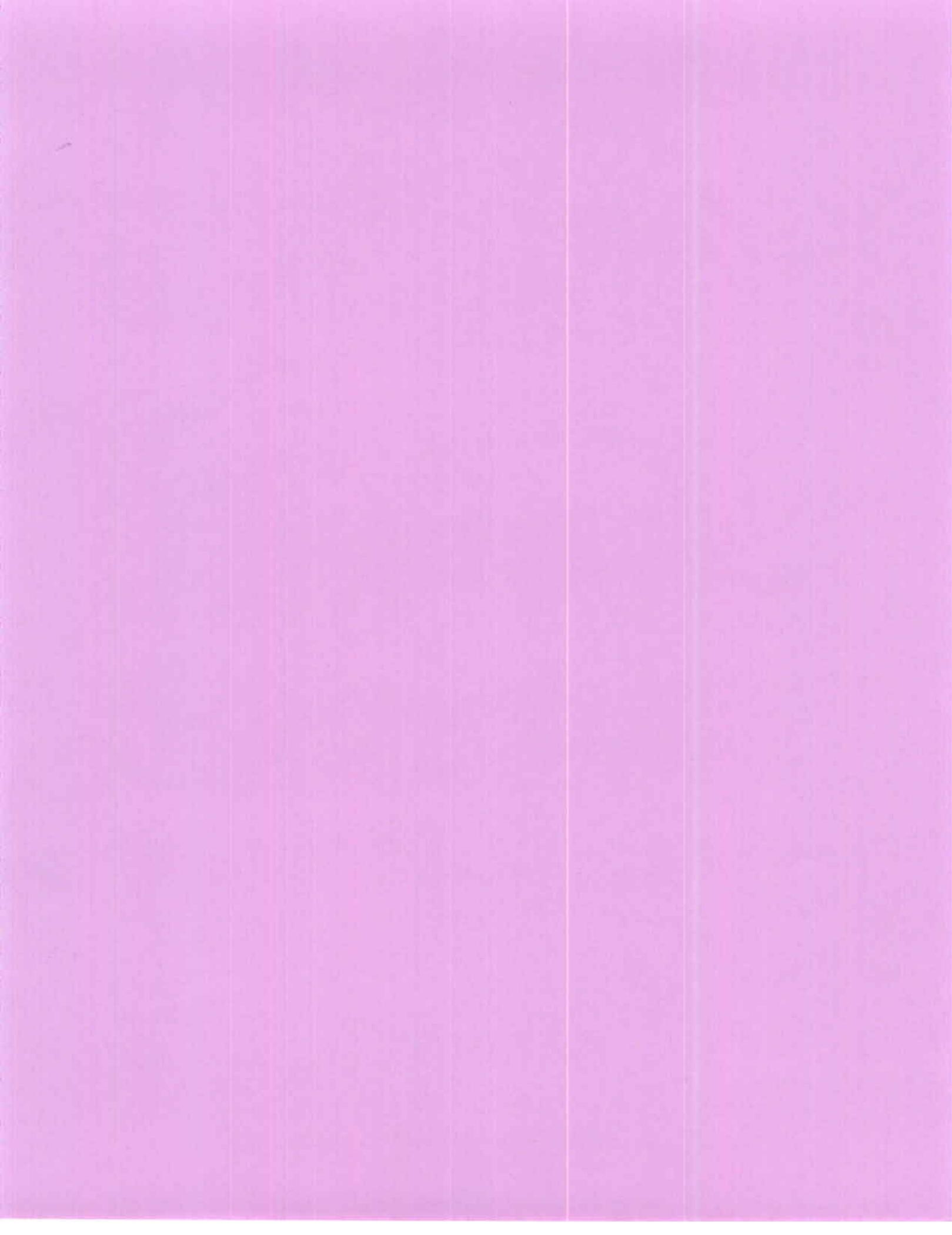
CAS NO.	ANALYTE	RESULT	Q
91-20-3	Naphthalene	11	U
208-96-8	Acenaphthylene	11	U
90-12-0	1-Methylnaphthalene	22	U
91-57-6	2-Methylnaphthalene	22	U
83-32-9	Acenaphthene	11	U
86-73-7	Fluorene	11	U
85-01-8	Phenanthrene	20	
120-12-7	Anthracene	11	U
206-44-0	Fluoranthene	11	
129-00-0	Pyrene	15	
56-55-3	Benzo(a)anthracene	7.8	J
218-01-9	Chrysene	7.2	J
205-99-2	Benzo(b)fluoranthene	14	
207-08-9	Benzo(k)fluoranthene	7.7	J
50-32-8	Benzo(a)pyrene	19	
53-70-3	Dibenz(a,h)anthracene	11	U
191-24-2	Benzo(g,h,i)perylene	17	
193-39-5	Indeno(1,2,3-cd)pyrene	15	

## PAH ORGANIC ANALYSIS DATA SHEET

Lab Name: PEL Laboratories, Inc. Contract: Whiting Fld EPA Sample No. 2701S080701  
 Lab Code: PEL Case No. \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 2108033  
 Matrix: SOIL Lab Sample ID 210803309 Lab File ID 33-9.D  
 Sample wt/vol: 33.03 Units: G Date Received: 08/08/01  
 Concentrated Extract Volume: 1 Date Extracted: 08/14/01  
 Level:(low/med) LOW Date Analyzed: 08/15/01 Time: 2251  
 PercentSolids: 90 decanted: \_\_\_\_\_ Dilution Factor: 1  
 Extraction: SONC Station ID 16SO2701 Method: 8310  
 GPC Cleanup : ( Y/N ) N pH: \_\_\_\_\_  
 Column: Vydac 201TP54 ID: 4.6 (mm)

CONCENTRATION UNITS: ug/Kg

CAS NO.	ANALYTE	RESULT	Q
91-20-3	Naphthalene	11	U
208-96-8	Acenaphthylene	11	U
90-12-0	1-Methylnaphthalene	14	J
91-57-6	2-Methylnaphthalene	154	
83-32-9	Acenaphthene	532	
86-73-7	Fluorene	11	U
85-01-8	Phenanthrene	59	
120-12-7	Anthracene	60	
206-44-0	Fluoranthene	236	
129-00-0	Pyrene	128	
56-55-3	Benzo(a)anthracene	156	
218-01-9	Chrysene	227	
205-99-2	Benzo(b)fluoranthene	291	
207-08-9	Benzo(k)fluoranthene	143	
50-32-8	Benzo(a)pyrene	275	
53-70-3	Dibenz(a,h)anthracene	9.8	J
191-24-2	Benzo(g,h,i)perylene	291	
193-39-5	Indeno(1,2,3-cd)pyrene	343	







**CH2MHILL**  
Constructors, Inc.

115 Perimeter Center Place, Suite 700  
Atlanta, GA 30346-1278  
Tel No: (770) 804-8182  
Fax No: (770) 804-9182

# CHAIN-OF-CUSTODY RECORD

COC NUMBER:

151168-010807-01

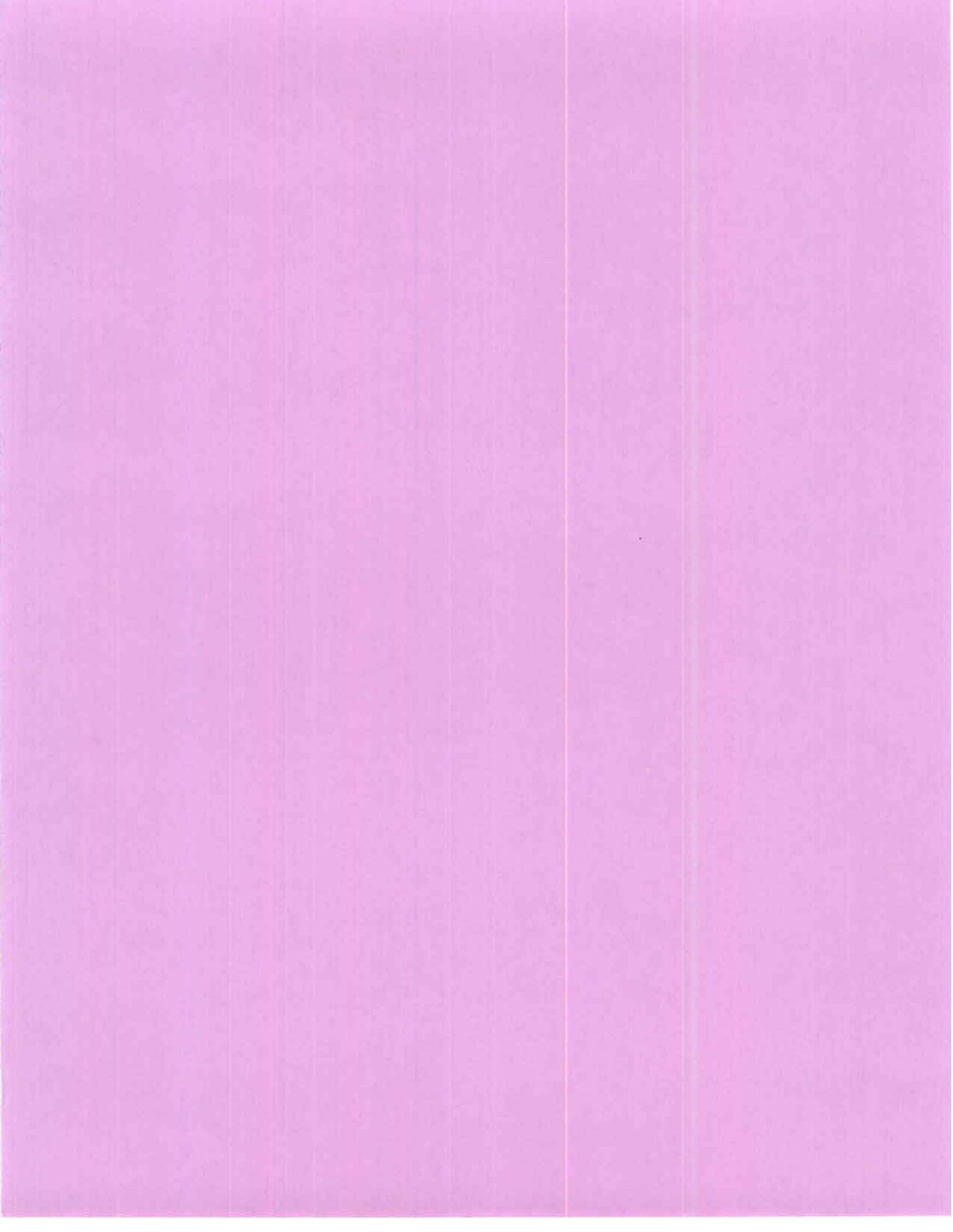
2108-033

T NAME:	PROJECT NUMBER:	LAB NAME AND CONTACT:	FAX AND MAIL REPORTS/EDD TO: RECIPIENT 1 (Name and Company):	RECIPIENT 1 (Address, Tel No., and Fax No.):
Hitting Field	151168	PEL Laboratories, 4420 Pendola Point Rd. Tampa, FL 33619	Amy Twitty	1766 Sea Lark Lane, Navarre, FL 32566 850-939-8300 (phone), 850-939-0035 (fax)
T PHASE/SITE/TASK:	CTO OR DO NUMBER:	LAB PO NUMBER:	FAX AND MAIL REPORTS/EDD TO: RECIPIENT 2 (Name and Company):	RECIPIENT 2 (Address, Tel No., and Fax No.):
	CTO-0011		Jeff Willmoth, CH2M Hill, Constructors, Inc.	115 Perimeter Center Place, NE, Suite 700, Atlanta, Ga. 30346 Phone-770-604-9182 Fax-770.604.9181
T CONTACT:	PROJECT TEL NO AND FAX NO:	LAB TEL NO AND FAX NO:	FAX AND MAIL REPORTS/EDD TO: RECIPIENT 3 (Name and Company):	RECIPIENT 3 (Address, Tel No., and Fax No.):
twitty	850-989-8300 ext 17	(813) 247-2805 phone (813) 248-1537 fax	Lisa Schwan	115 Perimeter Center Place, NE, Suite 700, Atlanta, Ga. 30346 Phone-770-604-9182 Fax-770.604.9181

SAMPLE IDENTIFIER	SAMPLE DESCRIPTION/LOCATION	MATRIX (see codes on SOP)	DATE COLLECTED	TIME COLLECTED	DATA PKG LEVEL (see codes on SOP)	TAT (calendar days)	SW310	ANALYSES REQUIRED (Include Method Numbers)										SAMPLE TYPE (see codes on SOP)	COMMENTS/ SCREENING READINGS	LAB ID (for lab's use)					
								1	2	3	4	5	6	7	8	9	10				11	12			
011-16-1801-S-0807-01	16SO1801	S	08/07/01	15:25	III	H	X															N	0-2'; Hold analysis		
011-16-1901-S-0807-01	16SO1901	S	08/07/01	13:00	III	H	X																N	0-2'; Hold analysis	
011-16-2001-S-0807-01	16SO2001	S	08/07/01	10:05	III	H	X																N	0-2'; Hold analysis	
011-16-2101-S-08076-01	16SO2101	S	08/07/01	11:15	III	H	X																N	0-2'; Hold analysis	
011-16-2201-S-0876-01	16SO2201	S	08/07/01	11:05	III	H	X																N	0-2'; Hold analysis	
011-16-2301-S-0876-01	16SO2301	S	08/07/01	10:30	III	H	X																N	0-2'; Hold analysis	
011-16-2401-S-0807-01	16SO2401	S	08/07/01	14:05	III	H	X																N	0-2'; Hold analysis	
011-16-2501-S-0807-01	16SO2501	S	08/07/01	15:15	III	H	X																N	0-2'; Hold analysis	
011-16-2601-S-0807-01	16SO2601	S	08/07/01	14:15	III	H	X																N	0-2'; Hold analysis	
011-16-2701-S-0807-01	16SO2701	S	08/07/01	13:50	III	H	X																N	0-2'; Hold analysis MS/MSD	(09)

RELINQUISHED BY (Name and Signature): Dunbar, CH2M Hill Constructors, Inc.	CARRIER AND SHIPPING NUMBER: Fed-Ex Air Bill No. 829354381619	SAMPLES TEMPERATURE AND CONDITION UPON RECEIPT (for lab's use):
---	--	---

RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME
(Name and Signature)	8-7-01	1800	(Printed Name and Signature) Fed-Ex		
(Name and Signature) Fed Ex			(Printed Name and Signature) M. Kuley	8/8/01	10:20



## Data Validation Qualifier Code Glossary

- J** - The positive result reported for this analyte is a quantitative estimate.
- U** - This analyte was not detected in the sample. The numeric value represents the sample quantitation/detection limit.
- UJ** - This analyte was not detected in the sample. The actual quantitation/detection limit may be higher than reported.
- N** - This analyte has been "tentatively" identified. The numeric value represents its approximate concentration.
- Y** - This analyte coelutes with another target compound on the two chromatographic columns used for analysis.
- R** - The result for this analyte is unreliable. Additional data is needed to confirm or disprove the presence of this compound/analyte in the sample.

### Other Codes:

- ND** - There were no positive results for this analytical fraction.
- NA** - This parameter is not applicable to this sample.
- NR** - This analysis parameter was not required for this sample.

Table 1-1 Samples For Data Validation Review  
 NAS Whiting Field (CTO-11)  
 Sites 6, 16 & 38  
 August 2001 Sampling  
 PEL Laboratories Sample Delivery Group 2108134

SAMPLE I.D.	LABORATORY I.D.	DATE COLLECTED	MATRIX	ANALYSES PERFORMED
				PAH
-2401-S-0807-	210813401	8/7/01	Soil	X
-2501-S-0807-	210813402	8/7/01	Soil	X
-2601-S-0807-	210813403	8/7/01	Soil	X
-3201-S-0807-	210813404	8/7/01	Soil	X
-3301-S-0807-	210813405	8/7/01	Soil	X

PAH Polynuclear Aromatic Hydrocarbons



Approved for Quality Assurance Release by:  
 Rev. 0 Date 11/15/01  
*P. Cristillo*

**Project:** NAS Whiting Field (CTO-11)  
**Laboratory:** PEL Laboratories, Inc., Tampa, Florida  
**Sample Delivery Group:** 2108134  
**Matrix:** Solid  
**Report Date:** 10/31/2001

This analytical quality assurance report is based upon a review of analytical data generated for soil samples. The sample locations, laboratory identification numbers, sample collection dates, sample matrix, and analyses performed are presented in Table 1.

The samples were analyzed for polynuclear aromatic hydrocarbons. The sample analyses were performed in accordance with the procedures outlined in "Test Methods for Evaluating Solid Wastes", SW-846, third edition, Promulgated Updates II, IIA, and III, June 1997.

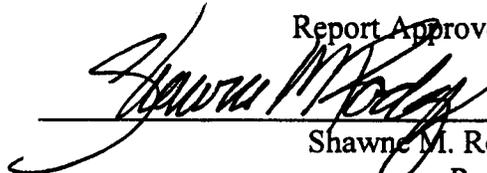
All sample analyses have undergone an analytical quality assurance review to ensure adherence to the required protocols. Results have been validated or qualified according to general guidance provided in the Region IV modifications to "Laboratory Data Validation Functional Guidelines for Validating Organic Analyses", USEPA 9/94. This document specifies procedures for validating data generated for CLP analyses. Therefore, the quality control requirements specified in the methods and associated acceptance criteria were also used to evaluate the non-CLP data. The parameters presented on the following page were evaluated.

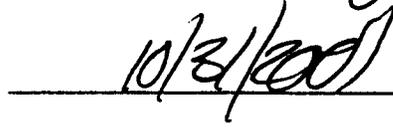
- 
- X • Data Completeness
  - X • Chain of Custody Documentation
  - X • Holding Times
  - X • Instrument Performance
  - X • Initial and Continuing Calibrations
  - X • Laboratory and Field Blank Analysis Results
  - X • Surrogate Compound Recoveries
  - X • Matrix Spike/Matrix Spike Duplicate Recoveries and Reproducibility
    - Field Duplicate Analysis Results
  - X • Laboratory Control Sample Results
  - X • Internal Standard Performance
  - X • Qualitative Identification
  - X • Reporting Limits
- 

X - Denotes parameter evaluated.

It is recommended that the data only be used according to the qualifiers presented, and discussed in this report. All other data should be considered qualitatively and quantitatively valid as reported by the laboratory, based on the items evaluated.

Report Approved By:

  
\_\_\_\_\_  
Shawne M. Rodgers  
President

  
\_\_\_\_\_  
Date

**1.0 DATA COMPLETENESS**

**2.0 CHAIN OF CUSTODY DOCUMENTATION**

All chain of custody documentation was complete.

**3.0 HOLDING TIMES**

All holding times were met.

**4.0 INITIAL AND CONTINUING CALIBRATIONS**

All criteria were met. No qualifiers were applied.

**5.0 LABORATORY AND FIELD BLANK ANALYSIS RESULTS**

All criteria were met. No qualifiers were applied.

**6.0 SURROGATE COMPOUNDS**

All criteria were met. No qualifiers were applied.

**7.0 MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERIES AND REPRODUCIBILITY**

All criteria were met. No qualifiers were applied.

**8.0 FIELD DUPLICATE RESULTS**

All criteria were met. No qualifiers were applied.

**9.0            *LABORATORY CONTROL SAMPLE RESULTS***

All criteria were met. No qualifiers were applied.

**10.0          *INTERNAL STANDARD PERFORMANCE***

All criteria were met. No qualifiers were applied.

**11.0          *REPORTING LIMITS***

As required by USEPA protocol, all compounds, which were qualitatively identified at concentrations below their respective Quantitation Limits (QLs), have been marked with "J" qualifiers to indicate that they are quantitative estimates.

**METHODOLOGY REFERENCES**

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Analysis	Reference
Polynuclear Aromatic Hydrocarbons	Method 8310, "Test Methods for Evaluating Solid Wastes", SW-846, third edition, Promulgated Updates II, IIA, and III, June 1997

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## PAH ORGANIC ANALYSIS DATA SHEET

EPA Sample No. **011-16-2401-S-0807-**

Lab Name: PEL Laboratories, Inc. Contract: Whiting Fld

Lab Code: PEL Case No. \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 2108134

Matrix: SOIL Lab Sample ID 210813401 Lab File ID 134-1.D

Sample wt/vol: 33.1 Units: G Date Received: 08/08/01

Concentrated Extract Volume: 1 Date Extracted: 08/21/01

Level:(low/med) LOW Date Analyzed: 08/22/01 Time: 0300

Percent Solids: 80 decanted: \_\_\_\_\_ Dilution Factor: 1

Extraction: SONC Station ID 16SO02401 Method: 8310

GPC Cleanup: (Y/N) N pH: \_\_\_\_\_

Column: Vydac 201TP54 ID: 4.6 (mm)

CONCENTRATION UNITS: ug/Kg

CAS NO.	ANALYTE	RESULT	Q
91-20-3	Naphthalene	7.6	U
208-96-8	Acenaphthylene	7.6	U
90-12-0	1-Methylnaphthalene	41	
91-57-6	2-Methylnaphthalene	10	U
83-32-9	Acenaphthene	7.6	U
86-73-7	Fluorene	7.6	U
85-01-8	Phenanthrene	14	
120-12-7	Anthracene	7.6	U
206-44-0	Fluoranthene	39	
129-00-0	Pyrene	20	
56-55-3	Benzo(a)anthracene	36	
218-01-9	Chrysene	42	
205-99-2	Benzo(b)fluoranthene	60	
207-08-9	Benzo(k)fluoranthene	20	
50-32-8	Benzo(a)pyrene	57	
53-70-3	Dibenz(a,h)anthracene	7.6	U
191-24-2	Benzo(g,h,i)perylene	50	
193-39-5	Indeno(1,2,3-cd)pyrene	48	

SMP  
10/31/001

## PAH ORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL Laboratories, Inc. Contract: Whiting Fld 011-16-2501-S-0807-  
 Lab Code: PEL Case No. \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: 2108134  
 Matrix: SOIL Lab Sample ID 210813402 Lab File ID 134-2.D  
 Sample wt/vol: 34 Units: G Date Received: 08/08/01  
 Concentrated Extract Volume: 1 Date Extracted: 08/21/01  
 Level:(low/med) LOW Date Analyzed: 08/22/01 Time: 0335  
 PercentSolids: 84 decanted: \_\_\_\_\_ Dilution Factor: 1  
 Extraction: SONC Station ID 16SO02501 Method: 8310  
 GPC Cleanup : (Y/N) N pH: \_\_\_\_\_  
 Column: Vydac 201TP54 ID: 4.6 (mm)

CONCENTRATION UNITS: ug/Kg

CAS NO.	ANALYTE	RESULT	Q
91-20-3	Naphthalene	27	
208-96-8	Acenaphthylene	7	U
90-12-0	1-Methylnaphthalene	10	U
91-57-6	2-Methylnaphthalene	9.8	U
83-32-9	Acenaphthene	7	U
86-73-7	Fluorene	7	U
85-01-8	Phenanthrene	7	
120-12-7	Anthracene	7	U
206-44-0	Fluoranthene	<del>18</del>	
129-00-0	Pyrene	5.9	J
56-55-3	Benzo(a)anthracene	24	
218-01-9	Chrysene	25	
205-99-2	Benzo(b)fluoranthene	57	
207-08-9	Benzo(k)fluoranthene	26	
50-32-8	Benzo(a)pyrene	47	
53-70-3	Dibenz(a,h)anthracene	7	U
191-24-2	Benzo(g,h,i)perylene	74	
193-39-5	Indeno(1,2,3-cd)pyrene	<del>38</del>	

SM  
10/4/2001

PAH ORGANIC ANALYSIS DATA SHEET

Lab Name: PEL Laboratories, Inc. Contract: Whiting Fld EPA Sample No. 011-16-2601-S-0807-  
 Lab Code: PEL Case No. \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 2108134  
 Matrix: SOIL Lab Sample ID 210813403 Lab File ID: 134-3.D  
 Sample wt/vol: 33.4 Units: G Date Received: 08/08/01  
 Concentrated Extract Volume: 1 Date Extracted: 08/21/01  
 Level:(low/med) LOW Date Analyzed: 08/22/01 Time: 0409  
 PercentSolids: 84 decanted: \_\_\_\_\_ Dilution Factor: 1  
 Extraction: SONC Station ID 16S002501 Method: 8310  
 GPC Cleanup : ( Y/N ) N pH: \_\_\_\_\_  
 Column: Vydac 201TP54 ID: 4.6 (mm)

CONCENTRATION UNITS: ug/Kg

CAS NO.	ANALYTE	RESULT	Q
91-20-3	Naphthalene	7.1	U
208-96-8	Acenaphthylene	7.1	U
90-12-0	1-Methylnaphthalene	11	U
91-57-6	2-Methylnaphthalene	10	U
83-32-9	Acenaphthene	7.1	U
86-73-7	Fluorene	7.1	U
85-01-8	Phenanthrene	34	
120-12-7	Anthracene	7.1	U
206-44-0	Fluoranthene	<del>169</del> 169	
129-00-0	Pyrene	93	
56-55-3	Benzo(a)anthracene	185	
218-01-9	Chrysene	159	
205-99-2	Benzo(b)fluoranthene	226	
207-08-9	Benzo(k)fluoranthene	102	
50-32-8	Benzo(a)pyrene	217	
53-70-3	Dibenz(a,h)anthracene	7.1	U
191-24-2	Benzo(g,h,i)perylene	214	
193-39-5	Indeno(1,2,3-cd)pyrene	<del>199</del> 189	

*SML*  
*10/21/2001*

## PAH ORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL Laboratories, Inc. Contract: Whiting Fld 011-16-3201-S-0807-  
 Lab Code: PEL Case No. \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 2108134  
 Matrix: SOIL Lab Sample ID 210813404 Lab File ID 134-4.D  
 Sample wt/vol: 34.1 Units: G Date Received: 08/08/01  
 Concentrated Extract Volume: 1 Date Extracted: 08/21/01  
 Level:(low/med) LOW Date Analyzed: 08/22/01 Time: 0444  
 PercentSolids: 83 decanted: \_\_\_\_\_ Dilution Factor: 1  
 Extraction: SONC Station ID 16SO03201 Method: 8310  
 GPC Cleanup : ( Y/N ) N pH: \_\_\_\_\_  
 Column: Vydac 201TP54 ID: 4.6 (mm)

CONCENTRATION UNITS: ug/Kg

CAS NO.	ANALYTE	RESULT	Q
91-20-3	Naphthalene	7.1	U
208-96-8	Acenaphthylene	7.1	U
90-12-0	1-Methylnaphthalene	11	U
91-57-6	2-Methylnaphthalene	9.9	U
83-32-9	Acenaphthene	7.1	U
86-73-7	Fluorene	7.1	U
85-01-8	Phenanthrene	4.9	J
120-12-7	Anthracene	7.1	U
206-44-0	Fluoranthene	<del>12</del>	
129-00-0	Pyrene	5.3	J
56-55-3	Benzo(a)anthracene	18	
218-01-9	Chrysene	9.3	
205-99-2	Benzo(b)fluoranthene	8.4	
207-08-9	Benzo(k)fluoranthene	7.1	U
50-32-8	Benzo(a)pyrene	7.1	U
53-70-3	Dibenz(a,h)anthracene	7.1	U
191-24-2	Benzo(g,h,i)perylene	7.1	U
193-39-5	Indeno(1,2,3-cd)pyrene	<del>11</del>	

SMK  
10/31/2001

PAH ORGANIC ANALYSIS DATA SHEET

Lab Name: PEL Laboratories, Inc. Contract: Whiting Fld EPA Sample No. 011-16-3301-S-0807-  
 Lab Code: PEL Case No. \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 2108134  
 Matrix: SOIL Lab Sample ID 210813405 Lab File ID 134-5.D  
 Sample wt/vol: 33.4 Units: G Date Received: 08/08/01  
 Concentrated Extract Volume: 1 Date Extracted: 08/21/01  
 Level:(low/med) LOW Date Analyzed: 08/22/01 Time: 0518  
 PercentSolids: 82 decanted: \_\_\_\_\_ Dilution Factor: 1  
 Extraction: SONC Station ID 16SO03301 Method: 8310  
 GPC Cleanup: ( Y/N ) N pH: \_\_\_\_\_  
 Column: Vydac 201TP54 ID: 4.6 (mm)

CONCENTRATION UNITS: ug/Kg

CAS NO.	ANALYTE	RESULT	Q
91-20-3	Naphthalene	7.3	U
208-96-8	Acenaphthylene	7.3	U
90-12-0	1-Methylnaphthalene	11	U
91-57-6	2-Methylnaphthalene	10	U
83-32-9	Acenaphthene	7.3	U
86-73-7	Fluorene	7.3	U
85-01-8	Phenanthrene	7.3	U
120-12-7	Anthracene	7.3	U
206-44-0	Fluoranthene	<del>11</del>	
129-00-0	Pyrene	24	
56-55-3	Benzo(a)anthracene	14	
218-01-9	Chrysene	6.3	J
205-99-2	Benzo(b)fluoranthene	7	J
207-08-9	Benzo(k)fluoranthene	7.3	U
50-32-8	Benzo(a)pyrene	7.3	U
53-70-3	Dibenz(a,h)anthracene	7.3	U
191-24-2	Benzo(g,h,i)perylene	14	
193-39-5	Indeno(1,2,3-cd)pyrene	<del>8.1</del>	

*Handwritten:* S.M.N. 10/23/2001



## Data Validation Qualifier Code Glossary

- J - The positive result reported for this analyte is a quantitative estimate.**
- U - This analyte was not detected in the sample. The numeric value represents the sample quantitation/detection limit.**
- UJ - This analyte was not detected in the sample. The actual quantitation/detection limit may be higher than reported.**
- N - This analyte has been "tentatively" identified. The numeric value represents its approximate concentration.**
- Y - This analyte coelutes with another target compound on the two chromatographic columns used for analysis.**
- R - The result for this analyte is unreliable. Additional data is needed to confirm or disprove the presence of this compound/analyte in the sample.**

### Other Codes:

- ND - There were no positive results for this analytical fraction.**
- NA - This parameter is not applicable to this sample.**
- NR - This analysis parameter was not required for this sample.**

**ATTACHMENT C**  
**Survey Data**

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**NAS WHITING FIELD  
SITE-16  
SOIL SAMPLE 16S00601**

**Project No. 151168.16.01.03.01  
Field Surveys March 21, 2001**

**Note:** Horizontal Datum is NAD (North American Datum) 83 (1990) SPC Fl. N. US Survey Ft..

Vertical Datum is NAVD (North American Vertical Datum) 88.

<b>Description</b>	<b>North Coord.</b>	<b>East Coord.</b>	<b>Elevation</b>
<u>Survey Control Points:</u>			
30 (PK & Washer)	627131.17	1174297.41	87.54
50 (Re Bar & Cap)	626383.99	1173959.44	53.52
51 (1X2 Stake <b>16S00600</b> )	626316.07	1173772.72	50.17

Grid Points:

1801	626353.2	1173734.7	51.5
1901	626353.3	1173759.9	51.3
2001	626350.9	1173784.9	51.5
2101	626353.8	1173809.9	51.4
2201	626329.1	1173809.9	52.0
2301	626328.6	1173784.9	50.6
2401	626328.6	1173759.9	51.7
2501	626328.1	1173735.1	52.1
2601	626303.2	1173735.3	51.9
2701	626303.1	1173760.0	53.1
2801	626303.9	1173785.3	52.2
2901	626303.8	1173810.4	51.8
3001	626279.0	1173810.5	51.0
3101	626278.9	1173785.7	50.6
3201	626278.5	1173760.6	50.4
3301	626278.0	1173735.3	50.7
3401	626320.9	1173767.8	50.9
3501	626321.2	1173777.7	50.3
3601	626311.2	1173777.7	50.9
3701	626311.0	1173767.8	51.7