



UNITED STATES AIR FORCE

**GRIFFISS AIR FORCE BASE
NEW YORK**

**SOIL SAMPLING ALONG JET
FUEL TRANSFER PIPELINE**

Prepared For:
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Environmental Management Branch
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SOIL SAMPLING ALONG JET FUEL TRANSFER PIPELINE

1.0 INTRODUCTION

As part of Griffiss Air Force Base's Interim Removal Action Design Program five soil borings were drilled and sampled adjacent to the Building No. 110 Jet Fuel Transfer Pipeline on October 27, 1992. The soil boring locations were drilled and sampled to monitor for possible fuels related soil contamination which may have occurred along this pipeline. The boring locations were selected based on elevated volatile compounds detected during a soil gas survey performed by Tracer Research in November of 1991.

At the request of the New York State Department of Environmental Conservation (NYSDEC), the five borings were continuously sampled from the ground surface to a depth below the invert of the abandoned pipeline (the pipeline invert is estimated to be at depths of 7-9 feet throughout its length). One sample from each borehole was chosen for chemical analysis, based on head space screening. The samples were submitted to Princeton Analytical Laboratories of Princeton, New Jersey for chemical testing.

The objective of the soil sampling program was to ascertain if petroleum contaminated soils were present in these areas and if the soils could potentially leach petroleum constituents to ground water. This was accomplished by visual examination of the soil samples, head space screening and eventual chemical analysis.

2.0 METHODS OF INVESTIGATION

The soil borings were positioned along the pipeline as close as possible to the locations of the five highest elevated soil gas results. The borings were located by the reestablishment of the previously surveyed soil gas probe points along the abandoned pipeline. In addition, personnel from the Griffiss Air Force Base Department of Liquid Fuels located the abandoned pipeline using an electronic pipe locating device.

2.1 Soil Test Borings

Soil borings were completed at five locations adjacent to the pipeline (Figure 1). Continuous split spoon soil samples were collected through the entire depth of each boring. Soil Borings A through E correspond to soil gas locations SG-7, SG-10, SG-16, SG-18 and SG-21, respectively. Soil Borings A through D were sampled to a total depth of 12 feet below the ground surface using a truck mounted drilling rig. At Soil Boring E, a portable tripod derrick and motorized cathead hoist was used. Soil Boring E was sample to a total depth of 10-feet below ground surface. Two inch split spoon samples were collected in accordance with ASTM 1584D except that the split spoons were driven 24-inches instead of 18-inches.

Detailed sample descriptions were made at each borehole and recorded on Corps standard HTW field boring logs. These descriptions include penetration resistance, amount of sample recovered and a geologic description of the density, grain size, texture, and moisture content of the sample. In addition, notations were made of any observed odor, sheen or staining. Final boring logs were completed based on the field results. Both field and final logs were contained in Appendix A.

As the boring was being sampled, duplicate soil samples were retained. One set was placed in glass laboratory jars and kept on ice to await the field screening results. The other sample split was placed in glass jars sealed with aluminum foil and were later tested with a Hnu photo-ionization organic vapor analyzer for head space screening. The Hnu was calibrated to a 100 part per million isobutylene in air standard prior to use.

The results of the head space screening were used to select soil samples for chemical analysis. The sample from each soil boring with the highest head space reading or the interval closest to the base of the pipeline was selected and submitted for laboratory analysis.

3.0 RESULTS OF INVESTIGATION

The five test borings were completed on October 27, 1992. The borings were advanced to twelve feet below ground surface except at Soil Boring E which was drilled to 10 feet below

ground surface. The distances between boreholes was approximately 180 feet to 500 feet apart. The boreholes penetrated fill and glacial outwash material. Directly beneath the ground surface at each location is a disturbed fill which was 0 to 6 feet in thickness (Appendix A, Soil Test Borings). Below the fill are native glacial deposits. The deposits range in grain size from a fine sand and silt at soil borings A, B, and D, to a medium to coarse sand found at soil borings C and E. The medium to coarse sands are believed to be glacial-fluvial deposits which may have eroded through preexisting lacustrine fine sand and silt.

No visual indication of petroleum contamination was observed in the soil samples. However, head space screening of the samples indicated low levels of volatile organic compounds in the soils at locations tested (Table 1). The highest head space reading of 4.0 PPM was detected in the 4 to 6-foot sample at Soil Boring B. Head space readings ranging from .2 ppm to 1.0 ppm were detected at other sample intervals from Soil Boring B. One other elevated head space reading of .2 ppm was detected at the 6 to 8 foot interval at Soil Boring C.

Evidence of groundwater was noted on boring logs when soil conditions changed from unsaturated to saturated while soil sampling. In addition, the water level in the hollow stem augers was measured at each location following the completion of soil sampling and prior to grouting of the borehole.

Ground water was encountered from 6 to 8 feet below ground surface at Soil Borings B through E. It was not encountered at Soil Boring A which was terminated at a depth of 12 feet.

4.0 ANALYTICAL RESULTS

Soil samples collected from along the abandoned pipeline at Griffiss Air Force Base were submitted to Princeton Analytical Laboratories for analysis. The TCLP extract of the samples were analyzed by gas chromatographic Method 8021 and by the gas chromatographic/mass spectrometer Method 8270. For ground-water protection from petroleum contaminated soils the NYSDEC applies the TCLP method to simulate the potential for petroleum contaminated soil to leach contaminants to ground-water.

TCLP analytical results indicate that concentrations of volatile organic compounds (8021) were above the practical detection limit of .5 ug/l in each of the soil samples submitted (Table 2). Specifically, Benzene ranging in concentration of 1.1 to 3.3 ug/l, Toluene in concentrations of 1.6 to 5.0 ug/l, ethylbenzene in concentrations of 2.8 to 17.9 ug/l, and xylenes in concentrations of 5.0 to 23.0 ug/l were consistently detected in the TCLP extract. No semi volatile compounds were detected above the practical detection limit of 10 ug/l.

At the Soil Borings A through E, BTEX constituents were detected above the NYSDEC Ground-Water Quality Standards (Table 2). In addition 1,2,4-trimethylbenzene was detected above NYSDEC Ground-Water Quality Standards in the 6 to 8 foot sample at Soil Boring D.

TABLES

TABLE 1

HEAD SPACE SCREENING RESULTS
 SOIL SAMPLING ALONG JET FUEL TANSFER PIPELINE
 GRIFFISS AIR FORCE BASE

HEAD SPACE READING (ppm)					
<u>DEPTH (ft)</u>	<u>BORING A</u>	<u>BORING B</u>	<u>BORING C</u>	<u>BORING D</u>	<u>BORING E</u>
0-2'	0 ppm	.5 ppm	0 ppm	0ppm	0 ppm
2-4'	0 ppm	1.0 ppm	0 ppm	0 ppm	0 ppm
4-6'	NR	4* ppm	0 ppm	0 ppm	0 ppm
6-8'	0* ppm	.4 ppm	.2* ppm	0 ppm	0 ppm
8-10'	0 ppm	.2 ppm	0 ppm	0 ppm	0 ppm
10-12'	0 ppm	NR	.2 ppm	0 ppm	---

NOTES:

NR : No recovery in split spoon sampler

* : Split sample submitted for chemical analysis to Princeton Analytical Laboratories

NOTES:

The HNu detects photo-ionizable organic compounds and is calibrated to a benzene standard. The HNu was calibration checkd just prior to head space screening.

TABLE 2

**SUMMARY OF ANALYTICAL RESULTS
ALONG JET FULE TRANSFER PIPELINE
GRIFFISS AIR FORCE BASE**

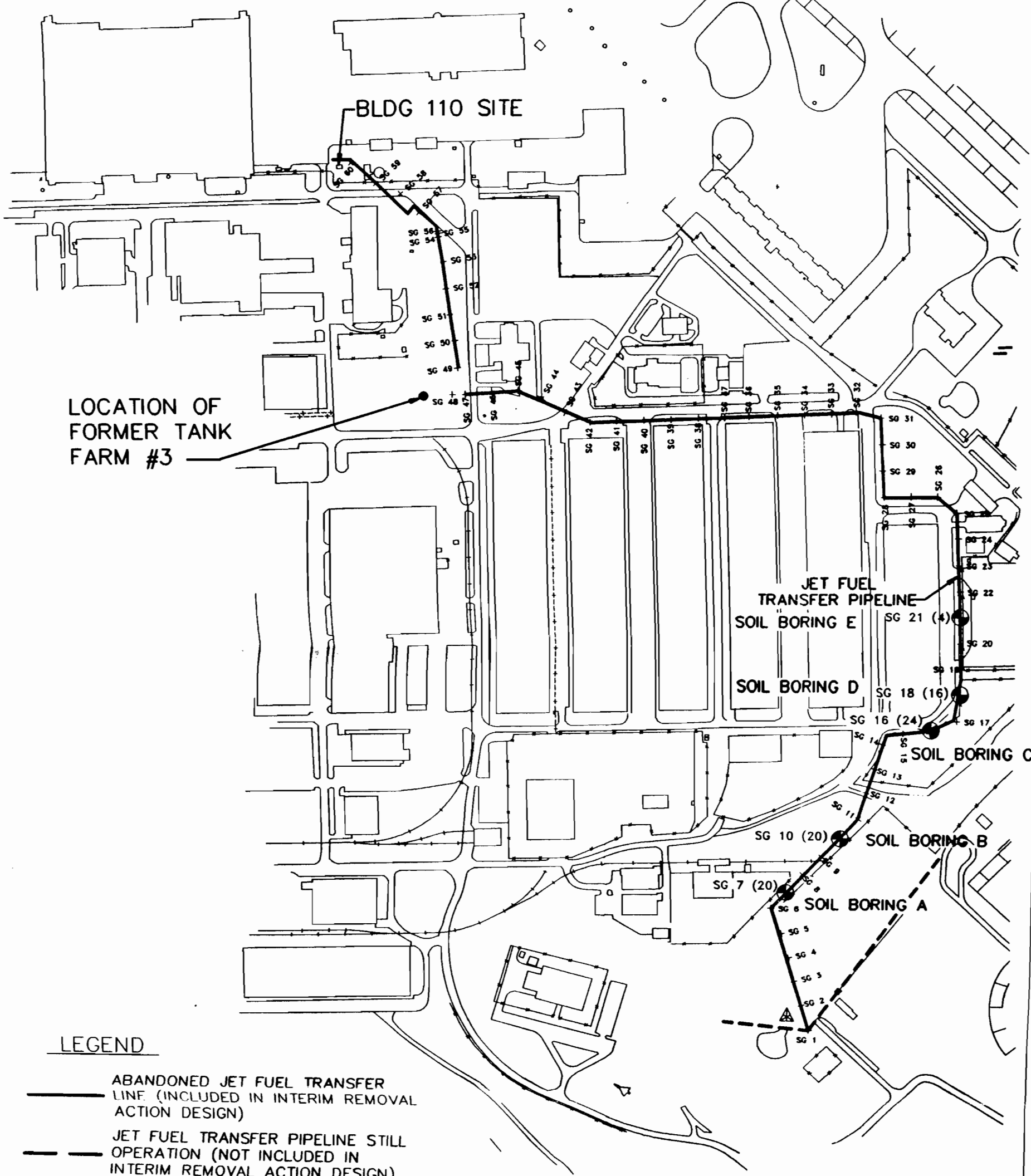
RESULTS REPORTED IN ug/l

	NYSDEC GROUND WATER QUALITY STANDARD	RESULTS REPORTED IN ug/l					TRIP BLANK
		A 6-8	B 4-6	C 6-8	D 6-8	E 6-8	
8021 ANALYSIS							
BENZENE	.7	3.3	1.1	2.3	2.1	2.3	<.5
ETHYBENZENE	5.0	17.9	2.8	7.2	6.5	<.5	<.5
TOLUENE	5.0	3.4	1.9	3.6	5.0	1.6	<.5
O-XYLENE	5.0	10.3	1.7	5.3	4.8	2.9	<.5
M, P-XYLENE	5.0	12.7	4.1	9.7	12.0	2.6	<.5
TOTAL XYLENES	5.0	23.0	5.8	15.0	16.8	5.5	<.5
ISOPROPYLBENZENE	5.0	<.5	<.5	<.5		<.5	<.5
N-PROPYLBENZENE	5.0	<.5	<.5	<.5		<.5	<.5
P-ISOPROPYLTOLUENE	5.0	<.5	<.5	<.5		<.5	<.5
1,2,4 TRIMETHYLBENZENE	5.0	<.5	1.0	<.5	6.9	3.0	<.5
1,3,5 TRIMETHYLBENZENE	5.0	<.5	<.5	<.5	<.5	<.5	<.5
N-BUTYLBENZENE	5.0	<.5	<.5	<.5	<.5	<.5	<.5
SEC-BUTYLBENZENE	5.0	<.5	<.5	<.5	<.5	<.5	<.5
T-BUTYLBENZENE	5.0	<.5	<.5	<.5	<.5	<.5	<.5
NAPHTALENE	10	<.5	<.5	<.5	<.5	<.5	<.5
METHYL-T-BUTYLTER	50	<.5	<.5	<.5	<.5	<.5	<.5
8270 ANALYSIS							
	50	<10.	<10.	<10.	<10.	<10.	
ANTHRACENE	50	<10.	<10.	<10.	<10.	<10.	
FLOURENE	50	<10.	<10.	<10.	<10.	<10.	
PYRENE	20	<10.	<10.	<10.	<10.	<10.	
ACENAPATHENE	.002	<10.	<10.	<10.	<10.	<10.	
BENZO(a)ANTHRACENE	50	<10.	<10.	<10.	<10.	<10.	
FLOURANTHENE	.002	<10.	<10.	<10.	<10.	<10.	
BENZO(b)FLOURANTHENE	.002	<10.	<10.	<10.	<10.	<10.	
BENZO(k)FLOURANTHENE	.002	<10.	<10.	<10.	<10.	<10.	
CHRYSENE	.002	<10.	<10.	<10.	<10.	<10.	
BENZO(a)PYRENE	.002	<10.	<10.	<10.	<10.	<10.	
INDENO(1,2,3,cd)PYRENE	50	<10.	<10.	<10.	<10.	<10.	
DIBENZ(a,h)ANTHRACENE							

FIGURES

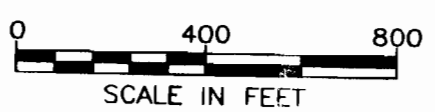
FIGURE 1
 SOIL BORING LOCATIONS ALONG JET
 FUEL TRANSFER PIPELINE SITE TO SUPPLEMENT
 SOIL GAS SURVEY INVESTIGATION

GRIFFISS AFB ROME, NEW YORK



LEGEND

- ABANDONED JET FUEL TRANSFER LINE (INCLUDED IN INTERIM REMOVAL ACTION DESIGN)
- - - JET FUEL TRANSFER PIPELINE STILL OPERATION (NOT INCLUDED IN INTERIM REMOVAL ACTION DESIGN)
- SOIL BORING LOCATION
- + SG 3 SOIL GAS SURVEY POINT LOCATION
- (20) DEPICTED RESULTS ARE THE MEASURED VALUES ABOVE NON-DETECT REPRESENTING C4-C9 TOTAL VOLATILE COMPOUNDS, (UNITS EXPRESSED IN $\mu\text{g/L}$)



NOTE:
 ABANDONED JET FUEL TRANSFER PIPELINE IS APPROXIMATELY 5600 ft. IN LENGTH.

SOURCE:
 GRIFFISS AFB COMPREHENSIVE BASE MAP FURNISHED BY GRIFFISS AFB.

APPENDIX A

SOIL TEST BORINGS

**TEST BORING RECORD
SOIL BORING A**

ELEVATION (FEET)	DEPTH (FEET)	DESCRIPTION	WELL DIAGRAM	PENETRATION-BLOWS PER FOOT																		
				0	5	10	15	20	40	60	80	100										
		Loose, Brown Topsoil (0-.5')																				
		Loose red brown Fine Sand, dry																				
	6.0																					
		Loose, tan to light brown very well sorted Fine Sand, little silt, fine laminations, occasional beds of silt and medium sand, dry																				
	11.5																					
	12.0	Loose, brown medium to coarse Sand, dry End of Boring																				

REMARKS:
Soil Boring Grouted to surface

DRILLED BY	Parratt-W.	BORING NUMBER	11-1564A
LOGGED BY	ADM	DATE STARTED	10/27/92
CHECKED BY	MB	DATE COMPLETED	10/27/92
		JOB NUMBER	11-1564.29



**TEST BORING RECORD
SOIL BORING C**

ELEVATION (FEET)	DEPTH (FEET)	DESCRIPTION	WELL DIAGRAM	PENETRATION-BLOWS PER FOOT
	2.0	Loose, brown Silt, Sand and Gravel, Fill, dry		62
		Loose, orange brown fine Sand, Fill, dry		24
	5.0	Firm, grey Silt, Sand and trace Clay, moist		10
	6.0	Dense, brown and grey fine to medium Sand and well rounded fine to medium gravel, moist		23
	10.0	Loose to firm, brown well sorted coarse to med Sand and well rounded medium gravel, trace silt, wet		31
	12.0	End of Boring	25	

REMARKS:
Soil boring grouted to surface. Refusal at 4',
move boring approximately 4'.

DRILLED BY	Parratt-W.	BORING NUMBER	11-1564C
LOGGED BY	ADM	DATE STARTED	10/27/92
CHECKED BY	MB	DATE COMPLETED	10/27/92
		JOB NUMBER	11-1564.29



**TEST BORING RECORD
SOIL BORING D**

ELEVATION (FEET)	DEPTH (FEET)	DESCRIPTION	WELL DIAGRAM	PENETRATION-BLOWS PER FOOT												
				0	5	10	15	20	40	60	80	100				
		Loose to firm, brown fine to medium Sand and angular Gravel, little silt, Fill dry to wet														
	7.0															
		Firm, grey Silt and fine Sand alternately bedded, occasional medium to coarse sand lamimia, moist to wet														
	9.5															
		Firm, brown well sorted fine to medium Sand, wet														
	12.0	End of Boring														

REMARKS:
Soil boring grouted to surface. Refusal at 4', move boring approximately 4'.

DRILLED BY	Parratt-W.	BORING NUMBER	11-1564D
LOGGED BY	ADM	DATE STARTED	10/27/92
CHECKED BY	MB	DATE COMPLETED	10/27/92
		JOB NUMBER	11-1564.29



TEST BORING RECORD SOIL BORING E

ELEVATION (FEET)	DEPTH (FEET)	DESCRIPTION	WELL DIAGRAM	PENETRATION-BLOWS PER FOOT											
				0	5	10	15	20	40	60	80	100			
	4.0	Loose to firm, brown Sand, Silt and Gravel													
		Loose Brown well sorted medium to coarse Sand, little well rounded medium to coarse Gravel, moist to wet													
	10.0	End of Boring													

REMARKS:
Tripod location, soil boring grouted to surface.

DRILLED BY	Parrett-W.	BORING NUMBER	11-1564E
LOGGED BY	ADM	DATE STARTED	10/27/92
CHECKED BY	MB	DATE COMPLETED	10/27/92
		JOB NUMBER	11-1564.29



FIGURE 7-7

HTW DRILLING LOG										HOLE No. Area - A	
1. COMPANY NAME Law Environmental Inc.					2. DRILLING SUBCONTRACTOR PARRAH-WULFF					SHEET 1 OF 2 SHEETS	
3. PROJECT Coffiss AFB Interim Removal Action Design							4. LOCATION Rome, NY.				
5. NAME OF DRILLER							6. MANUFACTURER'S DESIGNATION OF DRILL				
7. SIZE AND TYPES OF DRILLING AND SAMPLING EQUIPMENT			CME-35 Truck Mounted				8. HOLE LOCATION Near Soil gas point SG-7			9. SURFACE ELEVATION Approximately 475' ASL	
			2" Split spoons								
			12. OVERBURDEN THICKNESS			13. DEPTH DRILLED INTO ROCK			10. DATE STARTED 10/27/92		
14. TOTAL DEPTH OF HOLE 12 - Feet			15. DEPTH GROUNDWATER ENCOUNTERED NOT Encountered			16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED			17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)		
18. GEOTECHNICAL SAMPLES Split spoons (continuous)			DISTURBED		UNDISTURBED		19. TOTAL NUMBER OF CORE BOXES				
20. SAMPLES FOR CHEMICAL ANALYSIS Continuous splits 6-8' submitted			VOC 8021	METALS	OTHER (SPECIFY) Semi Vol 8270	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY		
22. DISPOSITION OF HOLE remic Grouted - to surface			BACKFILLED	MONITORING WELL	OTHER (SPECIFY) Head	23. SIGNATURE OF INSPECTOR <i>Antho D. Mustain</i>					
ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Spike SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h				
	1	Topsoil Lse, Red Brown Fine Sand	0 PPM			2,3,4,7	SW				
	2	17" Recovery Dry									
	3	Lse, Red Brown Fine Sand	0 PPM			7,6,7,8	SW				
	4	12" Recovery Dry									
	5	No Recovery, Pushing Stone	N.R.			10,12,13,16					
	6										
	7	Lse TAN - Light Brown very well sorted Fine Sand, Hl silt, Fine Laminations	0 PPM		Area A (6-8')	12,15,16,15	SW - SM				
	8	18" Recovery Dry									
	9	Lse TAN - Light Brown well sorted Fine Sand Fine Laminations,	0 PPM			11,12,13,14	SW - SM				
	10	18" Recovery Dry									

FIGURE 7-7 (CONTD)

HTW DRILLING LOG

HOLE No.
Area - A

PROJECT
Griffiss AFB Interim Removal Design *Action*

INSPECTOR
Anthony D. Murtanik

SHEET *2*
OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
	10	Use TARU - Light Red Brown well sorted fine sand occasional beds of silt and med. sand	OFFM			9, 12, 12, 12	SW
	11	med. sand @ 11.5'					
	12	Med-Coarse Sand Dry 24" Recovery					

FIGURE 7-7

HTW DRILLING LOG		HOLE No. Area - B
1. COMPANY NAME Law Environmental		2. DRILLING SUBCONTRACTOR Parratt - Wolff
3. PROJECT Gr-Fiss AFB Interim Removal Action Design		SHEET 1 OF SHEETS
5. NAME OF DRILLER		4. LOCATION Rome, NY
7. SIZE AND TYPES OF DRILLING AND SAMPLING EQUIPMENT CME-55 Truck Mounted 2" Split Spoons		8. HOLE LOCATION Near Soil gas point SG-10
		9. SURFACE ELEVATION Approximately 464'
12. OVERBURDEN THICKNESS		10. DATE STARTED 10/27/92
13. DEPTH DRILLED INTO ROCK		11. DATE COMPLETED 10/27/92
14. TOTAL DEPTH OF HOLE 12-Feet		15. DEPTH GROUNDWATER ENCOUNTERED Approximately 7.5 feet BGS
		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED
		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)

18. GEOTECHNICAL SAMPLES Continuous split Spoons	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES			
20. SAMPLES FOR CHEMICAL ANALYSIS Continuous splits 4-6 5 samples	VOC 8021	METALS	OTHER (SPECIFY) Semi Vol 8270	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
22. DISPOSITION OF HOLE Tiemie Grouted to Surface	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR C. M. Mustang		

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
	0	Frm, Brown - Dark Brown Silt, Fine Sand, gravel Fill Moist	.5 ppm			4,8,11,9	SM
	2	12" Recovery					
	3	Frm, Gray, Fine - Medium Sand, little coarse sand little silt Few gravel clasts Fill	1.0 ppm			6,21 17,13	SM
	4	15" Recovery Moist					
	5	Frm, Grey Fine Sand Fine - coarse gravel	4 ppm		Area B 4-6	11,7,4,5	SW
	6	12" Recovery moist					
w 27.5 ▽	7	Frm, grey Fine Sand, silt and clay beds	.4 ppm			3,2,2,2	SM/ML
	8	16" Recovery, Moist-Wet					
	9	Soft-Frm, grey Fine Sand, Silt, Clay	.2 ppm			4,5,3,4	SM/ML
	10	20" Recovery Wet					

FIGURE 7-7 (CONTD)

HTW DRILLING LOG

HOLE No.
Area B

PROJECT
Coffin AFE Interim Removal Action Design

INSPECTOR
Anthony Murtzugh

SHEET # 2
OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
	10	Lse grey coarse Sand, Poor Recovery, sat.	N/R			33, 4,3	SW
	11						
	12						

HTW DRILLING LOG							HOLE NO. AREA C	
1. COMPANY NAME LAW Environmental 411-5014				2. DRILLING SUBCONTRACTOR Farratt - Wolff			SHEET 1 OF SHEETS	
3. PROJECT Griffis AFB Interim Removal Action Design				4. LOCATION Rome NY				
5. NAME OF DRILLER				6. MANUFACTURER'S DESIGNATION OF DRILL				
7. SIZE AND TYPES OF DRILLING AND SAMPLING EQUIPMENT		CME-55 Truck Mounted			8. HOLE LOCATION		Near Soil Gas point SG-16	
		2-INCH Split Spoons			9. SURFACE ELEVATION		Approximately 463	
					10. DATE STARTED		11. DATE COMPLETED	
					10/27/92		10/27/92	
12. OVERBURDEN THICKNESS				15. DEPTH GROUNDWATER ENCOUNTERED				
				Approximately 8-feet Below GS				
13. DEPTH DRILLED INTO ROCK				16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED				
14. TOTAL DEPTH OF HOLE				17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)				
12-Feet								
18. GEOTECHNICAL SAMPLES		DISTURBED		UNDISTURBED		19. TOTAL NUMBER OF CORE BOXES		
Continuous Split Spoons								
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY	
6-8 sub/s		8021		Semi Vol			8270	
Continuous Solids Spoons								
22. DISPOSITION OF HOLE		BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR			
Tremie Grouted to Surface					Anthony Mustang			
ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c		SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
	0	Firm - stiff, Brown silt, sand and gravel fill					16, 26	SM/SW
	1			0 PPM			26, 17	
	2	14" Recovery Dry						
	3	Lse, Orange Brn Fine Sand Dry, BACK Fill Sand?		0 PPM			12, 12	@ 4' Refusal, Move Borehole SW
	4	20" Recovery Dry						
	5	Lse - Firm, Brown Sand + Gravel Fill @ 5' Native Gray Silt and Sand, @ 5.5 silt, sand trace Clay 18" Recovery Moist		0 PPM			11, 4	SM/ML
	6						5, 6	
	7	Dense, Brown and Grey Fine - Medium Sand and well rounded Fine - med gravel Tight sand Matrix, (But Almost clast supported)		.2 PPM			9, 11, 12, 16	SW/GW
W=8 V	8	16" recovery moist						
	9	Frm, Brown Fine to Med. Sand w/ gul		0 PPM			11, 12	SW
	10	Poor Recovery Wet					19, 20	

FIGURE 7-7 (CONT'D)

HTW DRILLING LOG

HOLE No. *Aret C*

PROJECT *Griffiss AFB Interim Removal Action*

INSPECTOR *Anthony M. ...*

SHEET *2*
OF *2* SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
	10 11 12	10-11' Lse, Brn Coarse and Medium well sorted SAND 11-12' Fm, Brown SAND + well round med. Gravel little silt wet	.2 PPM			11, 13 12, 15	SW

FIGURE 7-7

HTW DRILLING LOG							HOLE No. Area D	
1. COMPANY NAME Law Environmental 11-1564 29				2. DRILLING SUBCONTRACTOR PARAH-WOLFF			SHEET 1 OF 2 SHEETS	
3. PROJECT Griffiss AFB Interim Removal Action Design				4. LOCATION Rome, N.Y.				
5. NAME OF DRILLER				6. MANUFACTURER'S DESIGNATION OF DRILL				
7. SIZE AND TYPES OF DRILLING AND SAMPLING EQUIPMENT		CME-SS Truck Mounted			8. HOLE LOCATION Near Soil Gas point SG-18			
		2" Split Spoons			9. SURFACE ELEVATION Approximately 463'			
					10. DATE STARTED 10/27/92		11. DATE COMPLETED 10/27/92	
					12. OVERBURDEN THICKNESS			
13. DEPTH DRILLED INTO ROCK				15. DEPTH GROUNDWATER ENCOUNTERED Approximately 9-Feet BGS				
14. TOTAL DEPTH OF HOLE 12-Feet				16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED				
18. GEOTECHNICAL SAMPLES		DISTURBED		UNDISTURBED		19. TOTAL NUMBER OF CORE BOXES		
Continuous split spoons								
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %	
Continuous splits 6-8 submitted		8021		Semi Vol 2270				
22. DISPOSITION OF HOLE		BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR			
Tremie Grouted to Surface								
ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c		Head Space SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
	1	Frm, Brown Fine to Medium Sand, some Coarse Sand, Ang Gul Fill		0 PPM			5, 12 14, 15	SW
	2	18" recovery Moist						
	3	Lse, Brown Fine to Med Sand, Fill		0 PPM			20, 18 9, 8	Refused @ 4 More Borehole SW
	4	8" recovery Dry						
	5	Firm, Brown Fine Sand And silt, Fill		0 PPM			11, 4 5, 6	SM
	6	Moist-Wet						
	7	Lse, Brn Sand and gravel Fill					9, 11 12, 16	SW SM/SW
	8	@ 7' Frm, Grey Silt, Fine Sand, Trace Coarse Sand bedded Rhythmites		0 PPM				
	9	Frm, Grey Alternating Silt and Fine Sand, occasional Medium to Coarse Sand Lamina		0 PPM			11, 12, 19 20	SM/ML
	10	9.5-10' Frm Brown well sorted Fine-Med Sand moist-wet						

FIGURE 7-7 (CONT'D)

HTW DRILLING LOG							HOLE No. Area D
PROJECT Griffiss AFB Intern. Removal ^{Action} Design				INSPECTOR Anthony Murtaugh		SHEET 2 OF 2 SHEETS	
ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
	7 - 11 12	Firm, Brown, Well sorted Uniform Fine - Medium Sand wet				11.13 12.15	SW

FIGURE 7-7

HTW DRILLING LOG

HOLE No.
Area E

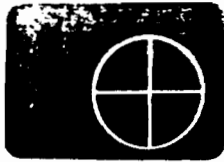
1. COMPANY NAME LAW Environmental 11-156424		2. DRILLING SUBCONTRACTOR Parrah - Wolff		SHEET 1 OF 1 SHEETS	
3. PROJECT Gr. FFISS AFB Interim Removal Action Design			4. LOCATION Rome, N.Y.		
5. NAME OF DRILLER			6. MANUFACTURER'S DESIGNATION OF DRILL		
7. SIZE AND TYPES OF DRILLING AND SAMPLING EQUIPMENT		Tri-pod w/ motorized		8. HOLE LOCATION Near Soil Gas Point SG-21	
		Cat head		9. SURFACE ELEVATION Approximately 463	
		2-inch Split Spoons		10. DATE STARTED 10/27/92	
				11. DATE COMPLETED 10/27/92	
12. OVERBURDEN THICKNESS			15. DEPTH GROUNDWATER ENCOUNTERED Approximately 6-Foot BGS		
13. DEPTH DRILLED INTO ROCK			16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED		
14. TOTAL DEPTH OF HOLE 10-Feet			17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)		

18. GEOTECHNICAL SAMPLES		DISTURBED		UNDISTURBED		19. TOTAL NUMBER OF CORE BOXES	
Continuous split spoon							
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
Continuous Splits 6-8 submitted		8021		Sem. Vol 8270			
22. DISPOSITION OF HOLE		BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR		
Tremie Grouted to surface							

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
	1	Lse Brown Sand + Gravel	OPAM			6.5, 4.8	SM
	2	Poor Recovery					
	3	Lse, Firm Brn Sand Silt and Gravel	OPAM			10,13 15,14	SM
	4	6-inches Dry-Moist					
	5	Lse, Brown Medium to Coarse Sand. little Gravel	OPAM			12,7 6,4	SW
wl +6' ▽	6	10-inches Wet @ 6'					
	7	Lse, Brn Brown Medium to Coarse Sand little well rounded gravel	OPAM			7,3 4,5	SW
	8	16" Recovery Wet					
	9	Lse, Brown Medium to Coarse Sand Few Med-Coarse, Well Rounded Gravel	OPAM			4,3 3,3	SW,
	10						

APPENDIX B

SOIL ANALYTICAL DATA



princeton testing
laboratory inc.

P.O. Box 3108
3490 U.S. Route 1
Princeton, NJ 08543-3108
(609) 452-9050
FAX (609) 452-0347

LAW ENVIRONMENTAL
114 Town Park Drive
Kennesaw, Georgia 30144-5599

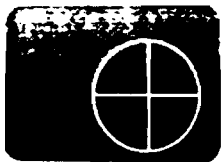
Attn: Mr. Michael Bartenfeld

Job #9206842-001GM

Organic Results

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Semi-Volatile Organics and Spiked Sample Results . .	8



princeton testing
laboratory inc.

P.O. Box 3108
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Princeton, NJ 08543-3108
(609) 452-9050
FAX (609) 452-0347

November 30, 1992

Law Environmental
114 Town Park Dr.
Kennesaw, Georgia 30144-5599
Attn: Mr. Michael Bartenfeld

RE: PTL Job No. 9206842-001 - CASE NARRATIVE

The following data package contains TCLP analytical results pertaining to the soil samples received by PTL on October 29, 1992.

1. TCLP VOA was extracted by Zero Head space (Extraction ZHE technique) and the extracts were analyzed by SW-846, Method 8021, purge & trap GC analysis.
2. TCLP extraction was performed on the soil samples as received. All TCLP leachates were extracted by liquid/liquid extraction method, SW 846 Method 3520, and the extracts were analyzed by GC/MS in accordance with SW 846, Method 8270.

VOLATILE ORGANICS:

Blanks: No contamination is detected in the Laboratory Blank samples.

Surrogates: All surrogate recoveries are within control limits.

MS: All spike recoveries are within the QC limits.

Samples: Benzene, Ethylbenzene, Toluene, Xylenes, and 1,2,4-Trimethylbenzene were detected in the samples.

SEMIVOLATILES:

Blanks: No contamination is present in the laboratory blank.

Surrogates: All surrogate recoveries are within the established control limits.

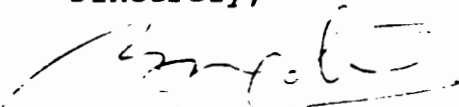
MS: Matrix spike recoveries were quantitative and are within the established control limits.

Samples: No TCLP compounds are detected in the samples.

-2-

If you require any further information regarding this report, do not hesitate to contact me.

Sincerely,



Bipin Patel, Ph.D.
Manager Organic Laboratory

BP/rk
Enclosures

APPROVED SAMPLE ANALYSIS REQUEST

Law Environmental
114 Town Park Dr.
Kennesaw, Georgia 30144-5599

Attention: Mr. Michael Bartenfeld
Phone: (404) 499-6813

Customer Number: 2517-000
P.O. Number: CONTRACT
Standard Tests

Project No.: 9206842-001GM

Date Received: 10/29/92
Analysis Due : 11/16/92

Number Of Samples : 6
Number Of Containers: 12

Approved By: Dennis Guinto
Account Manager: Bipin Patel
Reports: Custom Report Format

Sample I.D.'s	Code	Requested Analytical Services	Sampled
001 Area A 6-8' 10/27/92	LLE1 LLE2	Base Neutral/Acids, TCLP Extraction, Method 8270 Volatile Organics, TCLP Extraction, Method 8021	10/27/92
002 Area B 4-6' 10/27/92	LLE1 LLE2	Base Neutral/Acids, TCLP Extraction, Method 8270 Volatile Organics, TCLP Extraction, Method 8021	10/27/92
003 Area C 6-8' 10/27/92	LLE1 LLE2	Base Neutral/Acids, TCLP Extraction, Method 8270 Volatile Organics, TCLP Extraction, Method 8021	10/27/92
004 Area D 6-8' 10/27/92	LLE1 LLE2	Base Neutral/Acids, TCLP Extraction, Method 8270 Volatile Organics, TCLP Extraction, Method 8021	10/27/92
005 Area E 6-8' 10/27/92	LLE1 LLE2	Base Neutral/Acids, TCLP Extraction, Method 8270 Volatile Organics, TCLP Extraction, Method 8021	10/27/92
006 Trip Blank 10/27/92	LLE2	Volatile Organics, TCLP Extraction, Method 8021	10/27/92

Project Notes:

1. Received only 2 vials for Trip Blanks. One to GC one to GCMS Lab.
2. Client did not send their Chain of custody.
3. 11/6/92 per Malene faxed copy within 21 days to Tony 518-869-0992-S2

Received By Lab:
Reviewed By:
Q.A. Approved:

Initials/Date

[Signature] 12/1/92

Printed By: Rose Kovacs
Date: 12/01/92
Time: 15:26:11

CHAIN OF CUSTODY RECORD

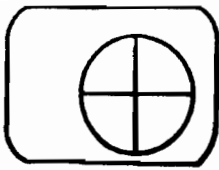
CLIENT LAW Environmental PTL JOB NO. 9206842
 CONTACT Tony Mustang FIELD SUPERVISOR same CLIENT PROJECT NO. 11-1564
 PHONE NO. 518-869-0364 COMPANY LAW Environmental
 SAMPLING SITE Guffiss AFB PHONE NO. 518-369-0364

SAMPLE IDENTIFICATION	MATRIX	COLLECTION			CONTAINER TYPE	CONTAINER NO	ANALYSES REQUIRED (Specify Method if Known)	REMARKS (Specify QA/QC, preservation required, due date, etc.)
		COMP.	GRAB	DATE TIME				
Area A (6-8)	soil	✓	✓	10/29/92 2:30	2	TCLP, 8021 8021 + 8270 (SMA only) OF Leachate		
Area B (4-6)		✓	✓	3:10	2	TCLP 8021 + 8270		
Area C (6-8)		✓	✓	11:30	2	TCLP 8021 + 8270		
Area D (6-8)		✓	✓	10:30	2	TCLP 8021 + 8270		
Area E (6-8)	✓	✓	✓		2	TCLP 8021 + 8270		
TOP BLANK	✓	✓	✓		2	8021 8021 + 8270		

LABORATORY SEAL NO. _____ FIELD SEAL BROKEN BY _____
 SEALED ON 10/29/92 AT 6:16 (Military Time) DATE _____ MILITARY TIME _____
 PREPARED BY A. Mustang REMARKS _____
 MEANS OF TRANSPORT Fed Ex

RECEIVED BY _____ DATE _____ REASON FOR CHANGE OF CUSTODY _____
 (Print and Sign Name)

✓ Chitt D. Mustang Agil D. Mustang
Federal Express Agil D. Mustang
Agil D. Mustang 10/29/92 6:11
10/26/92 13:00
10/29/92 10:20



Princeton Testing Laboratory Inc.

P.O. Box 3108
3480 U.S. Route 1
Princeton, NJ 08543-3108
(808) 482-8000
(FAX) (808) 482-0347

Law Environmental
114 Town Park Dr.
Kennesaw, Georgia 30144-5599

Report Date: 12/01/92
Job Number: 9206842-001
Date Received: 10/29/92

Attention: Mr. Michael Bartenfeld

Page: 1

Analysis: Volatile Organics, TCLP Extraction, Method 8021 Units: ug/liter

Parameters	Sample I.D.:	Area A 6-8' 10/27/92	Area B 4-6' 10/27/92	Area C 6-8' 10/27/92
Benzene		3.3	1.1	2.3
Ethylbenzene		17.9	2.8	7.2
Toluene		3.4	1.9	3.6
o-Xylene		10.3	1.7	5.3
m,p-Xylenes		12.7	4.1	9.7
Total Xylenes		23.0	5.8	15.0
Isopropylbenzene		<.5	<.5	<.5
n-Propylbenzene		<.5	<.5	<.5
p-Isopropyltoluene		<.5	<.5	<.5
1,2,4-Trimethylbenzene		<.5	1.0	<.5
1,3,5-Trimethylbenzene		<.5	<.5	<.5
n-Butylbenzene		<.5	<.5	<.5
sec-Butylbenzene		<.5	<.5	<.5
t-Butylbenzene		<.5	<.5	<.5
Naphthalene		<.5	<.5	<.5
Methyl t-butyl ether		<.5	<.5	<.5

RECOVERY DATA

QC LIMITS

A,A,A-Trifluorotoluene	74-127%	89	84	92
------------------------	---------	----	----	----

Analysis: Volatile Organics, TCLP Extraction, Method 8021 Units: ug/liter

Parameters	Sample I.D.:	Area D 6-8' 10/27/92	Area E 6-8' 10/27/92	Trip Blank 10/27/92
Benzene		2.1	2.3	<.5
Ethylbenzene		6.5	<.5	<.5
Toluene		5.0	1.6	<.5
o-Xylene		4.8	2.9	<.5
m,p-Xylenes		12.0	2.6	<.5
Total Xylenes		16.8	5.5	<.5
Isopropylbenzene		<.5	<.5	<.5
n-Propylbenzene		<.5	<.5	<.5
p-Isopropyltoluene		<.5	<.5	<.5
1,2,4-Trimethylbenzene		6.9	3.0	<.5
1,3,5-Trimethylbenzene		<.5	<.5	<.5
n-Butylbenzene		<.5	<.5	<.5
sec-Butylbenzene		<.5	<.5	<.5
t-Butylbenzene		<.5	<.5	<.5
Naphthalene		<.5	<.5	<.5
Methyl t-butyl ether		<.5	<.5	<.5

RECOVERY DATA

QC LIMITS

A,A,A-Trifluorotoluene	74-127%	114	111	103
------------------------	---------	-----	-----	-----

000005



Analysis: Volatile Organics, TCLP Extraction, Method 8021
Units: ug/liter

Parameters

Sample I.D.: Blank 11/11/92

Benzene	<.5
Ethylbenzene	<.5
Toluene	<.5
o-Xylene	<.5
m,p-Xylenes	<.5
Total Xylenes	<.5
Isopropylbenzene	<.5
n-Propylbenzene	<.5
p-Isopropyltoluene	<.5
1,2,4-Trimethylbenzene	<.5
1,3,5-Trimethylbenzene	<.5
n-Butylbenzene	<.5
sec-Butylbenzene	<.5
t-Butylbenzene	<.5
Naphthalene	<.5
Methyl t-butyl ether	<.5

RECOVERY DATA

QC LIMITS

A.A.A-Trifluorotoluene	74-127%	85
------------------------	---------	----

Jane E. Dennison

Jane Dennison, Ph.D., IHIT
Supervisor G.C. Laboratory

For inquiries call us at (609) 452-9050 and ask for our Customer Service Department

Member: American Council of Independent Laboratories, Inc.

000006

Water Volatile TCLP Matrix Spike Recovery Data

Lab Name: Princeton Testing Lab **Contract:** LAW ENVIRONMENTAL

Lab Code: Lab **Case No.:** 6842-001 **SAS No.:** **SDG No.:**

Matrix Spike - EPA Sample No.: Blank Spike **Level:** Low

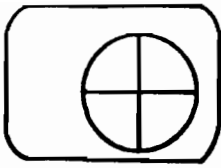
COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #
Methyl-t-butyl ether	10	ND	9.62	96.20
Benzene	10	ND	11.3	113.0
Toluene	10	ND	10.8	108.0
Ethylbenzene	10	ND	11.2	112.0
M,P-Xylenes	10	ND	10.4	104.0
O-Xylene	10	ND	10.9	109.0
Isopropylbenzene	10	ND	10.1	101.0
n-Propylbenzene	10	ND	10.3	103.0
1,3,5-Trimethylbenzene	10	ND	10.9	109.0
Tert-Butylbenzene	10	ND	9.58	95.8
1,2,4-Trimethylbenzene	10	ND	11.0	110.0
Sec-Butylbenzene	10	ND	9.4	94.0
p-Isopropyltoluene	10	ND	9.37	93.7
n-Butylbenzene	10	ND	10.2	102.0

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

COMMENTS: _____

000007



Princeton Testing Laboratory Inc.

P.O. Box 3108
3490 U.S. Route 1
Princeton, NJ 08543-3108
(800) 452-9050
(FAX) (800) 452-0347

Law Environmental
114 Town Park Dr.
Kennesaw, Georgia 30144-5599

Report Date: 12/01/92
Job Number: 9206842-001
Date Received: 10/29/92

Attention: Mr. Michael Bartenfeld

Page: 1

Analysis: Base Neutral/Acids, TCLP Extraction, Method 8270
Units: ug/liter

Parameters	Sample I.D.: 10/27/92	Area A 6-8' 10/27/92	Area B 4-6' 10/27/92	Area C 6-8' 10/27/92
Anthracene		<10	<10	<10
Fluorene		<10	<10	<10
Pyrene		<10	<10	<10
Acenaphthene		<10	<10	<10
Benzo(a)anthracene		<10	<10	<10
Fluoranthene		<10	<10	<10
Benzo(b)fluoranthene		<10	<10	<10
Benzo(k)fluoranthene		<10	<10	<10
Chrysene		<10	<10	<10
Benzo(a)pyrene		<10	<10	<10
Benzo(g,h,i)perylene		<10	<10	<10
Indeno(1,2,3-cd)pyrene		<10	<10	<10
Dibenz(a,h)anthracene		<10	<10	<10

Analysis: Base Neutral/Acids, TCLP Extraction, Method 8270
Units: ug/liter

Parameters	Sample I.D.: 10/27/92	Area D 6-8' 10/27/92	Area E 6-8' 10/27/92	Blank 11/05/92
Anthracene		<10	<10	<10
Fluorene		<10	<10	<10
Pyrene		<10	<10	<10
Acenaphthene		<10	<10	<10
Benzo(a)anthracene		<10	<10	<10
Fluoranthene		<10	<10	<10
Benzo(b)fluoranthene		<10	<10	<10
Benzo(k)fluoranthene		<10	<10	<10
Chrysene		<10	<10	<10
Benzo(a)pyrene		<10	<10	<10
Benzo(g,h,i)perylene		<10	<10	<10
Indeno(1,2,3-cd)pyrene		<10	<10	<10
Dibenz(a,h)anthracene		<10	<10	<10


Bipin Patel, Ph.D.
Organic Laboratory Manager

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000008

3C
Water Semi-Volatile TCLP Spike Recovery

Lab Name: Princeton Testing Lab Contract: LAW ENVIRONMENTAL

Lab Code: Lab Case No.: 6842-001 SAS No.: _____ SDG No.: _____

Matrix Spike - EPA Sample No.: Area E 6-8' 10/27 Level: Low
M 2211

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #
2-Methylphenol	200	ND	111.4	56
4-Methylphenol (1)	200	ND	202.6	101
1,4-Dichlorobenzene	200	ND	96.7	48
Hexachlorobenzene	200	ND	127.1	64
Hexachlorobutadiene	200	ND	93.6	47
Hexachloroethane	200	ND	83.3	42
Nitrobenzene	200	ND	126.1	63
2,4,5-Trichloro (2)	200	ND	97.4	49
2,4,6-Trichloro (2)	200	ND	98.1	49
2,6-Dinitrotoluene	200	ND	105.3	53
Pentachlorophenol	200	ND	140.0	72
Pyridine	200	ND	140.9	70

- (1) Coelutes with 4-methylphenol
- (2) 2,4,5-Trichlorophenol
- (3) 2,4,6-Trichlorophenol

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

COMMENTS: _____

000009