

BUSTR SITE ASSESSMENT REPORT

INCIDENT #229369-01, #229369-02

PLUM BROOK STATION

NASA LeRC

TASK NO. 6105-008

SEPTEMBER 2, 1993

INTRODUCTION

NASA Lewis Research Center removed four underground storage tanks (USTs) in the Building 7132 Area at the Plum Brook Station facility. The Bureau of Underground Storage Tank Regulations (BUSTR) incident numbers for the USTs are:

#229369-01 for USTs 7132-1 (9,000 gallon gasoline), 7132-2 (9,000 gallon gasoline), 7132-3 (9,000 gallon diesel) removed in July 1989, and

#229369-02 for UST 7132-4 (8,000 gallon diesel) removed in July 1990.

At NASA's request, Morrison Knudsen Ferguson Group/NASA (MK/NASA) has conducted a UST Site Assessment (SA) of the project area. The SA determined the extend of any remaining hydrocarbon contamination vertically and horizontally in the subsurface based on the analytical results of the UST SA sampling. A site location map is provided in Figure 1.

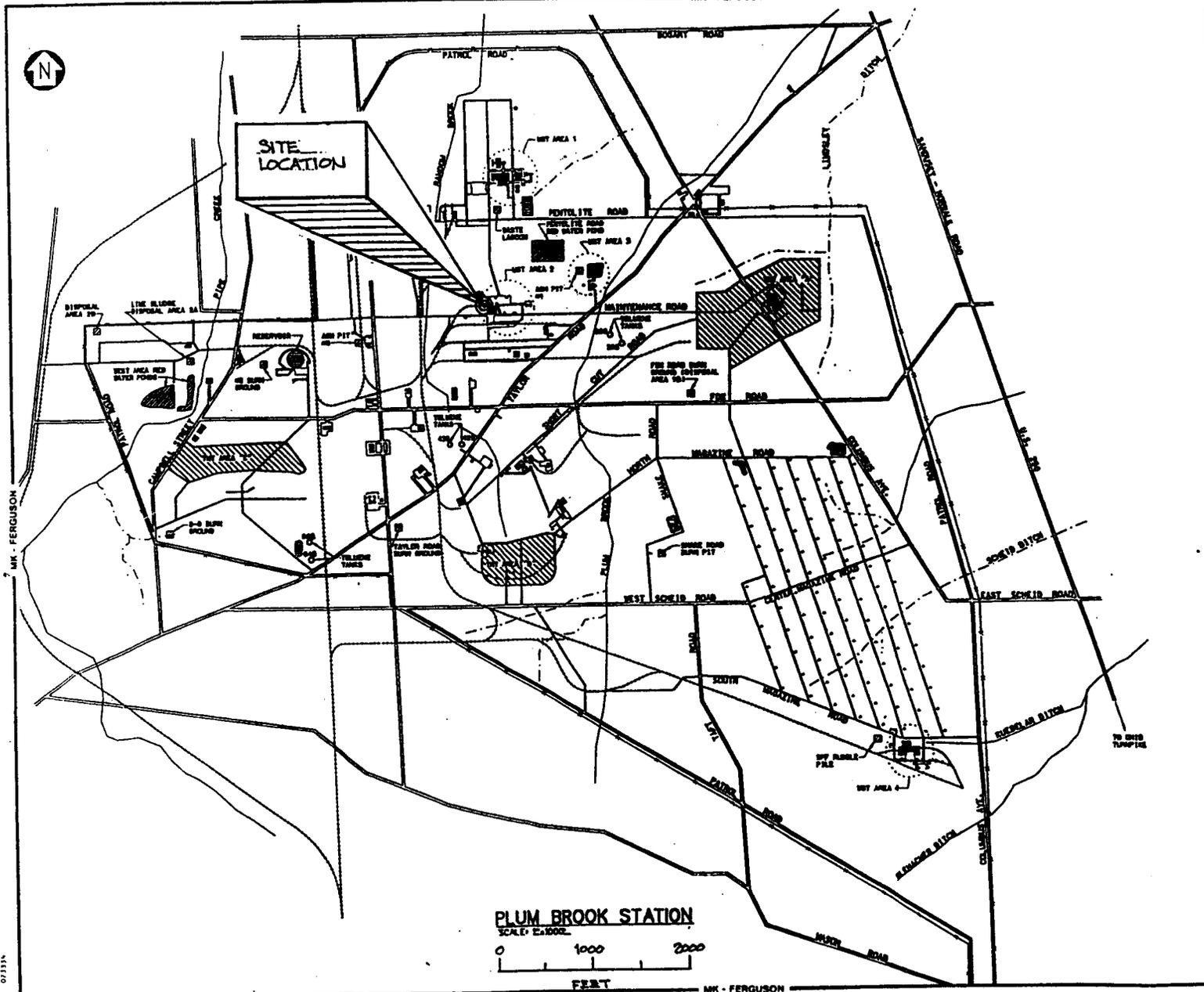
SAMPLING AND RESULTS

The drilling, sampling, and analysis portion of the Building 7132 Area UST SA occurred in April and May 1993. Four borings were drilled and sampled, with one boring completed as a monitoring well. Soil samples were analyzed for Benzene, Toluene, Ethylbenzene and Total Xylenes (BTEX), Total Petroleum Hydrocarbons (TPH), and Polynuclear Aromatic Hydrocarbons (PNA). Boring and monitor well locations are presented on Figure 2.

The BUSTR Site Action Level Category has been determined to be Category 3. The scoring sheets and an explanation are presented in Appendix A.

MK - FERGUSON

REV	DATE	DESCRIPTION	BY	SD ENGR NOBR.	DEPT	PE



PLUM BROOK STATION
SCALE: 1"=500'
0 1000 2000
FEET

NASA LEWIS RESEARCH CENTER
PLUM BROOK STATION - SANDUSKY, OHIO

7132 SITE LOCATION MAP

MK-FERGUSON
A DIVISION OF
MCKESSON CORPORATION

1000 WEST 3RD ST. - CLEVELAND, OHIO 44113 - 216-623-0000

DRAWN BY 12T	APPROVED BY [Signature]	WORK ORDER NUMBER 4825-2105-008
CHECKED BY [Signature]	SCALE 1"=500'	DRAWING NUMBER FIGURE 1

REV.

MK - FERGUSON

07133

MK - FERGUSON

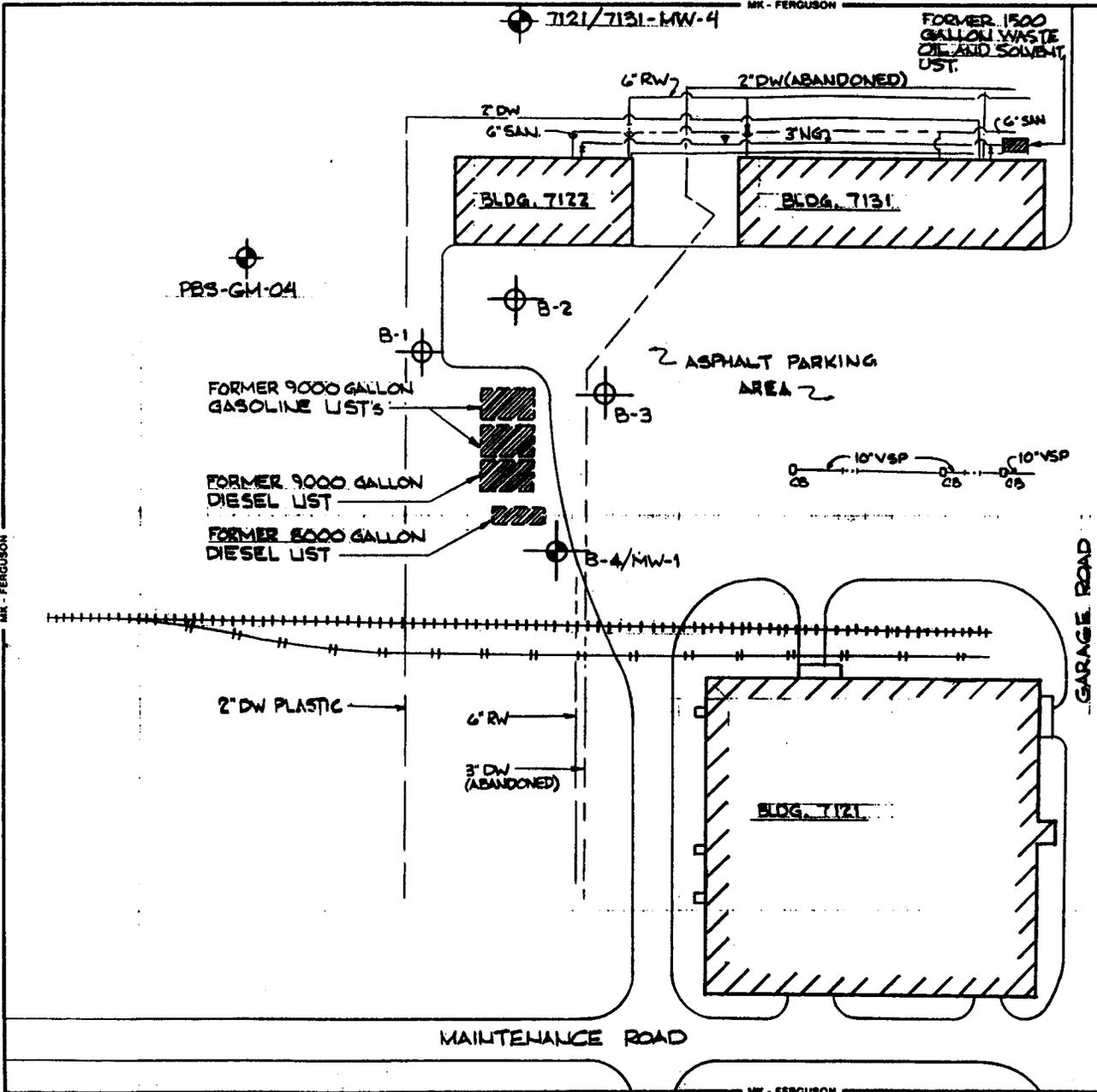
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7121/7131-MW-4

FORMER 1500 GALLON WASTE OIL AND SOLVENT LIST.

REV	DATE	DESCRIPTION	BY	SR	DEPT	PE



LEGEND:

- ⊕ SOIL BORING
- ⊕ SOIL BORING/MONITOR WELL
- SAN SANITARY SEWER
- CB CATCH BASIN (STORM SEWER)
- DW DOMESTIC WATER
- RW RAW WATER
- NG NATURAL GAS



NASA LEWIS RESEARCH CENTER
PLUM BROOK STATION - SANDUSKY, OHIO

SOIL BORING
AND MONITOR WELL
LOCATIONS



1900 WEST 250 ST. - CLEVELAND, OHIO 44115 • 216-224-0000

DESIGNED BY S	APPROVED BY	WORK ORDER NUMBER 4063-6105-008
CHECKED BY	SCALE 1" = 50'-0"	DESIGNED DRAWN FIGURE 2

MK - FERGUSON

MK - FERGUSON

MK - FERGUSON

073334

MK/NASA conducted drilling activities on April 20, 21, and 26, 1993. Continuous sampling was conducted with a split spoon sampler and 3-1/4 inch O.D. solid stem augers for the soil borings, while 4-1/4 inch I.D. hollow stem augers were used in the boring converted to a monitor well.

The subsurface conditions at the site consist of approximately 4 inches of asphalt underlain by 8 inches of limestone gravel in the parking lot area. The soil type is represented by layers of brown silty clay, sandy silt, and silty sand extending from the surface to an approximate depth of 12 feet where a dense gray silty clay layer was encountered. Groundwater was encountered in all borings from approximately 3 to 8 feet. Table 1 provides water level and elevation data. Bedrock was not encountered in any of the borings. Monitoring well MW-1 was installed in boring B-4 upon completion of drilling. MW-1 is constructed of 2 inch stainless steel well screen and riser. Boring logs are provided in Appendix B.

TABLE 1

WATER LEVELS IN MONITORING WELLS⁽¹⁾

DATE	WELL	SURFACE OR CASING ELEVATION	DEPTH ⁽²⁾ TO WATER	WATER ELEVATION
7-21-93	7132-MW-1	637.49'	5.45'	632.04'
7-21-93	PBS-GM-04	637.02'	7.75'	629.27'
7-21-93	7121/7131-MW-4	632.45'	3.6'	628.85'

⁽¹⁾ See Figure 2 for monitoring well locations.

⁽²⁾ Depth to water is measured from top of well cover.

All of the samples were field-scanned for the presence of hydrocarbons using a Photovac Microtip photoionization detector (PID). In this test, each sample was split into two identical halves, one-half of each sample was placed into a clean, air-tight jar, the mouth of which was covered with aluminum foil, then secured with a screw-on plastic lid. The PID was calibrated with a 100 ppm isobutylene-in-air commercial gas standard, and used in accordance with the manufacturer's operating instructions. After at least ten minutes holding time, the headspace above the sample within the jar was scanned for volatile organic compounds (VOCs) with the PID. This was accomplished by piercing the aluminum foil seal with the instrument probe and recording the maximum VOC reading observed from the headspace above the sample in the jar. The other half of the sample was placed in a 500 milliliter (ml) soil sample jar fitted with a Teflon-lined lid, placed on ice and saved for possible laboratory analysis. The three soil samples from each boring with the highest PID reading were chosen for laboratory analysis of BTEX and TPH.

The TPH and BTEX components in the soil samples were compared to the BUSTR action levels established for Category 3. The analytical results for the soil samples indicated BTEX and TPH concentrations less than the Category 3 BUSTR action levels. Category 3 BUSTR Action Levels are shown in Table 2. Table 3 provides soil sampling analytical results. Analytical data is provided in Appendix C. PNA concentrations were detected in the soil samples and are listed in Table 3. Presently, BUSTR has no established action levels for PNAs in soil.

TABLE 2

CATEGORY 3 ACTION LEVELS

CONSTITUENTS IN SOIL	ALLOWABLE LEVEL
BENZENE	335 ppb
TOLUENE	9,000 ppb
ETHYLBENZENE	14,000 ppb
TOTAL XYLENES	67,000 ppb
TPH	450 ppm
CONSTITUENTS IN GROUNDWATER	
BENZENE	5 ppb
TOLUENE	1,000 ppb
ETHYLBENZENE	700 ppb
TOTAL XYLENES	10,000 ppb

TABLE 3**TPH AND BTEX RESULTS FOR SOIL****BUILDING 7132
TASK NO. 6105-008**

BORING NUMBER	SAMPLE DEPTH	TPH (418.1) (mg/kg) ⁽¹⁾	TPH (8015) (mg/kg)	BENZENE (ug/kg) ⁽²⁾	TOLUENE (ug/kg)	ETHYLBENZENE (ug/kg)	M&P XYLENES (ug/kg)	O XYLENE (ug/kg)
B1	8'-10'	17	< 0.2	< 2	3.39	< 2	2.24	< 2
B1	12'-14'	22	< 0.2	< 2	< 2	< 2	< 2	< 2
B1	14'-15'	76	< 0.2	< 2	3.22	< 2	< 2	< 2
B2	1'-3'	130	< 0.2	< 2	< 2	< 2	< 2	< 2
B2	9'-11'	11	< 0.2	< 2	< 2	< 2	< 2	< 2
B2	11'-13'	26	< 0.2	< 2	< 2	< 2	< 2	< 2
B3	7'-9'	13	< 0.2	< 2	< 2	< 2	< 2	< 2
B3	11'-13'	< 10	< 0.2	< 2	< 2	< 2	< 2	< 2
B3	13'-15'	15	< 0.2	< 2	< 2	< 2	< 2	< 2
B4	4'-6'	60	< 0.2	< 2	< 2	< 2	< 2	2.78
B4	6'-8'	77	< 0.2	< 2	< 2	< 2	< 2	< 2
B4	10'-12'	17	< 0.2	< 2	< 2	< 2	< 2	< 2

(1) mg/kg = ppm

(2) ug/kg = ppb

TABLE 3
(continued)

POLYNUCLEAR AROMATIC HYDROCARBONS AND TPH 418.1
(FOR COMPARISON) IN SOIL

BUILDING 7132
TASK NO. 6105-008

BORING NUMBER	SAMPLE DEPTH	COMPOUND	RESULT (mg/kg) ⁽¹⁾	PQL (mg/kg) ⁽²⁾
B1	8'-10'	PYRENE	0.20	< 0.1
B1	8'-10'	TPH (418.1)	17	< 10
B1	12'-14'	PYRENE	0.13	< 0.1
B1	12'-14'	TPH (418.1)	22	< 10
B1	14'-15'	PYRENE	0.12	< 0.1
B1	14'-15'	TPH (418.1)	76	< 10
B2	1'-3'	ACENAPHTYLENE	0.74	< 0.1
B2	1'-3'	ANTHRACENE	0.81	< 0.1
B2	1'-3'	BENZO (a) ANTHRACENE	3.8	< 0.1
B2	1'-3'	BENZO (a) PYRENE	4.0	< 0.1
B2	1'-3'	BENZO (b) FLUOROANTHENE	3.4	< 0.1
B2	1'-3'	BENZO (k) FLUOROANTHENE	4.3	< 0.1
B2	1'-3'	BENZO (ghi) PERYLENE	2.8	< 0.1
B2	1'-3'	CHRYSENE	3.6	< 0.1
B2	1'-3'	FLUORANTHENE	6.1	< 0.1
B2	1'-3'	INDENO (1,2,3-CD) PYRENE	2.7	< 0.1
B2	1'-3'	PHENANTHRENE	1.2	< 0.1
B2	1'-3'	PYRENE	6.1	< 0.1
B2	1'-3'	TPH (418.1)	130	< 10
B2	9'-11'	FLUORANTHENE	0.12	< 0.1
B2	9'-11'	PYRENE	0.19	< 0.1

TABLE 3
(continued)

POLYNUCLEAR AROMATIC HYDROCARBONS AND TPH 418.1
(FOR COMPARISON) IN SOIL

BUILDING 7132
TASK NO. 6105-008

BORING NUMBER	SAMPLE DEPTH	COMPOUND	RESULT (mg/kg) ⁽¹⁾	PQL (mg/kg) ⁽²⁾
B2	9'-11'	TPH (418.1)	11	< 10
B2	11'-13'	PYRENE	0.12	< 0.1
B3	11'-13'	TPH (418.1)	26	< 10
B3	7'-9'	---	--- ⁽³⁾	---
B3	7'-9'	TPH (418.1)	13	< 10
B3	11'-13'	---	---	---
B3	11'-13'	TPH (418.1)	< 10	< 10
B3	13'-15'	---	---	---
B3	13'-15'	TPH (418.1)	15	< 10
B4	4'-6'	---	---	---
B4	4'-6'	TPH (418.1)	60	< 10
B4	6'-8'	---	---	---
B4	6'-8'	TPH (418.1)	77	< 10
B4	10'-12'	PHENANTHRENE	0.225	< 0.1
B4	10'-12'	TPH (418.1)	17	< 10

(1) mg/kg = ppm

(2) PQL = Practical Quantification Limit

(3) --- = Compound/Concentrations Below PQL

Monitoring well 7132-MW-1 was surged with a surge block, then developed, purged and sampled using a stainless steel bailer. A previously installed monitoring well, PBS-GM-04, and 7132-MW-1 were sampled for BTEX and PNA. A third monitoring well, 7121/7131-MW-4, was analyzed for volatile organics (8240) which includes BTEX constituents. The analytical results of the groundwater samples collected from 7132-MW-1, PBS-GM-04, and 7121/7131-MW-4 indicate BTEX concentrations below detection levels and less than BUSTR Category 3 action levels. Chlorinated solvents were detected in 7121/7131-MW-4 and are probably related to a former waste oil and solvent UST north of Building 7131 near Garage Road, currently being coordinated with the Ohio EPA. The sampling analytical results are provided in Table 4. Analytical data is provided in Appendix C.

TABLE 4
BTEX RESULTS FOR WATER

BUILDING 7132
TASK NO. 6105-008

MONITOR WELL	BENZENE (ug/L) ⁽¹⁾	TOLUENE (ug/L)	ETHYLBENZENE (ug/L)	M&P XYLENES (ug/L)	O XYLENE (ug/L)
7132-MW-1 ⁽²⁾	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
7132-MW-1A ⁽³⁾	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
PBS-GM-04 ⁽⁴⁾	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
7121/7131-MW-4 ⁽⁵⁾	< 1	< 1	< 1	< 1	< 1

- (1) ug/L = ppb
- (2) MW-1 = MK/NASA Installed Well
- (3) MW-1A = Duplicate Sample of MW1
- (4) PBS-GM-04 = Ebasco Installed Well
- (5) 7121/7131-MW-4 = MK/NASA installed well. BTEX results are taken from 8240 analysis.

TABLE 4 (continued)

POLYNUCLEAR AROMATIC HYDROCARBONS IN WATER

BUILDING 7132
TASK NO. 6105-008

MONITOR WELL	COMPOUND	RESULT (ug/L) ⁽¹⁾	PQL (ug/L) ⁽²⁾
MW1	PHENANTHRENE	1.14	< 0.1
MW1 ⁽³⁾	ACENAPHTHENE	1.05	< 0.1
MW1A ⁽⁴⁾	PHENANTHRENE	1.07	< 0.1
PBS-GM-04 ⁽⁵⁾	---	--- ⁽⁶⁾	< 0.1

- (1) ug/L = ppb
- (2) PQL = Practical Quantification Limit
- (3) MW1 = MK/NASA Installed Well
- (4) MW1A = Duplicate Sample of MW1
- (5) PBS-GM-04 = Ebasco Installed Well
- (6) --- = Compound/Concentrations Below PQL

CONCLUSION AND RECOMMENDATION

The soil and groundwater analytical results from the UST SA sampling indicate no residual hydrocarbon contamination of the soil or groundwater in concentrations exceeding BUSTR Category 3 action levels. Figure 2 provides details of the site.

Based on the initial corrective actions NASA performed by removing the UST and associated dispenser island, product lines, hydrocarbon contaminated soil and the results of the SA, MK/NASA feels that pursuant to the Ohio Administrative Code (OAC) 1301:7-7-36(E) no further action is required at the PBS Building 7132 Area.

APPENDIX A

BUSTR SITE SCORING SHEETS AND EXPLANATION

API DIX A

BUILDING 7132
TASK ORDER 6105-008

SITE FEATURE SCORING SYSTEM

SITE FEATURES	COLUMN A		COLUMN B		COLUMN C		COLUMN D	
	SCORE 20 IF TRUE	SCORE	SCORE 15 IF TRUE	SCORE	SCORE 10 IF TRUE	SCORE	SCORE 5 IF TRUE	SCORE
1. Distance of UST system from closest drinking water supply well or intake currently in use.	> 1,000 feet	20	301-1,000 feet		< 301 feet		Inside of designated sensitive area.	
2. Average depth to ground water.	> 50 feet		31-50 feet		15-30 feet or unknown		< 15 feet	5
3. Predominant soil type of substratum.	Clay or Shale	20	Silt or Clayey Sands or Fine Sandstone		Silty Sand or Fine Sand or Sandstone or Unknown		Clean Sand or Gravel or Conglomerate	
4. Natural and/or manmade conduits or receptors (from worksheet on following page).	< 8	20	8-10		11-13		> 13	
SUBTOTAL		60		0		0		5
TOTAL SCORE			65					

APPENDIX A

BUILDING 7132 TASK ORDER 6105-008

SITE FEATURE NUMBER 4 WORKSHEET

Basements or subsurface foundations within 100 feet of UST system.	4 points	0
Storm sewer within 50 feet of UST system.	4 points	0
Sanitary Sewer within 50 feet of UST system.	4 points	0
Septic system leach field within 50 feet of UST system.	2 points	0
Water line main within 50 feet of UST system.	1 point	1
Natural gas line main within 50 feet of UST system.	1 point	0
Bedrock area prone to dissolution along joints of fractures (i.e., caves and sinkholes) within 100 feet of UST system.	1 point	0
Faults or known fractures within 100 feet of UST system.	1 point	0
Buried telephone/television cable main within 50 feet of UST system.	1 point	0
Buried electrical cable main within 50 feet of UST system.	1 point	0
TOTAL POINTS		1

APPENDIX A

**BUILDING 7132
TASK ORDER 6105-008**

ACTION LEVEL TABLE

TOTAL SCORE	CATEGORY 4	CATEGORY 3	CATEGORY 2	CATEGORY 1
	> 71	70-51	50-31	< 31
Constituents Level in Soil:				
Benzene	0.500 PPM	0.335 PPM	0.170 PPM	0.006 PPM
Toluene	12 PPM	9 PPM	7 PPM	4 PPM
Ethylbenzene	18 PPM	14 PPM	10 PPM	6 PPM
Total Xylenes	85 PPM	67 PPM	47 PPM	28 PPM
Constituents Level in Ground Water:				
Benzene	0.005 PPM	0.005 PPM	0.005 PPM	0.005 PPM
Toluene	1 PPM	1 PPM	1 PPM	1 PPM
Ethylbenzene	0.700 PPM	0.700 PPM	0.700 PPM	0.700 PPM
Total Xylenes	10 PPM	10 PPM	10 PPM	10 PPM
TPH Level in Soil:				
Analytical Group No. 1	600 PPM	450 PPM	300 PPM	105 PPM
Analytical Group Nos. 2, 3, and 4	1156 PPM	904 PPM	642 PPM	380 PPM

SOURCE: B.U.S.T.R.

BUSTR SITE SCORING SHEET WORKSHEET

From the Underground Record Drawing PF-65180 (7/69) the following utilities were identified:

Sanitary Sewer (VC, San)	110 Feet
Storm Sewer (S)	120 Feet
Water Line	35 Feet
Natural Gas Line	110 Feet
Telephone (Fiber Optics)	OVERHEAD
Electric Lines	OVERHEAD

The total score on the Site Feature Number 4 Worksheet is 1, which leads to a total site score of 65 points, which places the Building 7132 Area in an Action Level of Category 3. The TPH in soil analytical was from Analytical Group 1 and Group 2 due to the combination of gasoline and diesel USTs in a common excavation (BUSTR guidelines manual).

APPENDIX B

BORING LOGS

LOG OF TEST BORING

BORING MKB-38

PROJECT: NASA PLUMBROOK UST PHASE II

JOB #: DR-16184

BORING NO.: MKB-38

ELEV.: 0.0

LOCATION: 7132-B-1

DATE: 4/20/93

DRILL METHOD: SOLID STEM AUGERS

DRILLERS: JL/GM

ENCOUNTERED WATER DEPTH: 8.0

COMPLETION: 4.5

DEPTH TO - WATER: 4.5

CAVING:

DATE CHECKED: 4/20/93

ELEVATION	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	Description	P.I.D. Rdg.	Density pcf	Unconfined Strength, psf
DEPTH					
0	 3/6 12/12 9/6	FILL-SANDY CLAY FILL WITH GRAVEL	0.0		
2.5	 3/6 10/12 6/6	MOIST BROWN SILTY CLAY WITH GRAVEL AND TRACE FINE SAND	0.7		
5	 3/6 10/12 7/6	MOIST BROWN GREY SANDY SILT	0.9		
5	 3/6 10/12 7/6	MOIST BROWN GREY CLAYEY SILT			
7.5	 2/6 6/12 3/6		1.1		
7.5	 3/6 8/12 6/6		1.5		
10	 3/6 6/12 3/6	WET GREY CLAYEY SILT	1.0		
12.5	 3/6 3/12 6/6		2.6		
15	 2/6 4/6		3.3		

Water Checked
4/20/93

(1) indicates depth water encountered

Figure Number 38

LOG OF TEST BORING

BORING MKB-39

PROJECT: NASA PLUMBROOK UST PHASE II

JOB #: DR-16184

BORING NO.: MKB-39

ELEV.: 0.0

LOCATION: 7132-B-2

DATE: 4/21/93

DRILL METHOD: SOLID STEM AUGERS

DRILLERS: GM/CM

ENCOUNTERED WATER DEPTH: 1.0

COMPLETION: 4.3

DEPTH TO - WATER: 4.3

CAVING:

DATE CHECKED: 4/21/93

ELEVATION	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	Description	P.I.D. Rdg.	Density pcf	Unconfined Strength, psf
DEPTH					
0		TWO INCHES OF ASPHALT CRUSHED STONE			
0.2		FILL-SANDY CLAY FILL	5.5		
1.0		MOIST BROWN GREY SANDY CLAY			
1.5		MOIST BLACK SANDY CLAY			
2.0		MOIST GREY BROWN SANDY CLAY	3.1		
5.0		MOIST GREY BROWN CLAYEY SILT	2.4		
7.0		WET GREY BROWN CLAYEY SILT WITH TRACE FINE SAND	2.5		
10.0			6.9		
12.5		WET GREY SILTY CLAY	5.5		
15.0			3.1		

Water Checked
4/21/93

(1) indicates depth water encountered

LOG OF TEST BORING

BORING MKB-40

PROJECT: NASA PLUMBROOK UST PHASE II
 BORING NO.: MKB-40
 LOCATION: 7132-B-3
 DRILL METHOD: SOLID STEM AUGERS
 ENCOUNTERED WATER DEPTH: 3.0
 DEPTH TO - WATER: 3.5

JOB #: DR-16184
 ELEV.: 0.0
 DATE: 4/21/93
 DRILLERS: JL/GM
 COMPLETION: 3.5
 DATE CHECKED: 4/21/93

ELEVATION DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	Description	P.I.D. Rdg.	Density pcf	Unconfined Strength, psf
0		THREE INCHES OF ASPHALT CRUSHED STONE AND GRAVEL			
0.6	8/6 14/12 5/6	WET BROWN SILTY SAND	0.6		
0.9	2/6 6/12 3/6		0.9		
1.1	3/6 5/12 2/6		1.1		
1.3	1/6 2/12 2/6	WET GREY SILTY SAND	1.3		
1.3	4/6 10/12 7/6	WET GREY BROWN CLAYEY SILT	1.3		
3.4	4/6 6/12 4/6		3.4		
6.9	3/6 9/12 5/6	WET GREY SILTY CLAY	6.9		

Water Checked
4/21/93

* BORING CAVED IN AT 3.5 FEET

(1) indicates depth water encountered

Figure Number 40

LOG OF TEST BORING

BORING MKB-41

PROJECT: NASA PLUMBROOK UST PHASE II
 BORING NO.: MKB-41
 LOCATION: 7132-B-4 MW-1
 DRILL METHOD: SOLID STEM AUGERS
 ENCOUNTERED WATER DEPTH: 8.0
 DEPTH TO - WATER:

JOB #: DR-16184
 ELEV.: 0.0
 DATE: 4/26/93
 DRILLERS: JL/GM
 COMPLETION:
 DATE CHECKED: 4/26/93

ELEVATION	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	Description	P.I.D. Rdg.	Density pcf	Unconfined Strength, psf
DEPTH					
0	3/6 12/12 6/6	TOPSOIL			
		LOOSE SILTY SAND WITH TRACE CLAY	2.0		
	5/6 8/12 4/6				
5	2/6 5/12 2/6	MOIST BROWN SANDY SILTY CLAY	3.7		
		MOIST BROWN SILTY CLAY WITH SAND			
	2/6 5/12 4/6	MOIST TO WET	5.2		
	4/6 9/12 4/6		3.6		
10	6/6 8/12 4/6		70.2		
	3/6 7/12 4/6	WET GREY SILTY CLAY	8.0		
15	4/6 10/12 3/6		19.2		

(1) indicates depth water encountered

Figure Number 41

APPENDIX C

LABORATORY ANALYTICAL RESULTS

MK-Ferguson
 Nasa Lewis Research Center
 Attn: Elise Allen
 21000 Brookpark Road, M.S. 66-2
 Cleveland, OH 44135



biological & environmental control laboratories, inc.
 615 front street toledo, ohio 43605 (419) 693-5307
 1632 enterprise parkway twinsburg, ohio 44087 (216) 425-8200

lab no:
 93C01267
 P.O. No.
 2F2-4065-2435

sample 4065-6105-006 PHASE II UST STUDY
 description: 7132-B1 8-10 FT
 4/21/93 1030

results:

<u>ANALYTE</u>	<u>METHOD</u>	<u>RESULT</u>
Total Petroleum Hydrocarbons	EPA 600, 418.1 SW-846, 9071	17 mg/Kg
TPH as Gasoline	SW-846, 8015 modified	less than 0.2 mg/Kg

SURROGATE RECOVERY

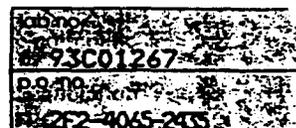
a,a,a-trifluorotoluene 61.2%

completed: 5/5/93 tech: MD/ELT approved by: *Edward Stewart*

MK-Ferguson
Nasa Lewis Research Center
Attn: Elise Allen
21000 Brookpark Road, M.S. 66-2
Cleveland, OH 44135



biological & environmental control laboratories, inc.
615 front street
toledo, ohio 43605
(419) 693-5307
1632 enterprise parkway
twinsburg, ohio 44087
(216) 425-8200



sample 4065-6105-006 PHASE II UST STUDY
description: 7132-B1 8-10 FT.
4/21/93 1030

analysis: BTEX

procedure: The sample was analyzed as outlined in US EPA "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, November, 1986, Method 8020.

results:

Benzene	less than	2	µg/Kg
Toluene		3.39	µg/Kg
Ethylbenzene	less than	2	µg/Kg
m & p-Xylenes		2.24	µg/Kg
o-Xylene	less than	2	µg/Kg

SURROGATE RECOVERY

a,a,a-Trifluorotoluene 122% See note 1

1) High surrogate recovery is due to matrix effects.

date completed: 5/6/93	tech: ELT	approved by: <i>[Signature]</i>
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 1632 enterprise parkway Twinsburg, ohio 44087 (216) 425-8200

lab no:
 93C01268
 P.O. NO:
 2F2-4065-2435

sample 4065-6105-006 PHASE II UST STUDY
 description: 7132-B1 12-14 FT.
 4/21/93 1030

results:

<u>ANALYTE</u>	<u>METHOD</u>	<u>RESULT</u>
Total Petroleum Hydrocarbons	EPA 600, 418.1 SW-846, 9071	22 mg/Kg
TPH as Gasoline	SW-846, 8015 modified	less than 0.2 mg/Kg

SURROGATE RECOVERY

a,a,a-trifluorotoluene 70.8%

Report completed: 5/5/93
 Tech: MD/ELT
 Approved by: *Edward Shved*

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lab no:	73C01268
proj no:	7132-4065-2435

sample: 4065-6105-006 PHASE II UST STUDY
description: 7132-B1 12-14 FT.
4/21/93 1030

analysis: BTEX

procedure: The sample was analyzed as outlined in US EPA "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, November, 1986, Method 8020.

results:

Benzene	less than	2 µg/Kg
Toluene	less than	2 µg/Kg
Ethylbenzene	less than	2 µg/Kg
m & p-Xylenes	less than	2 µg/Kg
o-Xylene	less than	2 µg/Kg

SURROGATE RECOVERY

a,a,a-Trifluorotoluene 130% See note 1

1) High surrogate recovery is due to matrix effects.

date completed: 5/6/93	tech: ELT	approved by: <i>Edward Shurt</i>
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lab no:	93C01269
P.O. no:	2F2-4065-2435

sample 4065-6105-006 PHASE II UST STUDY
description: 7132-B1 14-15 FT.
4/21/93 1030

results:

<u>ANALYTE</u>	<u>METHOD</u>	<u>RESULT</u>
Total Petroleum Hydrocarbons	EPA 600, 418.1 SW-846, 9071	76 mg/Kg
TPH as Gasoline	SW-846, 8015 modified	less than 0.2 mg/Kg

SURROGATE RECOVERY

a,a,a-trifluorotoluene 53.6% See note 1

1) Low surrogate recovery due to matrix effects.

date completed: 5/5/93	tech: MD/ELT	approved by: <i>Charles J. Hunt</i>
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lab no.	93C01269
p.o. no.	2E2-4065-205

sample 4065-6105-006 PHASE II UST STUDY
description: 7132-B1 14-15 FT.
4/21/93 1030

analysis: BTEX

procedure: The sample was analyzed as outlined in US EPA "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, November, 1986, Method 8020.

results:

Benzene	less than	2	µg/Kg
Toluene		3.22	µg/Kg
Ethylbenzene	less than	2	µg/Kg
m & p-Xylenes	less than	2	µg/Kg
o-Xylene	less than	2	µg/Kg

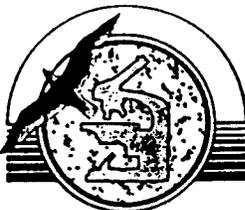
SURROGATE RECOVERY

a,a,a-Trifluorotoluene 143% See note 1

1) High surrogate recovery is due to matrix effects.

date completed: 5/6/93	tech: ELT	approved by: <i>Elise Allen</i>
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lab no.	93C01270
p.o. no.	2F2-4065-2435

sample 4065-6105-006 PHASE II UST STUDY
 description: 7132-B2 1-3 FT.
 4/21/93 1130

results:

<u>ANALYTE</u>	<u>METHOD</u>	<u>RESULT</u>
Total Petroleum Hydrocarbons	EPA 600, 418.1 SW-846, 9071	130 mg/Kg
TPH as Gasoline	SW-846, 8015 modified	less than 0.2 mg/Kg

SURROGATE RECOVERY

a,a,a-trifluorotoluene 95.5%

date completed: 5/5/93	tech: MD/ELT	approved by: <i>Edward J. Hunt</i>
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lab no:	93C01270
p.o. no.	272-4065-2435

sample 4065-6105-006 PHASE II UST STUDY
description: 7132-B2 1-3 FT.
4/21/93 1030

analysis: BTEX

procedure: The sample was analyzed as outlined in US EPA "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, November, 1986, Method 8020.

results:

Benzene	less than	2 µg/Kg
Toluene	less than	2 µg/Kg
Ethylbenzene	less than	2 µg/Kg
m & p-Xylenes	less than	2 µg/Kg
o-Xylene	less than	2 µg/Kg

SURROGATE RECOVERY

a,a,a-Trifluorotoluene 116%

date completed: 5/6/93	tech: ELT	approved by: <i>Charles Shuman</i>
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lab no.	93C01271
proj. no.	2F2-4065-2435

sample 4065-6105-006 PHASE II UST STUDY
 description: 7132-B2 9-11 FT.
 4/21/93 1130

results:

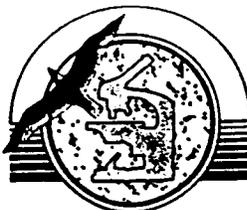
<u>ANALYTE</u>	<u>METHOD</u>	<u>RESULT</u>
Total Petroleum Hydrocarbons	EPA 600, 418.1 SW-846, 9071	11 mg/Kg
TPH as Gasoline	SW-846, 8015 modified	less than 0.2 mg/Kg

SURROGATE RECOVERY

a,a,a-trifluorotoluene 69.8%

date completed: 5/5/93	tech: MD/ELT	approved by: <i>Clarence Shindt</i>
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lab no. 93C01271
p.o. no. 2F2-4065-245

sample 4065-6105-006 PHASE II UST STUDY
description: 7132-B2 9-11 FT.
4/21/93 1130

analysis: BTEX

procedure: The sample was analyzed as outlined in US EPA "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, November, 1986, Method 8020.

results:

Benzene	less than	2 µg/Kg
Toluene	less than	2 µg/Kg
Ethylbenzene	less than	2 µg/Kg
m & p-Xylenes	less than	2 µg/Kg
o-Xylene	less than	2 µg/Kg

SURROGATE RECOVERY

a,a,a-Trifluorotoluene 130% See note 1

1) High surrogate recovery due to matrix effects.

date completed: 5/6/93	tech: ELT	approved by: <i>Edward H. Smith</i>
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lab no.	93C01272
p.o. no.	2F2-4065-2435

sample 4065-6105-006 PHASE II UST STUDY
 description: 7132-B2 11-13 FT.
 4/21/93 1130

results:

<u>ANALYTE</u>	<u>METHOD</u>	<u>RESULT</u>
Total Petroleum Hydrocarbons	EPA 600, 418.1 SW-846, 9071	26 mg/Kg
TPH as Gasoline	SW-846, 8015 modified	less than 0.2 mg/Kg

SURROGATE RECOVERY

a,a,a-trifluorotoluene 99.0%

date completed: 5/7/93	tech: MD/ELT	approved by: <i>Edward Stewart</i>
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lab no.	93C01272
P.O. NO.	272-4065-2435

sample 4065-6105-006 PHASE II UST STUDY
description: 7132-B3 11-13 FT.
4/21/93 1130

analysis: BTEX

procedure: The sample was analyzed as outlined in US EPA "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, November, 1986, Method 8020.

results:

Benzene	less than	2 µg/Kg
Toluene	less than	2 µg/Kg
Ethylbenzene	less than	2 µg/Kg
m & p-Xylenes	less than	2 µg/Kg
o-Xylene	less than	2 µg/Kg

SURROGATE RECOVERY

a,a,a-Trifluorotoluene 94.2%

date completed: 5/7/93	tech: ELT	approved by: <i>Edward Stewart</i>
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lab no: 93C01273
p.o. no: 2F2-4065-2435

sample 4065-6105-006 PHASE II UST STUDY
 description: 7132-B3 7-9 FT.
 4/21/93 1430

results:

<u>ANALYTE</u>	<u>METHOD</u>	<u>RESULT</u>
Total Petroleum Hydrocarbons	EPA 600, 418.1 SW-B46, 9071	13 mg/Kg
TPH as Gasoline	SW-B46, 8015 modified	less than 0.2 mg/Kg

SURROGATE RECOVERY

a,a,a-trifluorotoluene 101%

report completed: 5/7/93	tech: MD/ELT	approved by: <i>Edward J. Smith</i>
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job no.	93C01273
p.o. no.	2F2-4065-235

sample: 4065-6105-006 PHASE II UST STUDY
description: 7132-B3 7-9 FT.
4/21/93 1430

analysis: BTEX

procedure: The sample was analyzed as outlined in US EPA "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, November, 1986, Method 8020.

results:

Benzene	less than	2 µg/Kg
Toluene	less than	2 µg/Kg
Ethylbenzene	less than	2 µg/Kg
m & p-Xylenes	less than	2 µg/Kg
o-Xylene	less than	2 µg/Kg

SURROGATE RECOVERY

a,a,a-Trifluorotoluene 97.3%

date completed: 5/7/93	tech: ELT	approved by: <i>Charles Stewart</i>
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lab no. 93C01274
 p.o. no. 2E2-4065-2435

sample 4065-6105-006 PHASE II UST STUDY
 description: 7132-B3 11-13 FT.
 4/21/93 1430

results:

<u>ANALYTE</u>	<u>METHOD</u>	<u>RESULT</u>
Total Petroleum Hydrocarbons	EPA 600, 418.1 SW-846, 9071	less than 10 mg/Kg
TPH as Gasoline	SW-846, 8015 modified	less than 0.2 mg/Kg

SURROGATE RECOVERY

a,a,a-trifluorotoluene 69.9%

report completed: 5/7/93 tech: MD/ELT approved by: *Michael Stewart*

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lab no. 93C01274
p.o. no. 22-4065-233

sample 4065-6105-006 PHASE II UST STUDY
description: 7132-B3 11-13 FT.
4/21/93 1430

analysis: BTEX

procedure: The sample was analyzed as outlined in US EPA "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, November, 1986, Method 8020.

results:

Benzene	less than	2 µg/Kg
Toluene	less than	2 µg/Kg
Ethylbenzene	less than	2 µg/Kg
m & p-Xylenes	less than	2 µg/Kg
o-Xylene	less than	2 µg/Kg

SURROGATE RECOVERY

a,a,a-Trifluorotoluene 68.1% See note 1

1) Low surrogate recovery is due to matrix effects.

date completed: 5/7/93	tech: ELT	approved by: <i>Charles Shurt</i>
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lab no: 93C01275
 P. 9. 09
 2F2-4065-2435

sample 4065-6105-006 PHASE II UST STUDY
 description: 7132-B3 13-15 FT.
 4/21/93 1430

results:

<u>ANALYTE</u>	<u>METHOD</u>	<u>RESULT</u>
Total Petroleum Hydrocarbons	EPA 600, 418.1 SW-846, 9071	15 mg/Kg
TPH as Gasoline	SW-846, 8015 modified	less than 0.2 mg/Kg

SURROGATE RECOVERY

a,a,a-trifluorotoluene 70.7%

date completed: 5/7/93 tech: MD/ELT approved by: *Edward Shurt*

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lab no.	93C01275
P.O. NO.	4065-2135

sample: 4065-6105-006 PHASE II UST STUDY
description: 7132-B3 13-15 FT.
4/21/93 1430

analysis: BTEX

procedure: The sample was analyzed as outlined in US EPA "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, November, 1986, Method 8020.

results:

Benzene	less than	2 µg/Kg
Toluene	less than	2 µg/Kg
Ethylbenzene	less than	2 µg/Kg
m & p-Xylenes	less than	2 µg/Kg
o-Xylene	less than	2 µg/Kg

SURROGATE RECOVERY

a,a,a-Trifluorotoluene 69.2% See note 1

1) Low surrogate recovery is due to matrix effects.

date completed: 5/7/93	tech: ELT	approved by: <i>Edward Sherrill</i>
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lab no. 93C01422
 P.O. no. 2E2-4065-2435

sample 4065-6105-006 PHASE II UST STUDY
 description: 7132 B-4 4'-6'
 4/26/93 10:57

results:

<u>ANALYTE</u>	<u>METHOD</u>	<u>RESULT</u>
Total Petroleum Hydrocarbons	EPA 600, 418.1 SW-846, 9071	60 mg/Kg
TPH as Gasoline	SW-846, 8015 modified	less than 0.2 mg/Kg

SURROGATE RECOVERY

a,a,a-trifluorotoluene 95.8%

date completed: 5/12/93
 tech: MD/ELT
 approved by: *Edward Street*

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lab no.	93C01422
p.o. no.	2F2-4065-2435

sample description: 4065-6105-006 PHASE II UST STUDY
7132 B-4 4'-6'
4/26/93 10:57

analysis: BTEX

procedure: The sample was analyzed as outlined in US EPA "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, November, 1986, Method 8020.

results:

Benzene	less than	2 µg/Kg
Toluene	less than	2 µg/Kg
Ethylbenzene	less than	2 µg/Kg
m & p-Xylenes	less than	2 µg/Kg
o-Xylene		2.78 µg/Kg

SURROGATE RECOVERY

a,a,a-Trifluorotoluene 93.2%

date completed: 5/10/93	tech: ELT	approved by: <i>Charles Shind</i>
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lab no:	93C01423
p.o. no:	2E2-4065-2435

sample 4065-6105-006 PHASE II UST STUDY
 description: 7132 B-4 6'-8'
 4/26/93 11:00

results:

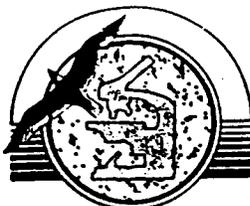
<u>ANALYTE</u>	<u>METHOD</u>	<u>RESULT</u>
Total Petroleum Hydrocarbons	EPA 600, 418.1 SW-846, 9071	77 mg/Kg
TPH as Gasoline	SW-846, 8015 modified	less than 0.2 mg/Kg

SURROGATE RECOVERY

a,a,a-trifluorotoluene 92.9%

completed: 5/12/93	tech: MD/ELT	approved by: <i>[Signature]</i>
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lab no:	73C01423
p.o. no:	
ref no:	2F2-4065-235

sample: 4065-6105-006 UST STUDY - PHASE II
description: 7132 B-4 6'-8'
4/26/93 11:00

analysis: BTEX

procedure: The sample was analyzed as outlined in US EPA "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, November, 1986, Method 8020.

results:

Benzene	less than	2 µg/Kg
Toluene	less than	2 µg/Kg
Ethylbenzene	less than	2 µg/Kg
m & p-Xylenes	less than	2 µg/Kg
o-Xylene	less than	2 µg/Kg

SURROGATE RECOVERY

a,a,a-Trifluorotoluene 89.8%

date completed: 5/10/93	tech: ELT	approved by: <i>Elise Allen</i>
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lab no: 93C01424
 p.o. no: 2E2-4065-2435

sample 4065-6105-006 PHASE II UST STUDY
 description: 7132 B-4 10'-12'
 4/26/93 11:10

results:

<u>ANALYTE</u>	<u>METHOD</u>	<u>RESULT</u>
Total Petroleum Hydrocarbons	EPA 600, 418.1 SW-846, 9071	17 mg/Kg
TPH as Gasoline	SW-846, 8015 modified	less than 0.2 mg/Kg

SURROGATE RECOVERY

a,a,a-trifluorotoluene 66.5%

date completed: 5/12/93 tech: MD/ELT approved by: Edward Sheet

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lab no. 93C01424
p.o. no. 4065-2435

sample 4065-6105-006 UST STUDY - PHASE II
description: 7132 B-4 10'-12'
4/26/93 11:10

analysis: BTEX

procedure: The sample was analyzed as outlined in US EPA "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, November, 1986, Method 8020.

results:

Benzene	less than	2 µg/Kg
Toluene	less than	2 µg/Kg
Ethylbenzene	less than	2 µg/Kg
m & p-Xylenes	less than	2 µg/Kg
o-Xylene	less than	2 µg/Kg

SURROGATE RECOVERY

a,a,a-Trifluorotoluene 94.8%

completed: 4/11/93	tech: ELT	approved by: <i>Edward Shindt</i>
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lab no.	93C01267
pp. no.	2F2-4065-2435

sample description: 4065-6105-006 PHASE II UST STUDY
 7132-B1 8-10 FT.
 4/21/93 1030

analysis: Polynuclear Aromatic Hydrocarbons

procedure: The sample was analyzed as outlined in US EPA "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, November, 1986, Method 8100.

results:

COMPOUND	METHOD PQL (mg/Kg)	RESULTS (mg/Kg)
Acenaphthene	less than 0.1	less than 0.1
Acenaphthylene	less than 0.1	less than 0.1
Anthracene	less than 0.1	less than 0.1
Benzo (a) anthracene	less than 0.1	less than 0.1
Benzo (a) pyrene	less than 0.1	less than 0.1
Benzo (b) fluoroanthene	less than 0.1	less than 0.1
Benzo (k) fluoroanthene	less than 0.1	less than 0.1
Benzo (ghi) perylene	less than 0.1	less than 0.1
Chrysene	less than 0.1	less than 0.1
Dibenzo(a,h)anthracene	less than 0.1	less than 0.1
Fluoranthene	less than 0.1	less than 0.1
Fluorene	less than 0.1	less than 0.1
Indeno(1,2,3-cd)pyrene	less than 0.1	less than 0.1
Naphthalene	less than 0.1	less than 0.1
Phenanthrene	less than 0.1	less than 0.1
Pyrene	less than 0.1	0.20

Surrogate Recovery

Compound	% Recovery
2-Fluorobiphenyl	94.8%
p-Terphenyl-d14	121%

- 1) A value reported as "less than" indicates the analyte was not detected. The number is the quantification limit for the sample.
- 2) A value in parenthesis following a "less than" value indicates the analyte was detectable but below the limit of quantification. The value is an estimate only.
- 3) Due to the multi-component nature of petroleum hydrocarbon fuels, the majority of which falls within the retention time window which include PAH's, a strong possibility exists for the detection of false positives in samples where hydrocarbon fuels are detected.

date completed: 1/6/93	tech: PDB/KJY/AMG/GJB/RJS	approved by: <i>[Signature]</i>
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lab no. 93C01248
 p.p. no. 2E2-4065-2435

sample description: 4065-6105-006 PHASE II UST STUDY
 7132-B1 12-14 FT.
 4/21/93 1030

analysis: Polynuclear Aromatic Hydrocarbons

procedure: The sample was analyzed as outlined in US EPA "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, November, 1986, Method 8100.

results:

COMPOUND	METHOD PQL (mg/Kg)	RESULTS (mg/Kg)
Acenaphthene	less than 0.1	less than 0.1
Acenaphthylene	less than 0.1	less than 0.1
Anthracene	less than 0.1	less than 0.1
Benzo (a) anthracene	less than 0.1	less than 0.1
Benzo (a) pyrene	less than 0.1	less than 0.1
Benzo (b) fluoroanthene	less than 0.1	less than 0.1
Benzo (k) fluoroanthene	less than 0.1	less than 0.1
Benzo (ghi) perylene	less than 0.1	less than 0.1
Chrysene	less than 0.1	less than 0.1
Dibenzo(a,h)anthracene	less than 0.1	less than 0.1
Fluoranthene	less than 0.1	less than 0.1
Fluorene	less than 0.1	less than 0.1
Indeno(1,2,3-cd)pyrene	less than 0.1	less than 0.1
Naphthalene	less than 0.1	less than 0.1
Phenanthrene	less than 0.1	less than 0.1
Pyrene	less than 0.1	0.13

Surrogate Recovery

Compound	% Recovery
2-Fluorobiphenyl	71.3%
p-Terphenyl-d14	95.8%

- 1) A value reported as "less than" indicates the analyte was not detected. The number is the quantification limit for the sample.
- 2) A value in parenthesis following a "less than" value indicates the analyte was detectable but below the limit of quantification. The value is an estimate only.
- 3) Due to the multi-component nature of petroleum hydrocarbon fuels, the majority of which falls within the retention time window which include PAH's, a strong possibility exists for the detection of false positives in samples where hydrocarbon fuels are detected.

Report completed: 5/6/93
 Tech: PDB/KJY/AMG/GJB/RJS
 Approved by: *Charles Stewart*

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lab no. 93C01269
 p.o. no. 2F2-4065-2435

sample description: 4065-6105-006 PHASE II UST STUDY
 7132-B1 14-15 FT.
 4/21/93 1030

analysis: Polynuclear Aromatic Hydrocarbons

procedure: The sample was analyzed as outlined in US EPA "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, November, 1986, Method 8100.

results:

COMPOUND	METHOD PQL (mg/Kg)	RESULTS (mg/Kg)
Acenaphthene	less than 0.1	less than 0.1
Acenaphthylene	less than 0.1	less than 0.1
Anthracene	less than 0.1	less than 0.1
Benzo (a) anthracene	less than 0.1	less than 0.1
Benzo (a) pyrene	less than 0.1	less than 0.1
Benzo (b) fluoroanthene	less than 0.1	less than 0.1
Benzo (k) fluoroanthene	less than 0.1	less than 0.1
Benzo (ghi) perylene	less than 0.1	less than 0.1
Chrysene	less than 0.1	less than 0.1
Dibenzo(a,h)anthracene	less than 0.1	less than 0.1
Fluoranthene	less than 0.1	less than 0.1
Fluorene	less than 0.1	less than 0.1
Indeno(1,2,3-cd)pyrene	less than 0.1	less than 0.1
Naphthalene	less than 0.1	less than 0.1
Phenanthrene	less than 0.1	less than 0.1
Pyrene	less than 0.1	0.12

Surrogate Recovery

Compound	% Recovery
2-Fluorobiphenyl	95.4%
p-Terphenyl-d14	124%

- 1) A value reported as "less than" indicates the analyte was not detected. The number is the quantification limit for the sample.
- 2) A value in parenthesis following a "less than" value indicates the analyte was detectable but below the limit of quantification. The value is an estimate only.
- 3) Due to the multi-component nature of petroleum hydrocarbon fuels, the majority of which falls within the retention time window which include PAH's, a strong possibility exists for the detection of false positives in samples where hydrocarbon fuels are detected.

date completed: 5/6/93 tech: PDB/KJY/RJS/AMG/GJB approved by: *Edward J. Hunt*

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lab no. 93C01270
 p.o. no. 2F2-4065-2435

sample description: 4065-6105-006 PHASE II UST STUDY
 7132-B2 1-3 FT.
 4/21/93 1130

analysis: Polynuclear Aromatic Hydrocarbons

procedure: The sample was analyzed as outlined in US EPA "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, November, 1986, Method 8100.

results:

COMPOUND	METHOD PQL (mg/Kg)	RESULTS (mg/Kg)
Acenaphthene	less than 0.1	less than 0.1
Acenaphthylene	less than 0.1	0.74
Anthracene	less than 0.1	0.81
Benzo (a) anthracene	less than 0.1	3.8
Benzo (a) pyrene	less than 0.1	4.0
Benzo (b) fluoroanthene	less than 0.1	3.4
Benzo (k) fluoroanthene	less than 0.1	4.3
Benzo (ghi) perylene	less than 0.1	2.8
Chrysene	less than 0.1	3.6
Dibenzo(a,h)anthracene	less than 0.1	less than 0.1
Fluoranthene	less than 0.1	6.1
Fluorene	less than 0.1	less than 0.1
Indeno(1,2,3-cd)pyrene	less than 0.1	2.7
Naphthalene	less than 0.1	less than 0.1
Phenanthrene	less than 0.1	1.2
Pyrene	less than 0.1	6.1

Surrogate Recovery

Compound	% Recovery
2-Fluorobiphenyl	74.6%
p-Terphenyl-d14	112%

- 1) A value reported as "less than" indicates the analyte was not detected. The number is the quantification limit for the sample.
- 2) A value in parenthesis following a "less than" value indicates the analyte was detectable but below the limit of quantification. The value is an estimate only.
- 3) Due to the multi-component nature of petroleum hydrocarbon fuels, the majority of which falls within the retention time window which include PAH's, a strong possibility exists for the detection of false positives in samples where hydrocarbon fuels are detected.

date completed: 5/6/93 tech: PDB/KJY/AMG/GJB/RJS approved by: *Edward Shurt*

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lab no. 93C01271
 p.o. no. 2F2-4065-2435

sample description: 4065-6105-006 PHASE II UST STUDY
 7132-B2 9-11 FT.
 4/21/93 1130

analysis: Polynuclear Aromatic Hydrocarbons

procedure: The sample was analyzed as outlined in US EPA "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, November, 1986, Method 8100.

results:

COMPOUND	METHOD PQL (mg/Kg)	RESULTS (mg/Kg)
Acenaphthene	less than 0.1	less than 0.1
Acenaphthylene	less than 0.1	less than 0.1
Anthracene	less than 0.1	less than 0.1
Benzo (a) anthracene	less than 0.1	less than 0.1
Benzo (a) pyrene	less than 0.1	less than 0.1
Benzo (b) fluoroanthene	less than 0.1	less than 0.1
Benzo (k) fluoroanthene	less than 0.1	less than 0.1
Benzo (ghi) perylene	less than 0.1	less than 0.1
Chrysene	less than 0.1	less than 0.1
Dibenzo(a,h)anthracene	less than 0.1	less than 0.1
Fluoranthene	less than 0.1	0.12
Fluorene	less than 0.1	less than 0.1
Indeno(1,2,3-cd)pyrene	less than 0.1	less than 0.1
Naphthalene	less than 0.1	less than 0.1
Phenanthrene	less than 0.1	less than 0.1
Pyrene	less than 0.1	0.19

Surrogate Recovery

Compound	% Recovery
2-Fluorobiphenyl	92.6%
p-Terphenyl-d14	120%

- 1) A value reported as "less than" indicates the analyte was not detected. The number is the quantification limit for the sample.
- 2) A value in parenthesis following a "less than" value indicates the analyte was detectable but below the limit of quantification. The value is an estimate only.
- 3) Due to the multi-component nature of petroleum hydrocarbon fuels, the majority of which falls within the retention time window which include PAH's, a strong possibility exists for the detection of false positives in samples where hydrocarbon fuels are detected.

report completed: 5/6/93
 tech: PDB/KJY/RJS/AMG/GJB
 approved by: *Edward Sheetz*

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lab no. 93C01272
 P.O. no. 2F2-4065-2435

sample description: 4065-6105-006 PHASE II UST STUDY
 7132-B2 11-13 FT.
 4/21/93 1130

analysis: Polynuclear Aromatic Hydrocarbons

procedure: The sample was analyzed as outlined in US EPA "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, November, 1986, Method 8100.

results:

COMPOUND	METHOD PQL (mg/Kg)	RESULTS (mg/Kg)
Acenaphthene	less than 0.1	less than 0.1
Acenaphthylene	less than 0.1	less than 0.1
Anthracene	less than 0.1	less than 0.1
Benzo (a) anthracene	less than 0.1	less than 0.1
Benzo (a) pyrene	less than 0.1	less than 0.1
Benzo (b) fluoroanthene	less than 0.1	less than 0.1
Benzo (k) fluoroanthene	less than 0.1	less than 0.1
Benzo (ghi) perylene	less than 0.1	less than 0.1
Chrysene	less than 0.1	less than 0.1
Dibenzo(a,h)anthracene	less than 0.1	less than 0.1
Fluoranthene	less than 0.1	less than 0.1
Fluorene	less than 0.1	less than 0.1
Indeno(1,2,3-cd)pyrene	less than 0.1	less than 0.1
Naphthalene	less than 0.1	less than 0.1
Phenanthrene	less than 0.1	less than 0.1
Pyrene	less than 0.1	0.12

Surrogate Recovery

Compound	% Recovery
2-Fluorobiphenyl	81.3%
p-Terphenyl-d14	103%

- 1) A value reported as "less than" indicates the analyte was not detected. The number is the quantification limit for the sample.
- 2) A value in parenthesis following a "less than" value indicates the analyte was detectable but below the limit of quantification. The value is an estimate only.
- 3) Due to the multi-component nature of petroleum hydrocarbon fuels, the majority of which falls within the retention time window which include PAH's, a strong possibility exists for the detection of false positives in samples where hydrocarbon fuels are detected.

date completed: 5/6/93 tech: PDB/KJY/RJS/AMG/GJB approved by: *[Signature]*

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lab no.	93C01273
p.o. no.	2E2-4065-2435

sample 4065-6105-006 PHASE II UST STUDY
 description: 7132-B3 7-9 FT.
 4/21/93 1430

analysis: Polynuclear Aromatic Hydrocarbons

procedure: The sample was analyzed as outlined in US EPA "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, November, 1986, Method 8100.

results:

COMPOUND	METHOD PQL (mg/Kg)	RESULTS (mg/Kg)
Acenaphthene	less than 0.1	less than 0.1
Acenaphthylene	less than 0.1	less than 0.1
Anthracene	less than 0.1	less than 0.1
Benzo (a) anthracene	less than 0.1	less than 0.1
Benzo (a) pyrene	less than 0.1	less than 0.1
Benzo (b) fluoroanthene	less than 0.1	less than 0.1
Benzo (k) fluoroanthene	less than 0.1	less than 0.1
Benzo (ghi) perylene	less than 0.1	less than 0.1
Chrysene	less than 0.1	less than 0.1
Dibenzo(a,h)anthracene	less than 0.1	less than 0.1
Fluoranthene	less than 0.1	less than 0.1
Fluorene	less than 0.1	less than 0.1
Indeno(1,2,3-cd)pyrene	less than 0.1	less than 0.1
Naphthalene	less than 0.1	less than 0.1
Phenanthrene	less than 0.1	less than 0.1
Pyrene	less than 0.1	less than 0.1

Surrogate Recovery

Compound	% Recovery
2-Fluorobiphenyl	69.9%
p-Terphenyl-d14	96.1%

- 1) A value reported as "less than" indicates the analyte was not detected. The number is the quantification limit for the sample.
- 2) A value in parenthesis following a "less than" value indicates the analyte was detectable but below the limit of quantification. The value is an estimate only.

date completed: 5/10/93	tech: AMG/RJS/GJB	approved by: <i>Charles Stewart</i>
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lab no:	93C01274
proj no:	252-406-2435

sample description: 4065-6105-006 PHASE II UST STUDY
 7132-B3 11-13 FT.
 4/21/93 1430

analysis: Polynuclear Aromatic Hydrocarbons

procedure: The sample was analyzed as outlined in US EPA "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, November, 1986, Method 8100.

results:

COMPOUND	METHOD PQL (mq/Kg)	RESULTS (mq/Kg)
Acenaphthene	less than 0.1	less than 0.1
Acenaphthylene	less than 0.1	less than 0.1
Anthracene	less than 0.1	less than 0.1
Benzo (a) anthracene	less than 0.1	less than 0.1
Benzo (a) pyrene	less than 0.1	less than 0.1
Benzo (b) fluoroanthene	less than 0.1	less than 0.1
Benzo (k) fluoroanthene	less than 0.1	less than 0.1
Benzo (ghi) perylene	less than 0.1	less than 0.1
Chrysene	less than 0.1	less than 0.1
Dibenzo(a,h)anthracene	less than 0.1	less than 0.1
Fluoranthene	less than 0.1	less than 0.1
Fluorene	less than 0.1	less than 0.1
Indeno(1,2,3-cd)pyrene	less than 0.1	less than 0.1
Naphthalene	less than 0.1	less than 0.1
Phenanthrene	less than 0.1	less than 0.1
Pyrene	less than 0.1	less than 0.1

Surrogate Recovery

Compound	% Recovery
2-Fluorobiphenyl	67.4%
p-Terphenyl-d14	91.9%

- 1) A value reported as "less than" indicates the analyte was not detected. The number is the quantification limit for the sample.
- 2) A value in parenthesis following a "less than" value indicates the analyte was detectable but below the limit of quantification. The value is an estimate only.

date completed: 5/10/93	tech: AMG/RJS/GJB	approved by: <i>Edward J. ...</i>
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lab no. 93C01275
 p.o. no. 2E2-4065-2435

sample description: 4065-6105-006 PHASE II UST STUDY
 7132-B3 13-15 FT.
 4/21/93 1430

analysis: Polynuclear Aromatic Hydrocarbons

procedure: The sample was analyzed as outlined in US EPA "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, November, 1986, Method 8100.

results:

COMPOUND	METHOD PQL (mg/Kg)	RESULTS (mg/Kg)
Acenaphthene	less than 0.1	less than 0.1
Acenaphthylene	less than 0.1	less than 0.1
Anthracene	less than 0.1	less than 0.1
Benzo (a) anthracene	less than 0.1	less than 0.1
Benzo (a) pyrene	less than 0.1	less than 0.1
Benzo (b) fluoroanthene	less than 0.1	less than 0.1
Benzo (k) fluoroanthene	less than 0.1	less than 0.1
Benzo (ghi) perylene	less than 0.1	less than 0.1
Chrysene	less than 0.1	less than 0.1
Dibenzo(a,h)anthracene	less than 0.1	less than 0.1
Fluoranthene	less than 0.1	less than 0.1
Fluorene	less than 0.1	less than 0.1
Indeno(1,2,3-cd)pyrene	less than 0.1	less than 0.1
Naphthalene	less than 0.1	less than 0.1
Phenanthrene	less than 0.1	less than 0.1
Pyrene	less than 0.1	less than 0.1

Surrogate Recovery

Compound	% Recovery
2-Fluorobiphenyl	65.8%
p-Terphenyl-d14	93.8%

- 1) A value reported as "less than" indicates the analyte was not detected. The number is the quantification limit for the sample.
- 2) A value in parenthesis following a "less than" value indicates the analyte was detectable but below the limit of quantification. The value is an estimate only.

date completed: 5/10/93 tech: AMG/RJS/GJB approved by: *Elise Allen*

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lab no. 93001422
p.o. no. 42-4065-235

sample description: 4065-6105-006 PHASE II UST STUDY
 7132 B-4 4'-6'
 4/26/93 10:57

analysis: Polynuclear Aromatic Hydrocarbons

procedure: The sample was analyzed as outlined in US EPA "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, November, 1986, Method 8100.

results:

<u>COMPOUND</u>	<u>METHOD PQL (mg/Kg)</u>	<u>RESULTS (mg/Kg)</u>
Acenaphthene	less than 0.1	less than 0.1
Acenaphthylene	less than 0.1	less than 0.1
Anthracene	less than 0.1	less than 0.1
Benzo (a) anthracene	less than 0.1	less than 0.1
Benzo (a) pyrene	less than 0.1	less than 0.1
Benzo (b) fluoroanthene	less than 0.1	less than 0.1
Benzo (k) fluoroanthene	less than 0.1	less than 0.1
Benzo (ghi) perylene	less than 0.1	less than 0.1
Chrysene	less than 0.1	less than 0.1
Dibenzo(a,h)anthracene	less than 0.1	less than 0.1
Fluoranthene	less than 0.1	less than 0.1
Fluorene	less than 0.1	less than 0.1
Indeno(1,2,3-cd)pyrene	less than 0.1	less than 0.1
Naphthalene	less than 0.1	less than 0.1
Phenanthrene	less than 0.1	less than 0.1
Pyrene	less than 0.1	less than 0.1

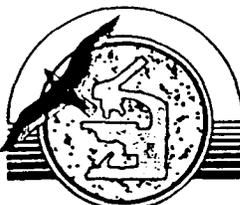
Surrogate Recovery

<u>Compound</u>	<u>% Recovery</u>
2-Fluorobiphenyl	68.7%
p-Terphenyl-d14	83.8%

- 1) A value reported as "less than" indicates the analyte was not detected. The number is the quantification limit for the sample.
- 2) A value in parenthesis following a "less than" value indicates the analyte was detectable but below the limit of quantification. The value is an estimate only.

date completed: 5/11/93	tech: AMG/RJS/GJB	approved by: <i>[Signature]</i>
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lab no. 298
93C01423
p.o. no.
262-4065-2405

sample description: 4065-6105-006 UST STUDY - PHASE II
 7132 B-4 6'-8'
 4/26/93 11:00

analysis: Polynuclear Aromatic Hydrocarbons

procedure: The sample was analyzed as outlined in US EPA "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, November, 1986, Method 8100.

results:

COMPOUND	METHOD PQL (mg/Kg)	RESULTS (mg/Kg)
Acenaphthene	less than 0.1	less than 0.1
Acenaphthylene	less than 0.1	less than 0.1
Anthracene	less than 0.1	less than 0.1
Benzo (a) anthracene	less than 0.1	less than 0.1
Benzo (a) pyrene	less than 0.1	less than 0.1
Benzo (b) fluoroanthene	less than 0.1	less than 0.1
Benzo (k) fluoroanthene	less than 0.1	less than 0.1
Benzo (ghi) perylene	less than 0.1	less than 0.1
Chrysene	less than 0.1	less than 0.1
Dibenzo(a,h)anthracene	less than 0.1	less than 0.1
Fluoranthene	less than 0.1	less than 0.1
Fluorene	less than 0.1	less than 0.1
Indeno(1,2,3-cd)pyrene	less than 0.1	less than 0.1
Naphthalene	less than 0.1	less than 0.1
Phenanthrene	less than 0.1	less than 0.1
Pyrene	less than 0.1	less than 0.1

Surrogate Recovery

Compound	% Recovery
2-Fluorobiphenyl	75.3%
p-Terphenyl-d14	88.9%

- 1) A value reported as "less than" indicates the analyte was not detected. The number is the quantification limit for the sample.
- 2) A value in parenthesis following a "less than" value indicates the analyte was detectable but below the limit of quantification. The value is an estimate only.

date completed: 5/11/93	tech: AMG/RJS/GJB	approved by: <i>Elise Allen</i>
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lab no:	93C01424
p.o. no:	272-4065-235

sample description: 4065-6105-006 UST STUDY - PHASE II
 7132 B-4 10'-12'
 4/26/93 11:10

analysis: Polynuclear Aromatic Hydrocarbons

procedure: The sample was analyzed as outlined in US EPA "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, November, 1986, Method 8100.

results:

COMPOUND	METHOD PQL (mq/Kg)	RESULTS (mq/Kg)
Acenaphthene	less than 0.1	less than 0.1
Acenaphthylene	less than 0.1	less than 0.1
Anthracene	less than 0.1	less than 0.1
Benzo (a) anthracene	less than 0.1	less than 0.1
Benzo (a) pyrene	less than 0.1	less than 0.1
Benzo (b) fluoroanthene	less than 0.1	less than 0.1
Benzo (k) fluoroanthene	less than 0.1	less than 0.1
Benzo (ghi) perylene	less than 0.1	less than 0.1
Chrysene	less than 0.1	less than 0.1
Dibenzo(a,h)anthracene	less than 0.1	less than 0.1
Fluoranthene	less than 0.1	less than 0.1
Fluorene	less than 0.1	less than 0.1
Indeno(1,2,3-cd)pyrene	less than 0.1	less than 0.1
Naphthalene	less than 0.1	less than 0.1
Phenanthrene	less than 0.1	0.225
Pyrene	less than 0.1	less than 0.1

Surrogate Recovery

Compound	% Recovery
2-Fluorobiphenyl	77.5%
p-Terphenyl-d14	90.6%

- 1) A value reported as "less than" indicates the analyte was not detected. The number is the quantification limit for the sample.
- 2) A value in parenthesis following a "less than" value indicates the analyte was detectable but below the limit of quantification. The value is an estimate only.
- 3) Due to the multi-component nature of petroleum hydrocarbon fuels, the majority of which falls within the retention time window which include PAH's, a strong possibility exists for the detection of false positives in samples where hydrocarbon fuels are detected.

date completed: 5/11/93	tech: AMG/RJS/GJB	approved by: <i>Elise Allen</i>
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lab no.
93001546
p.o. no.
2F2-4065-2435

sample 4065-6105-006 PLUM BROOK UST STUDY
description: 7132-MW-1
5/4/93 1020

analysis: BTEX

procedure: The sample was analyzed as outlined in US EPA "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, November, 1986, Method 8020.

results:

Benzene	less than 0.5 µg/L
Toluene	less than 0.5 µg/L
Ethylbenzene	less than 0.5 µg/L
m & p-Xylenes	less than 0.5 µg/L
o-Xylene	less than 0.5 µg/L

SURROGATE RECOVERY

a,a,a-Trifluorotoluene 99.8%

completed: 14/93	tech: ELT	approved by: <i>Elise Allen</i>
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lab no.
93C01550
proj. no.
2F2-4065-2435

sample 4065-6105-006 PLUM BROOK UST STUDY
description: 7132-MW-1-A
1345

analysis: BTEX

procedure: The sample was analyzed as outlined in US EPA "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, November, 1986, Method 8020.

results:

Benzene	less than 0.5 µg/L
Toluene	less than 0.5 µg/L
Ethylbenzene	less than 0.5 µg/L
m & p-Xylenes	less than 0.5 µg/L
o-Xylene	less than 0.5 µg/L

SURROGATE RECOVERY

a,a,a-Trifluorotoluene 99.7%

completed: 11/14/93	tech: ELT	approved by: <i>Charles Skicco</i>
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lab no. 93C01548
p.o. no. 2F2-4065-2435

sample 4065-6105-006 PLUM BROOK UST STUDY
description: 7132-EB + ~~EB~~ PBS-GM-04
5/4/93 1330

analysis: BTEX

procedure: The sample was analyzed as outlined in US EPA "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, November, 1986, Method 8020.

results:

Benzene	less than 0.5 µg/L
Toluene	less than 0.5 µg/L
Ethylbenzene	less than 0.5 µg/L
m & p-Xylenes	less than 0.5 µg/L
o-Xylene	less than 0.5 µg/L

SURROGATE RECOVERY

a,a,a-Trifluorotoluene 99.0%

completed: /14/93	tech: ELT	approved by: <i>Edward Stewart</i>
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lab no:
 93601547
 do no:
 2E2-4065-2435

sample description: 4065-6105-006 PLUM BROOK UST STUDY
 7132-MW-1
 5/4/93 1025

analysis: Polynuclear Aromatic Hydrocarbons

procedure: The sample was analyzed as outlined in US EPA "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods", SW-846, Third Edition, November 1986, Method 8100.

results:

COMPOUND	METHOD PQL (µg/L)	RESULTS (µg/L)
Acenaphthene	less than 1.0	1.05
Acenaphthylene	less than 1.0	less than 1.0
Anthracene	less than 1.0	less than 1.0
Benzo (a) anthracene	less than 1.0	less than 1.0
Benzo (a) pyrene	less than 1.0	less than 1.0
Benzo (b) fluoroanthene	less than 1.0	less than 1.0
Benzo (k) fluoroanthene	less than 1.0	less than 1.0
Benzo (ghi) perylene	less than 1.0	less than 1.0
Chrysene	less than 1.0	less than 1.0
Dibenzo(a,h)anthracene	less than 1.0	less than 1.0
Fluoranthene	less than 1.0	less than 1.0
Fluorene	less than 1.0	less than 1.0
Indeno(1,2,3-cd)pyrene	less than 1.0	less than 1.0
Naphthalene	less than 1.0	less than 1.0
Phenanthrene	less than 1.0	1.14
Pyrene	less than 1.0	less than 1.0

Surrogate Recovery

<u>Compound</u>	<u>% Recovery</u>
2-Fluorobiphenyl	58.8%
p-Terphenyl-d14	77.9%

- 1) A value reported as "less than" indicates the analyte was not detected. The number is the quantification limit for the sample.
- 2) A value in parenthesis following a "less than" value indicates the analyte was detectable but below the limit of quantification. The value is an estimate only.
- 3) Due to the multi-component nature of petroleum hydrocarbon fuels, the majority of which fall within the retention time window which also includes PAH's, a strong possibility exists for the detection of false positives in samples where hydrocarbon fuels are detected.

completed: 5/13/93 tech: RJS/GJB/AMG approved by: *Charles K. Smith*

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lab no: 93001551
 date: 2F2-4065-2435

sample description: 4065-6105-006 PLUM BROOK UST STUDY
 7132-MW-1-A
 1345

analysis: Polynuclear Aromatic Hydrocarbons

procedure: The sample was analyzed as outlined in US EPA "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods", SW-846, Third Edition, November 1986, Method 8100.

results:

COMPOUND	METHOD PQL (µg/L)	RESULTS (µg/L)
Acenaphthene	less than 1.0	less than 1.0
Acenaphthylene	less than 1.0	less than 1.0
Anthracene	less than 1.0	less than 1.0
Benzo (a) anthracene	less than 1.0	less than 1.0
Benzo (a) pyrene	less than 1.0	less than 1.0
Benzo (b) fluoroanthene	less than 1.0	less than 1.0
Benzo (k) fluoroanthene	less than 1.0	less than 1.0
Benzo (ghi) perylene	less than 1.0	less than 1.0
Chrysene	less than 1.0	less than 1.0
Dibenzo(a,h)anthracene	less than 1.0	less than 1.0
Fluoranthene	less than 1.0	less than 1.0
Fluorene	less than 1.0	less than 1.0
Indeno(1,2,3-cd)pyrene	less than 1.0	less than 1.0
Naphthalene	less than 1.0	less than 1.0
Phenanthrene	less than 1.0	1.07
Pyrene	less than 1.0	less than 1.0

Surrogate Recovery

Compound	% Recovery
2-Fluorobiphenyl	57.9%
p-Terphenyl-d14	80.2%

- 1) A value reported as "less than" indicates the analyte was not detected. The number is the quantification limit for the sample.
- 2) A value in parenthesis following a "less than" value indicates the analyte was detectable but below the limit of quantification. The value is an estimate only.
- 3) Due to the multi-component nature of petroleum hydrocarbon fuels, the majority of which fall within the retention time window which also includes PAH's, a strong possibility exists for the detection of false positives in samples where hydrocarbon fuels are detected.

completed: 1/13/93 tech: RJS/GJB/AMG approved by: *Edward J. ...*

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lab no.	93601549
proj no.	2F2-4065-2435

sample description: 4065-6105-006 PLUM BROOK UST STUDY
 7132-~~EB~~ → **PBS-Gm-04**
 5/4/93 1330

analysis: Polynuclear Aromatic Hydrocarbons

procedure: The sample was analyzed as outlined in US EPA "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods", SW-846, Third Edition, November 1986, Method 8100.

results:

COMPOUND	METHOD PQL (µg/L)	RESULTS (µg/L)
Acenaphthene	less than 1.0	less than 1.0
Acenaphthylene	less than 1.0	less than 1.0
Anthracene	less than 1.0	less than 1.0
Benzo (a) anthracene	less than 1.0	less than 1.0
Benzo (a) pyrene	less than 1.0	less than 1.0
Benzo (b) fluoroanthene	less than 1.0	less than 1.0
Benzo (k) fluoroanthene	less than 1.0	less than 1.0
Benzo (ghi) perylene	less than 1.0	less than 1.0
Chrysene	less than 1.0	less than 1.0
Dibenzo(a,h)anthracene	less than 1.0	less than 1.0
Fluoranthene	less than 1.0	less than 1.0
Fluorene	less than 1.0	less than 1.0
Indeno(1,2,3-cd)pyrene	less than 1.0	less than 1.0
Naphthalene	less than 1.0	less than 1.0
Phenanthrene	less than 1.0	less than 1.0
Pyrene	less than 1.0	less than 1.0

Surrogate Recovery

Compound	% Recovery
2-Fluorobiphenyl	68.6%
p-Terphenyl-d14	88.8%

- 1) A value reported as "less than" indicates the analyte was not detected. The number is the quantification limit for the sample.
- 2) A value in parenthesis following a "less than" value indicates the analyte was detectable but below the limit of quantification. The value is an estimate only.

analysis completed: 5/13/93	tech: RJS/GJB/AMG	approved by: <i>Edward Pruitt</i>
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lab no. 93C01651
 phone 216-4065-2435

Sample Description: 4065-6105-006 PLUM BROOK UST STUDY
 7121/7131 - MW-4
 5/6/93 0830

Analysis: GAS CHROMATOGRAPHY/MASS SPECTROMETRY FOR VOLATILE ORGANICS

Procedure: The sample was analyzed as outlined in US EPA "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, November 1986, Method 8240.

Results:	COMPOUND	METHOD PQL (µg/L)	RESULT (µg/L)
	Acrolein	10	< 10
	Acrylonitrile	10	< 10
	Acetone	10	< 10
	Benzene	1	< 1
	Bromodichloromethane	1	< 1
	Bromoform	1	< 1
	Bromomethane	1	< 1
	2-Butanone (MEK)	10	< 10
	Carbon disulfide	1	< 1
	Carbon tetrachloride	1	< 1
	Chlorobenzene	1	< 1
	Chlorodibromomethane	1	< 1
	Chloroethane	2	< 2
	2-Chloroethyl vinyl ether	2	< 2
	Chloroform	1	< 1
	Chloromethane	1	< 1
	1,2-Dibromoethane (EDB)	1	< 1
	Dibromomethane	1	< 1
	1,2-Dichlorobenzene	1	< 1
	1,3-Dichlorobenzene	1	< 1
	1,4-Dichlorobenzene	1	< 1
	1,4-Dichloro-2-butene	2	< 2
	Dichlorodifluoromethane	1	< 1
	1,1-Dichloroethane	1	18.0
	1,2-Dichloroethane	1	< 1
	1,1-Dichloroethene	1	1.74
	cis-1,2-Dichloroethene	1	< 1
	trans-1,2-Dichloroethene	1	< 1
	1,2-Dichloropropane	1	< 1
	cis-1,3-Dichloropropene	1	< 1

Completed: 5/17/93 tech: JM approved by: Edward Street

McK-Ferguson

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lab no.	93C01651
bio no.	2F2-4065-2435

sample 4065-6105-006 PLUM BROOK UST STUDY
 description: 7121/7131 - MW-4
 5/6/93 0830

analysis: GAS CHROMATOGRAPHY/MASS SPECTROMETRY FOR VOLATILE ORGANICS

results: Continued

COMPOUND	METHOD PQL (µg/L)	RESULT (µg/L)
trans-1,3-Dichloropropene	1	< 1
Ethyl acetate	2	< 2
Ethyl benzene	1	< 1
Ethyl ether	2	< 2
Ethyl methacrylate	1	< 1
2-Hexanone	2	< 2
Methylene chloride	1	< 1
Methyl iodide	1	< 1
4-Methyl-2-pentanone (MIBK)	10	< 10
Naphthalene	1	< 1
Styrene	1	< 1
1,1,1,2-Tetrachloroethane	1	< 1
1,1,2,2-Tetrachloroethane	1	< 1
Tetrachloroethene	1	< 1
Tetrahydrofuran	2	< 2
Toluene	1	< 1
1,1,1-Trichloroethane	1	< 1
1,1,2-Trichloroethane	1	< 1
Trichloroethene	1	< 1
Trichlorofluoromethane	1	< 1
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	1	< 1
1,2,3-Trichloropropane	1	< 1
Vinyl acetate	2	< 2
Vinyl chloride	1	< 1
m & p-Xylenes	1	< 1
o-Xylene	1	< 1

completed: 17/93	tech: JM	approved by: <i>Edward H. Smith</i>
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Page 3 of 3

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lab no:	93001651
date:	02-20-93

sample: 4065-6105-006 PLUM BROOK UST STUDY
description: 7121/7131 - MW-4
5/6/93 0830
analysis: VOLATILE ORGANICS
results: continued

Surrogate Recovery - Volatiles

<u>Compound</u>	<u>% Recovery</u>	<u>Acceptable Range</u>
1,2-Dichloroethane-d4	98.9%	76-114
Toluene-d8	98.0%	88-110
4-Bromofluorobenzene	100%	86-115

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- 2) A value in parenthesis following a "less than" value indicates the analyte was detectable but below the limit of quantification. The value is an estimate only.

completed: 1/17/93 tech: JM approved by: *Charles Stewart*