

Mr. Keith Nowell  
Alameda County Environmental Health  
Department of Environmental Health  
1131 Harbor Bay Parkway, 2<sup>nd</sup> Floor  
Alameda, CA 94502-6577

**RECEIVED**

*11:30 am, May 22, 2012*

Alameda County  
Environmental Health

**Re: Former Exxon Station**

5175 Broadway  
Oakland, California  
ACEH File No. 139  
SFRWQCB Site No. 01-0958  
UST Fund Claim No. 3406

Dear Mr. Nowell:

I, Mr. Ernie Nadel, have retained Pangea Environmental Services, Inc. (Pangea) as the environmental consultant for the project referenced above. Pangea is submitting the attached report on my behalf.

I declare, under penalty of perjury, that the information and/or recommendations contained in the attached report are true and correct to the best of my knowledge.

Sincerely,



Ernie Nadel  
Rockridge Heights, LLC



April 9, 2012

Deidre Mena  
EBMUD  
Environmental Services Division  
P.O. Box 24055, MS#702  
Oakland, CA 94623-1055

Re: **Semi-Annual Discharge Compliance Report – October 2011 to March 2012**  
Groundwater Remediation, 5175 Broadway, Oakland, California

Dear Ms. Mena:

Pangea Environmental Services, Inc. (Pangea) has prepared this *Semi-Annual Discharge Compliance Report – October 2011 to March 2012* for the subject site for the period of September 27, 2011 to March 31, 2012. As specified in the Wastewater Discharge Permit #50649181 issued August 20, 2010, discharge compliance reports are required semi-annually by the East Bay Municipal Utility District (EBMUD). This report presents the semi-annual test results -- no regulated substances (petroleum hydrocarbons) were detected in the system effluent compliance point. Described below are background information, system operation and performance, and system sampling.

## **BACKGROUND INFORMATION**

DPE system installation was required and approved by the Alameda County Environmental Health (ACEH) to cleanup residual petroleum hydrocarbons from a prior unauthorized release. The DPE system consists of an aboveground vacuum pump to simultaneously extract soil vapor and groundwater. The groundwater treatment equipment consists of a 200-gallon vapor/liquid separator (knockout tank), transfer pump, a particulate filter vessel, two 200-lb activated carbon vessels connected in series, and a water totalizer meter. Once the transfer tank becomes full, the transfer pump is activated by level control switches in the transfer tank and pumps the groundwater through the water treatment system prior to discharge to the sanitary sewer under permit from the EBMUD.

## **SYSTEM OPERATION AND PERFORMANCE**

The DPE system commenced continuous operation on Wednesday, December 8, 2010. As of the end of this reporting period (March 31, 2012), the DPE system extracted and treated approximately 72,634 gallons of groundwater. The DPE system was shutdown on January 31, 2012 due to low removal rates. The average groundwater flow rate has ranged from approximately 0.01 to 0.13 gpm, which includes system shutdown periods. GWE system performance is summarized in Table 1. No hazardous waste was removed from the site during this reporting period.

**PANGEA Environmental Services, Inc.**

1710 Franklin Street, Suite 200, Oakland, CA 94612 Telephone 510.836.3700 Facsimile 510.836.3709 [www.pangeaenv.com](http://www.pangeaenv.com)

## SYSTEM SAMPLING

During this reporting period, samples were collected from the influent and effluent ports of the groundwater treatment system on December 22, 2011. The system operated for approximately 85 days of the reporting period. System flow data and groundwater analytical results are summarized on Table 1. Based on laboratory analytical results, the DPE system was operating in compliance with discharge permit conditions: no regulated substances (petroleum hydrocarbons) were detected in the system effluent. The laboratory analytical reports are included in Appendix A.

## CLOSING

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

If you have any questions, please email [mgillies@pangeaenv.com](mailto:mgillies@pangeaenv.com) or call me at (408)910-1783.

Sincerely,  
**Pangea Environmental Services, Inc.**



Morgan Gillies  
Project Manager

## ATTACHMENTS

Table 1 – Groundwater Extraction System Performance Summary  
Appendix A – Laboratory Analytical Reports

# Pangea

**Table 1. GWE (DPE) System Performance Summary - 5175 Broadway, Oakland, California**

Well ID	Date	Totalizer Reading <sup>1</sup> (gallons)	Interval Flow Volume (gallons)	Interval Duration (days)	Average Flow Rate (gpm)	TPHg Concentration (ug/L)	Benzene Concentration (ug/L)	MTBE Concentration (ug/L)	TPHg Removed (Lbs)	Benzene Removed (Lbs)	MTBE Removed (Lbs)	Comments
<b>System</b>	12/08/10	0	0	0	--	---	---	---	0.000	0.000	0.000	System startup testing, water not discharged to sewer yet.
<b>Influent</b>	12/10/10	248	248	2	0.09	---	---	---	0.000	0.000	0.000	Off; restart.
	12/14/10	1,120	872	4	0.15	<b>300</b>	<b>4.6</b>	<b>ND (&lt;5.0)</b>	0.002	0.000	0.000	Startup water sampling of influent (12/14)
	12/22/10	3,585	2,465	8	0.21	---	---	---	0.006	0.000	0.000	On. Shutdown due to noise, restarted 12/29.
	01/07/11	7,622	4,037	16	0.18	---	---	---	0.010	0.000	0.000	On. System off 1/14 due to noise, restart 1/19.
	02/02/11	16,840	9,218	26	0.25	<b>1,300</b>	<b>52</b>	<b>ND (&lt;10)</b>	0.100	0.004	0.000	Off on arrival; add oil and restart.
	02/22/11	25,427	8,587	20	0.30	<b>680</b>	<b>8.4</b>	<b>ND (&lt;5.0)</b>	0.049	0.001	0.000	On. Add more oil.
	02/28/11	28,855	3,428	6	0.40	---	---	---	0.019	0.000	0.000	On. Shutdown for GWM and restarted.
	03/09/11	31,981	3,126	9	0.24	---	---	---	0.018	0.000	0.000	On.
	03/15/11	34,398	2,417	6	0.28	---	---	---	0.014	0.000	0.000	On.
	03/16/11	34,961	563	1	0.39	---	---	---	0.003	0.000	0.000	On.
	03/31/11	36,763	1,802	15	0.08	---	---	---	0.010	0.000	0.000	Off. Add more soundproofing and restart.
	04/06/11	39,571	2,808	6	0.33	---	---	---	0.016	0.000	0.000	On.
	04/12/11	39,671	100	6	0.01	<b>240</b>	<b>4.8</b>	<b>ND (&lt;5.0)</b>	0.000	0.000	0.000	See NOTE below.
	04/26/11	41,195	1,524	14	0.08	---	---	---	0.003	0.000	0.000	On.
	05/04/11	41,703	508	8	0.04	---	---	---	0.001	0.000	0.000	Off. Pump overheating. Restart
	05/24/11	42,965	1,262	20	0.04	<b>66</b>	<b>0.92</b>	<b>ND (&lt;5.0)</b>	0.001	0.000	0.000	Off. Restart
	06/02/11	43,908	943	9	0.07	---	---	---	0.001	0.000	0.000	On.
	06/06/11	47,392	3,484	4	0.60	---	---	---	0.002	0.000	0.000	Off on arrival; restart. Off on departure
	07/13/11	48,851	1,459	37	0.03	---	---	---	0.001	0.000	0.000	Off on arrival; restart.
	07/21/11	51,271	2,420	8	0.21	---	---	---	0.001	0.000	0.000	Off. Restart.
	07/26/11	53,411	2,140	5	0.30	<b>68</b>	<b>0.51</b>	<b>ND (&lt;5.0)</b>	0.001	0.000	0.000	On.
	07/28/11	54,069	658	2	0.23	---	---	---	0.000	0.000	0.000	On.
	08/08/11	55,829	1,760	11	0.11	---	---	---	0.001	0.000	0.000	Off. Restart.
	08/18/11	60,036	4,207	10	0.29	---	---	---	0.002	0.000	0.000	On.
	08/31/11	61,771	1,735	13	0.09	---	---	---	0.001	0.000	0.000	Off. Restart.
	09/22/11	65,179	3,408	22	0.11	---	---	---	0.002	0.000	0.000	Off. Restart.
	09/26/11	65,389	210	4	0.04	---	---	---	0.000	0.000	0.000	Off. Restart.
	10/05/11	65,650	261	9	0.02	---	---	---	0.000	0.000	0.000	On.
	10/11/11	65,743	93	6	0.01	---	---	---	0.000	0.000	0.000	Off. Restart.
	10/18/11	65,881	138	7	0.01	---	---	---	0.000	0.000	0.000	Off. Restart.
	11/02/11	66,589	708	15	0.03	---	---	---	0.000	0.000	0.000	On.
	11/15/11	66,684	95	13	0.01	---	---	---	0.000	0.000	0.000	Off on arrival, restart.
	11/22/11	67,082	398	7	0.04	---	---	---	0.000	0.000	0.000	On.
	11/23/11	67,161	79	1	0.05	---	---	---	0.000	0.000	0.000	On.
	11/29/11	67,810	649	6	0.08	---	---	---	0.000	0.000	0.000	On.
	12/08/11	68,695	885	9	0.07	---	---	---	0.001	0.000	0.000	On.
	12/16/11	69,431	736	8	0.06	---	---	---	0.000	0.000	0.000	On.
	12/22/11	69,481	50	6	0.01	<b>ND (&lt;50)</b>	<b>ND (&lt;0.5)</b>	<b>ND (&lt;5.0)</b>	0.000	0.000	0.000	Off. Leave off for QM event 12/29.
	01/03/12	69,841	360	12	0.02	---	---	---	0.000	0.000	0.000	Off. Restart.
	01/04/12	70,027	186	1	0.13	---	---	---	0.000	0.000	0.000	On.
	01/16/12	71,127	1,100	12	0.06	---	---	---	0.000	0.000	0.000	On.
	01/31/12	72,634	1,507	15	0.07	---	---	---	0.000	0.000	0.000	On. System shutdown.
									<b>0.266</b>	<b>0.006</b>	<b>0.000</b>	<b>Total Cumulative Removal (Lbs)</b>
<b>System</b>	04/12/11	---	---	---	---	<b>ND (&lt;50)</b>	<b>ND (&lt;0.5)</b>	<b>ND (&lt;5.0)</b>	---	---	---	See NOTE below.
<b>Midpoint</b>	05/24/11	---	---	---	---	<b>ND (&lt;50)</b>	<b>ND (&lt;0.5)</b>	<b>ND (&lt;5.0)</b>	---	---	---	
	07/26/11	---	---	---	---	<b>ND (&lt;50)</b>	<b>ND (&lt;0.5)</b>	<b>ND (&lt;5.0)</b>	---	---	---	
	12/22/11	---	---	---	---	<b>ND (&lt;50)</b>	<b>ND (&lt;0.5)</b>	<b>ND (&lt;5.0)</b>	---	---	---	
<b>System</b>	12/08/10	---	---	---	---	---	---	---	---	---	---	
<b>Effluent</b>	12/14/10	---	---	---	---	<b>ND (&lt;50)</b>	<b>ND (&lt;0.5)</b>	<b>ND (&lt;5.0)</b>	---	---	---	Startup water sampling of effluent (12/14)
	02/22/11	---	---	---	---	<b>ND (&lt;50)</b>	<b>ND (&lt;0.5)</b>	<b>ND (&lt;5.0)</b>	---	---	---	
	05/24/11	---	---	---	---	<b>ND (&lt;50)</b>	<b>ND (&lt;0.5)</b>	<b>ND (&lt;5.0)</b>	---	---	---	
	07/26/11	---	---	---	---	<b>ND (&lt;50)</b>	<b>ND (&lt;0.5)</b>	<b>ND (&lt;5.0)</b>	---	---	---	
	12/22/11	---	---	---	---	<b>ND (&lt;50)</b>	<b>ND (&lt;0.5)</b>	<b>ND (&lt;5.0)</b>	---	---	---	

# Pangea

**Table 1. GWE (DPE) System Performance Summary - 5175 Broadway, Oakland, California**

Well ID	Date	Totalizer Reading <sup>1</sup> (gallons)	Interval Flow Volume (gallons)	Interval Duration (days)	Average Flow Rate (gpm)	TPHg Concentration (ug/L)	Benzene Concentration (ug/L)	MTBE Concentration (ug/L)	TPHg Removed (Lbs)	Benzene Removed (Lbs)	MTBE Removed (Lbs)	Comments									
						<table border="1"> <tr> <td><i>Discharge Limits (ug/L):</i></td> <td><i>5</i></td> <td><i>5</i></td> <td><i>5</i></td> <td><i>5</i></td> </tr> <tr> <td></td> <td><i>Benzene</i></td> <td><i>Toluene</i></td> <td><i>Ethylbenzene</i></td> <td><i>Total Xylenes</i></td> </tr> </table>				<i>Discharge Limits (ug/L):</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>		<i>Benzene</i>	<i>Toluene</i>	<i>Ethylbenzene</i>	<i>Total Xylenes</i>		
<i>Discharge Limits (ug/L):</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>																	
	<i>Benzene</i>	<i>Toluene</i>	<i>Ethylbenzene</i>	<i>Total Xylenes</i>																	

**ABBREVIATIONS AND NOTES:**

NOTE = Based on previous and subsequent analytical results Pangea switched the 4/12/11 analytical results for System Influent and Midpoint. Pangea suspects that the samples were accidentally switched by the lab or mislabeled by the technician.

1 = Initial totalizer reading was 23,559. Therefore, shown reading above 0 is actual reading minus 23,559. The 12/10/10 reading of 23,807 less 23,559 equals 248 gallons discharged.

gpm = Gallons per minute

TPHd = Total Petroleum Hydrocarbon as Diesel analyzed by EPA Method 8015B with silica gel cleanup

TPHg = Total Petroleum Hydrocarbon as Gasoline analyzed by EPA Method 8015B

Benzene analyzed by EPA Method 8021B

MTBE = Methyl tertiary butyl ether analyzed by EPA Method 8021 Cm

Toulene, Ethylbenzene and Total Xylenes analyzed by EPA Method 8015B

-- = not measured/not available

\* Estimated contaminant mass calculated by multiplying average concentration detected during period (Table 1) by volume of extracted groundwater. Uses most recent lab data.

\*\*Unless noted Toulene, Ethylbenzene and Total Xylenes non-detect (<0.5)

## **APPENDIX A**

Laboratory Analytical Reports



## Analytical Report

Pangea Environmental Svcs., Inc.  1710 Franklin Street, Ste. 200  Oakland, CA 94612	Client Project ID: 5175 Broadway; Rockridge Heights	Date Sampled: 12/22/11
		Date Received: 12/23/11
	Client Contact: Tina De La Fuente	Date Reported: 12/29/11
	Client P.O.:	Date Completed: 12/28/11

**WorkOrder: 1112710**

December 29, 2011

Dear Tina:

Enclosed within are:

- 1) The results of the **3** analyzed samples from your project: **5175 Broadway; Rockridge Heights**,
- 2) QC data for the above samples, and
- 3) A copy of the chain of custody.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits.

If you have any questions or concerns, please feel free to give me a call. Thank you for choosing McC Campbell Analytical Laboratories for your analytical needs.

Best regards,

Angela Rydelius  
Laboratory Manager  
McC Campbell Analytical, Inc.

*The analytical results relate only to the items tested.*

1112710

**McCAMPBELL ANALYTICAL, INC.**

1534 Willow Pass Rd.  
Pittsburg, CA 94565

Website: [www.mccampbell.com](http://www.mccampbell.com) Email: [main@mccampbell.com](mailto:main@mccampbell.com)  
Telephone: (925) 252-9262 Fax: (925) 252-9269

**CHAIN OF CUSTODY RECORD**

**TURN AROUND TIME**      5 DAY  
RUSH 24 HR 48 HR 72 HR  
EDF Required? Coelt (Normal) No Write On (DW) No

Report To: Tina de la Fuente Bill To: Pangea  
Company: Pangea Environmental Services, Inc.  
1710 Franklin Street, Suite 200, Oakland, CA 94612  
E-Mail: [tdelafuente@pangeaenv.com](mailto:tdelafuente@pangeaenv.com)  
Tele: (510) 836-3702 Fax: (510) 836-3709  
Project #: 5175 Broadway Project Name: Rockridge Heights  
Project Location: 5175 Broadway, Oakland, CA  
Sampler Signature: *[Signature]*

Analysis Request										Other	Comments	
BTEX & TPH as Gas (602/8020 + 8015)/MTBE												
												Filter Samples for Metals analysis: Yes / No

SAMPLE ID (Field Point Name)	LOCATION	SAMPLING		# Containers	Type Containers	MATRIX					METHOD PRESERVED			
		Date	Time			Water	Soil	Air	Sludge	Other	ICE	HCL	HNO <sub>3</sub>	Other
EFF-W	EFF	12-22-11	1210	3	Vial	X					X	X		X
MID-W	MID	↓	1215	3	↓	X					X	X		X
INF-W	INF	↓	1220	3	↓	X					X	X		X

Relinquished By: <i>[Signature]</i>	Date: 12-23-11	Time: 1:30	Received By: <i>[Signature]</i>
Relinquished By: <i>[Signature]</i>	Date: 12-23	Time: 1400	Received By: <i>[Signature]</i>
Relinquished By:	Date:	Time:	Received By:

ICE    
 GOOD CONDITION    
 HEAD SPACE ABSENT    
 DECHLORINATED IN LAB    
 APPROPRIATE CONTAINERS    
 PRESERVED IN LAB    
 COMMENTS:   
 VOAS O&G METALS OTHER   
 PRESERVATION pH < 2

\* Sample labeled INF-V sample Confirmed by TMS.



**McC Campbell Analytical, Inc.**

1534 Willow Pass Rd  
 Pittsburg, CA 94565-1701  
 (925) 252-9262

**CHAIN-OF-CUSTODY RECORD**

**WorkOrder: 1112710**

**ClientCode: PEO**

WaterTrax     WriteOn     EDF     Excel     Fax     Email     HardCopy     ThirdParty     J-flag

**Report to:** Tina De La Fuente  
 Pangea Environmental Svcs., Inc.  
 1710 Franklin Street, Ste. 200  
 Oakland, CA 94612  
 (510) 836-3700    FAX: (510) 836-3709

**Email:** tdelafuente@pangeaenv.com

**ProjectNo:** 5175 Broadway; Rockridge Heights

**Bill to:** Bob Clark-Riddell  
 Pangea Environmental Svcs., Inc.  
 1710 Franklin Street, Ste. 200  
 Oakland, CA 94612

**Requested TAT:** 5 days

**Date Received:** 12/23/2011  
**Date Printed:** 12/23/2011

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below)												
					1	2	3	4	5	6	7	8	9	10	11	12	
1112710-001	EFF-W	Water	12/22/2011 12:10	<input type="checkbox"/>	A	A											
1112710-002	MID-W	Water	12/22/2011 12:15	<input type="checkbox"/>	A												
1112710-003	INF-W	Water	12/22/2011 12:20	<input type="checkbox"/>	A												

**Test Legend:**

1	G-MBTEX_W	2	PREFD REPORT	3		4		5	
6		7		8		9		10	
11		12							

**Prepared by: Ana Venegas**

**Comments:**

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).  
 Hazardous samples will be returned to client or disposed of at client expense.



### Sample Receipt Checklist

Client Name: **Pangea Environmental Svcs., Inc.** Date and Time Received: **12/23/2011 2:51:11 PM**  
 Project Name: **5175 Broadway; Rockridge Heights** Checklist completed and reviewed by: **Ana Venegas**  
 WorkOrder N°: **1112710** Matrix: Water Carrier: Derik Cartan (MAI Courier)

#### Chain of Custody (COC) Information

Chain of custody present? Yes  No   
 Chain of custody signed when relinquished and received? Yes  No   
 Chain of custody agrees with sample labels? Yes  No   
 Sample IDs noted by Client on COC? Yes  No   
 Date and Time of collection noted by Client on COC? Yes  No   
 Sampler's name noted on COC? Yes  No

#### Sample Receipt Information

Custody seals intact on shipping container/cooler? Yes  No  NA   
 Shipping container/cooler in good condition? Yes  No   
 Samples in proper containers/bottles? Yes  No   
 Sample containers intact? Yes  No   
 Sufficient sample volume for indicated test? Yes  No

#### Sample Preservation and Hold Time (HT) Information

All samples received within holding time? Yes  No   
 Container/Temp Blank temperature Cooler Temp: 5.8°C NA   
 Water - VOA vials have zero headspace / no bubbles? Yes  No  No VOA vials submitted   
 Sample labels checked for correct preservation? Yes  No   
 Metal - pH acceptable upon receipt (pH<2)? Yes  No  NA   
 Samples Received on Ice? Yes  No

(Ice Type: WET ICE )

\* NOTE: If the "No" box is checked, see comments below.

-----  
 Comments:



Table with client information: Pangea Environmental Svcs., Inc., Client Project ID: 5175 Broadway; Rockridge Heights, Date Sampled: 12/22/11, Date Received: 12/23/11, Client Contact: Tina De La Fuente, Date Extracted: 12/27/11-12/28/11, Oakland, CA 94612, Client P.O., Date Analyzed: 12/27/11-12/28/11

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE\*

Extraction method: SW5030B Analytical methods: SW8021B/8015Bm Work Order: 1112710

Main data table with columns: Lab ID, Client ID, Matrix, TPH(g), MTBE, Benzene, Toluene, Ethylbenzene, Xylenes, DF, % SS, Comments. Rows include 001A, 002A, 003A with ND results.

Reporting Limit table with columns: Matrix (W, S), TPH(g), MTBE, Benzene, Toluene, Ethylbenzene, Xylenes, DF, % SS, Units (µg/L, mg/Kg)

\* water and vapor samples are reported in ug/L, soil/sludge/solid samples in mg/kg, wipe samples in ug/wipe, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts in mg/L.

# cluttered chromatogram; sample peak coelutes w/surrogate peak; low surrogate recovery due to matrix interference. %SS = Percent Recovery of Surrogate Standard; DF = Dilution Factor

The following descriptions of the TPH chromatogram are cursory in nature and McC Campbell Analytical is not responsible for their interpretation:



**QC SUMMARY REPORT FOR SW8021B/8015Bm**

W.O. Sample Matrix: Water

QC Matrix: Water

BatchID: 63655

WorkOrder: 1112710

EPA Method: SW8021B/8015Bm		Extraction: SW5030B					Spiked Sample ID: 1112710-003A			
Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	Acceptance Criteria (%)			
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	MS / MSD	RPD	LCS	
TPH(btex) <sup>£</sup>	ND	60	107	110	3.45	112	70 - 130	20	70 - 130	
MTBE	ND	10	94.3	96	1.87	96.9	70 - 130	20	70 - 130	
Benzene	ND	10	91.4	89.8	1.82	100	70 - 130	20	70 - 130	
Toluene	ND	10	88.9	87.1	2.09	101	70 - 130	20	70 - 130	
Ethylbenzene	ND	10	89.3	88	1.46	97.8	70 - 130	20	70 - 130	
Xylenes	ND	30	92.2	91.6	0.677	101	70 - 130	20	70 - 130	
%SS:	101	10	98	95	3.16	104	70 - 130	20	70 - 130	

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:  
 NONE

BATCH 63655 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
1112710-001A	12/22/11 12:10 PM	12/27/11	12/27/11 9:18 PM	1112710-002A	12/22/11 12:15 PM	12/28/11	12/28/11 12:04 AM
1112710-003A	12/22/11 12:20 PM	12/27/11	12/27/11 11:34 PM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.  
 % Recovery = 100 \* (MS-Sample) / (Amount Spiked); RPD = 100 \* (MS - MSD) / ((MS + MSD) / 2).  
 MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.  
 £ TPH(btex) = sum of BTEX areas from the FID.  
 # cluttered chromatogram; sample peak coelutes with surrogate peak.  
 N/A = not enough sample to perform matrix spike and matrix spike duplicate.  
 NR = matrix interference and/or analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content, or inconsistency in sample containers.