

December 12, 2017

Mr. Phil Hamlin, REM, CSEM
Senior HSE Representative
Kerr-McGee Oil & Gas Onshore LP
1099 18th Street, Suite 1800
Denver, Colorado 80202

RE: Sump Closure Report
UPRC 33-4J5
API# 05-123-17697
Location ID # 329672
Remediation # 10777
NWNW Sec 33-T3N-R65W
Weld County, Colorado

Dear Mr. Hamlin:

LT Environmental, Inc. (LTE) was contracted by Kerr-McGee Oil & Gas Onshore LP (Kerr-McGee) to conduct environmental oversight activities at the above-referenced site. The oversight activities included documenting field activities, collecting soil samples, and reviewing laboratory analytical results.

The objective of the soil sampling was to determine if petroleum hydrocarbon impact to subsurface soil is present as a result of operating a produced water sump at the site. The soil sampling activities, laboratory analytical results, and conclusions are summarized below. The general site layout, soil sample location, and sump excavation dimensions are depicted on the Excavation Site Map provided as Figure 1.

On May 5, 2017, following removal of the produced water sump, soil samples were collected from the sidewalls and base of the excavation. The soil samples were field-screened for volatile organic compounds using a photoionization detector (PID). Soil staining, odor, and/or elevated headspace readings were not observed or identified through PID screening; the highest PID reading recorded was 18.2 parts per million. Based on field screening results, the excavation base soil sample (B01@5') was submitted for laboratory analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) and total petroleum hydrocarbons (TPH)-gasoline range organics (GRO) by United States Environmental Protection Agency (USEPA) Method 8260C, TPH-diesel range organics (DRO) and oil range organics (ORO) by USEPA Method 8015C, pH by USEPA Method 9045D, and specific conductance (EC) by USEPA Method 9050A. Laboratory analytical results for soil sample B01@5' indicated that BTEX, TPH, pH, and EC concentrations and levels were compliant with COGCC Table 910-1 allowable levels. The soil sample analytical results are summarized in Table 1, and the laboratory analytical report is attached.



The sump excavation extent measured approximately 16 feet north to south by 14 feet east to west to an approximate depth of 5 feet bgs. Groundwater and impacted soil were not encountered in the excavation. A liner was not present beneath the sump at this site. The produced water sump at this facility has been permanently removed. The excavation area was backfilled and contoured to match pre-existing site conditions.

LTE appreciates the opportunity to provide environmental services to Kerr-McGee. Please contact LTE at (303) 433-9788 if you have any questions regarding this Sump Closure Report or if you require additional information.

Sincerely,

LT ENVIRONMENTAL, INC.

A handwritten signature in blue ink that reads 'Katharine Howe'.

Katharine Howe, E.I.
Staff Engineer

Reviewed by

A handwritten signature in blue ink that reads 'Brian Sulzberger'.

Brian Sulzberger, P.E., P.G.
Senior Engineer

Attachments



ATTACHMENTS

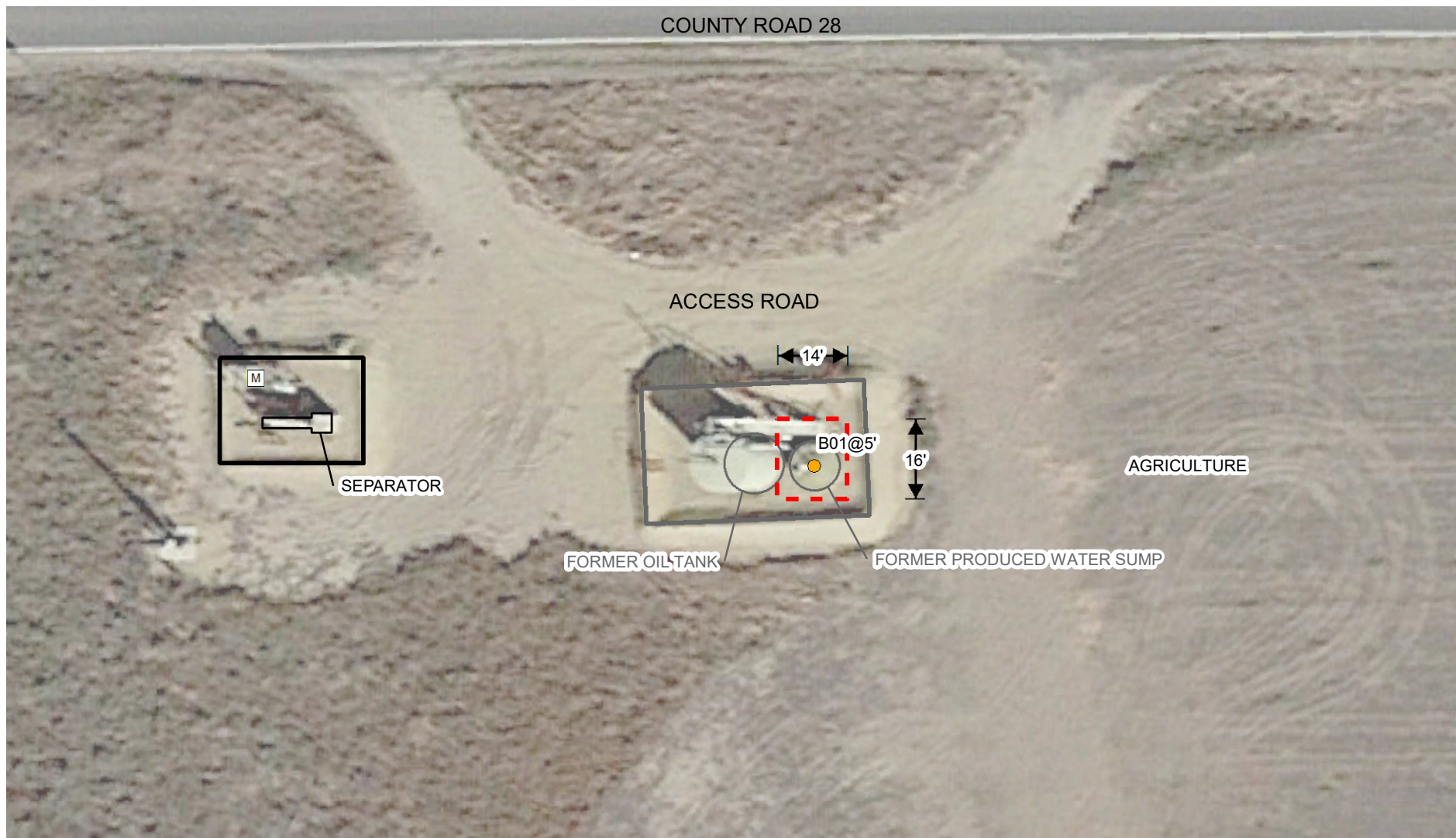


IMAGE COURTESY OF GOOGLE EARTH 2015

LEGEND

- SOIL SAMPLE
- M METER HOUSE
- EXCAVATION EXTENT
- BERM
- FORMER BERM

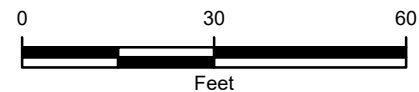


FIGURE 1
EXCAVATION SITE MAP
 UPRC 33-4J5
 NWNW SEC 33-T3N-R65W
 WELD COUNTY, COLORADO
 KERR-MCGEE OIL & GAS ONSHORE LP



TABLE 1
SOIL SAMPLE ANALYTICAL RESULTS
UPRC 33-4J5
WELD COUNTY, COLORADO
KERR-MCGEE OIL & GAS ONSHORE LP

Soil Sample ID	Depth (bgs)	Date	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	DRO (mg/kg)	GRO (mg/kg)	ORO (mg/kg)	pH (su)	Specific Conductance (mmhos/cm)
B01@5'	5'	05/05/2017	<0.002	<0.002	<0.002	<0.002	28.0	<0.200	<100	8.45	0.118
COGCC Allowable Levels			0.17	85	100	175	500*	500*	500*	6-9	4

Notes: bgs - below ground surface

COGCC - Colorado Oil and Gas Conservation Commission

DRO - diesel range organics

GRO - gasoline range organics

mg/kg - milligrams per kilogram

mmhos/cm - millimhos per centimeter

NA - not analyzed/not available

ORO - oil range organics

su - standard units

TPH - total petroleum hydrocarbons

* - TPH standard applies to combined DRO-GRO-ORO

< - less than laboratory reporting limit

Bold indicates result exceeds allowable level.





May 08, 2017

LT Environmental, Inc.

Brian Sulzberger

4600 West 60th Avenue

Arvada

CO 80003

Project Name - KMG - UPRC 33-4J5

Project Number - 014217098

Attached are your analytical results for KMG - UPRC 33-4J5 received by Origins Laboratory, Inc. May 05, 2017. This project is associated with Origins project number Y705098-01.

The analytical results in the following report were analyzed under the guidelines of EPA Methods. These methods are identified as follows; "SW" are defined in SW-846, "EPA" are defined in 40CFR part 136 and "SM" are defined in the most current revision of Standard Methods For the Examination of Water and Wastewater.

The analytical results apply specifically to the samples and analyses specified per the attached Chain of Custody. As such, this report shall not be reproduced except in full, without the written approval of Origin's laboratory.

Unless otherwise noted, the analytical results for all soil samples are reported on a wet weight basis. All analytical analyses were performed under NELAP guidelines unless noted by a data qualifier.

Any holding time exceedances, deviations from the method specifications or deviations from Origins Laboratory's Standard Operating Procedures are outlined in the case narrative.

Thank you for selecting Origins for your analytical needs. Please contact us with any questions concerning this report, or if we can help with anything at all.

Origins Laboratory, Inc.
303.433.1322
o-squad@oelabinc.com



1725 Elk Place, Denver, CO 80211 | Phone: 303.433.1322 | Fax: 303.265.9645

LT Environmental, Inc.

4600 West 60th Avenue

Arvada CO 80003

Brian Sulzberger

Project Number: 014217098

Project: KMG - UPRC 33-4J5

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B01@5'	Y705098-01	Soil	May 5, 2017 14:00	05/05/2017 17:21

Origins Laboratory, Inc.



The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Brian Sulzberger
Project Number: 014217098
Project: KMG - UPRC 33-4J5

ORIGINS

LABORATORY, INC

www.originslaboratory.com

page of

Client: IT Environmental

Address: 4600 W. 63rd Ave

Denver, CO 80003

Telephone Number: 303-433-4788

Email Address: 546 group

Project Manager: B. Sulzberger

Project Name: UPRC 33-4J5

Project Number: 0142170 98

Samples Collected By: Floyd DTT

APC contact: Paul Schwartz
WO: TBD

Fax: 303.265.9645

Phone: 303.433.1322

Denver, CO 80211

1725 Elk Place

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix			Analysis	Sample Instructions	
				Unpreserved	HCl	HNO ₃	Other	Groundwater	Soil	Air Summa Canister #			Other
B01@5'	5/5/17	1400	2	X					X		X	GC/MS EC	1
N01@4'		1405	2	X					X		X	PH	2
S01@4'		1410	2	X					X			Hold	3
E01@4'		1415	2	X					X			Hold	4
W01@4'		1420	2	X					X			Hold	5
B6		1435	2	X					X			Hold	6
													7
													8
													9
													10
Relinquished By: <u>Floyd DTT</u>	Date: <u>5-5-17</u>	Time: <u>1724</u>		Received By: <u>[Signature]</u>	Date: <u>5-5-17</u>	Time: <u>1724</u>		Turnaround Time: Same Day <input checked="" type="checkbox"/> 24 Hr <input type="checkbox"/> 48 Hr <input type="checkbox"/> 72 Hr <input type="checkbox"/> Standard <input type="checkbox"/>					
Relinquished By:	Date:	Time:		Received By:	Date:	Time:							

Temp Received- 23

Date Results Needed

Origins Laboratory, Inc.

Jeff Pellgrini

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LT Environmental, Inc.
4600 West 60th Avenue
Arvada CO 80003

Brian Sulzberger
Project Number: 014217098
Project: KMG - UPRC 33-4J5

Origins Laboratory

F-012207-01-R1
Effective Date: 01/09/12

Sample Receipt Checklist

Origins Work Order: 4705098

Client: LT

Client Project ID: KMG - UPRC 33-4J5

Checklist Completed by: D. L.

Shipped Via: 40

(UPS, FedEx, Hand Delivered, Pick-up, etc.)

Date/time completed: 5-5-17 1730

Airbill #: NA

Matrix(s) Received: (Check all that apply): ☒ Soil/Solid ☐ Water ☐ Other: _____

Cooler Number/Temperature: 1 / 26.3 °C 1 °C 1 °C (Describe) _____ °C

Thermometer ID: T003

Requirement Description	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature between 0°C to ≤ 6°C ⁽¹⁾ ?		<input checked="" type="checkbox"/>		<i>sampled same day</i>
Is there ice present (document if blue ice is used)	<input checked="" type="checkbox"/>			
Are custody seals present on cooler? (if so, document in comments if they are signed and dated, broken or intact)		<input checked="" type="checkbox"/>		
Are custody seals present on each sample container? (if so, document in comments if they are signed and dated, broken or intact)		<input checked="" type="checkbox"/>		
Were all samples received intact ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Are short holding time analytes or samples with HTs due within 48 hours present ⁽¹⁾ ?	<input checked="" type="checkbox"/>			<i>PH</i>
Is a chain-of-custody (COC) present and filled out completely ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client with date and time recorded ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
For volatiles in water – is there headspace (> ¼ inch bubble) present? If yes, contact client and note in narrative.			<input checked="" type="checkbox"/>	
Are samples preserved that require preservation and was it checked ⁽¹⁾ ? (note ID of confirmation instrument used in comments) / (preservation is not confirmed for subcontracted analyses in order to insure sample integrity)/(pH <2 for samples preserved with HNO ₃ , HCL, H ₂ SO ₄) / (pH >10 for samples preserved with NaAsO ₂ +NaOH, ZnAc+NaOH)		<input checked="" type="checkbox"/>		
Additional Comments (if any):				

⁽¹⁾ If NO, then contact the client before proceeding with analysis and note date/time and person contacted as well as the corrective action to in the additional comments (above) and the case narrative.

Reviewed by (Project Manager) [Signature]

Date/Time Reviewed 5-5-17 1730

Origins Laboratory, Inc.

Jen Pellegrini

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LT Environmental, Inc.
4600 West 60th Avenue
Arvada CO 80003

Brian Sulzberger
Project Number: 014217098
Project: KMG - UPRC 33-4J5

B01@5'
5/5/2017 2:00:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y705098-01 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	28.0	25.0	mg/kg	1	B7E0504	05/05/2017	05/05/2017	
Residual Range Organics (C28-C40)	ND	100	"	"	"	"	"	U

Surrogate: o-Terphenyl	94.7 %	59-131			"	"	"	
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GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	B7E0503	"	05/05/2017	U
Benzene	ND	0.002	"	"	"	"	"	U
Toluene	ND	0.002	"	"	"	"	"	U
Ethylbenzene	ND	0.002	"	"	"	"	"	U
Xylenes, total	ND	0.002	"	"	"	"	"	U

Surrogate: 1,2-Dichloroethane-d4	115 %	70-130			"	"	"	
Surrogate: Toluene-d8	98.3 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	101 %	70-130			"	"	"	

pH in Soil by EPA 9045D

pH	8.45		pH Units	1	B7E0506	05/05/2017	05/06/2017	
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.118		mmhos/cm	"	B7E0507	05/05/2017	05/06/2017	
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Origins Laboratory, Inc.



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LT Environmental, Inc.
4600 West 60th Avenue
Arvada CO 80003

Brian Sulzberger
Project Number: 014217098
Project: KMG - UPRC 33-4J5

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B7E0503 - EPA 5030 (soil)										
Blank (B7E0503-BLK1)					Prepared: 05/05/2017 Analyzed: 05/05/2017					
Gasoline Range Hydrocarbons	ND	0.200	mg/kg							U
Benzene	ND	0.002	"							U
Toluene	ND	0.002	"							U
Ethylbenzene	ND	0.002	"							U
Xylenes, total	ND	0.002	"							U
Surrogate: 1,2-Dichloroethane-d4	64		ug/kg	62.5		103	70-130			
Surrogate: Toluene-d8	63		"	62.5		100	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		100	70-130			

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Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B7E0503 - EPA 5030 (soil)										
Blank (B7E0503-BLK2)					Prepared: 05/05/2017 Analyzed: 05/05/2017					
Gasoline Range Hydrocarbons	ND	0.200	mg/kg							U
Benzene	ND	0.002	"							U
Toluene	ND	0.002	"							U
Ethylbenzene	ND	0.002	"							U
Xylenes, total	ND	0.002	"							U
Surrogate: 1,2-Dichloroethane-d4	65		ug/kg	62.5		103	70-130			
Surrogate: Toluene-d8	62		"	62.5		99.5	70-130			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		98.9	70-130			

Origins Laboratory, Inc.



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LT Environmental, Inc.
4600 West 60th Avenue
Arvada CO 80003

Brian Sulzberger
Project Number: 014217098
Project: KMG - UPRC 33-4J5

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B7E0503 - EPA 5030 (soil)										
Blank (B7E0503-BLK3)					Prepared: 05/05/2017 Analyzed: 05/05/2017					
Gasoline Range Hydrocarbons	ND	0.200	mg/kg							U
Benzene	ND	0.002	"							U
Toluene	ND	0.002	"							U
Ethylbenzene	ND	0.002	"							U
Xylenes, total	ND	0.002	"							U
Surrogate: 1,2-Dichloroethane-d4	65		ug/kg	62.5		104	70-130			
Surrogate: Toluene-d8	62		"	62.5		99.9	70-130			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.4	70-130			

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Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B7E0503 - EPA 5030 (soil)										
LCS (B7E0503-BS1)					Prepared: 05/05/2017 Analyzed: 05/05/2017					
Benzene	0.098	0.002	mg/kg	0.100		97.6	77.1-124			
Toluene	0.100	0.002	"	0.100		100	74.5-128			
Ethylbenzene	0.110	0.002	"	0.100		110	66.4-127			
m,p-Xylene	0.220	0.004	"	0.200		110	76.6-124			
o-Xylene	0.101	0.002	"	0.100		101	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	60		ug/kg	62.5		95.2	70-130			
Surrogate: Toluene-d8	64		"	62.5		102	70-130			
Surrogate: 4-Bromofluorobenzene	64		"	62.5		102	70-130			

Origins Laboratory, Inc.



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LT Environmental, Inc.
4600 West 60th Avenue
Arvada CO 80003

Brian Sulzberger
Project Number: 014217098
Project: KMG - UPRC 33-4J5

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B7E0503 - EPA 5030 (soil)

LCS (B7E0503-BS2)

Prepared: 05/05/2017 Analyzed: 05/05/2017

Benzene	0.098	0.002	mg/kg	0.100		98.0	77.1-124			
Toluene	0.098	0.002	"	0.100		97.6	74.5-128			
Ethylbenzene	0.107	0.002	"	0.100		107	66.4-127			
m,p-Xylene	0.215	0.004	"	0.200		108	76.6-124			
o-Xylene	0.099	0.002	"	0.100		98.5	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	61		ug/kg	62.5		97.9	70-130			
Surrogate: Toluene-d8	63		"	62.5		101	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		100	70-130			

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4600 West 60th Avenue
Arvada CO 80003

Brian Sulzberger
Project Number: 014217098
Project: KMG - UPRC 33-4J5

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B7E0503 - EPA 5030 (soil)

LCS (B7E0503-BS3)

Prepared: 05/05/2017 Analyzed: 05/05/2017

Benzene	0.102	0.002	mg/kg	0.100		102	77.1-124			
Toluene	0.101	0.002	"	0.100		101	74.5-128			
Ethylbenzene	0.114	0.002	"	0.100		114	66.4-127			
m,p-Xylene	0.226	0.004	"	0.200		113	76.6-124			
o-Xylene	0.103	0.002	"	0.100		103	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	61		ug/kg	62.5		97.1	70-130			
Surrogate: Toluene-d8	63		"	62.5		100	70-130			
Surrogate: 4-Bromofluorobenzene	64		"	62.5		102	70-130			

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Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B7E0503 - EPA 5030 (soil)

Matrix Spike (B7E0503-MS1)		Source: Y705038-01			Prepared: 05/05/2017 Analyzed: 05/05/2017					
Benzene	0.084	0.002	mg/kg	0.100	ND	84.2	71.8-126			
Toluene	0.080	0.002	"	0.100	ND	79.8	65.1-130			
Ethylbenzene	0.090	0.002	"	0.100	ND	90.1	62.2-130			
m,p-Xylene	0.178	0.004	"	0.200	ND	88.8	46.5-137			
o-Xylene	0.083	0.002	"	0.100	ND	83.5	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	65		ug/kg	62.5		104	70-130			
Surrogate: Toluene-d8	63		"	62.5		101	70-130			
Surrogate: 4-Bromofluorobenzene	66		"	62.5		105	70-130			

Origins Laboratory, Inc.



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LT Environmental, Inc.
4600 West 60th Avenue
Arvada CO 80003

Brian Sulzberger
Project Number: 014217098
Project: KMG - UPRC 33-4J5

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B7E0503 - EPA 5030 (soil)

Matrix Spike (B7E0503-MS2)		Source: Y705042-02			Prepared: 05/05/2017 Analyzed: 05/05/2017					
Benzene	0.097	0.002	mg/kg	0.100	ND	96.6	71.8-126			
Toluene	0.095	0.002	"	0.100	ND	95.0	65.1-130			
Ethylbenzene	0.106	0.002	"	0.100	ND	106	62.2-130			
m,p-Xylene	0.210	0.004	"	0.200	ND	105	46.5-137			
o-Xylene	0.098	0.002	"	0.100	ND	97.7	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	64		ug/kg	62.5		103	70-130			
Surrogate: Toluene-d8	61		"	62.5		98.4	70-130			
Surrogate: 4-Bromofluorobenzene	65		"	62.5		103	70-130			

Origins Laboratory, Inc.



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LT Environmental, Inc.
4600 West 60th Avenue
Arvada CO 80003

Brian Sulzberger
Project Number: 014217098
Project: KMG - UPRC 33-4J5

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B7E0503 - EPA 5030 (soil)

Matrix Spike (B7E0503-MS3)		Source: Y705042-03			Prepared: 05/05/2017 Analyzed: 05/05/2017					
Benzene	0.099	0.002	mg/kg	0.100	ND	98.7	71.8-126			
Toluene	0.095	0.002	"	0.100	ND	94.8	65.1-130			
Ethylbenzene	0.105	0.002	"	0.100	ND	105	62.2-130			
m,p-Xylene	0.209	0.004	"	0.200	ND	105	46.5-137			
o-Xylene	0.097	0.002	"	0.100	ND	97.2	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	64		ug/kg	62.5		102	70-130			
Surrogate: Toluene-d8	61		"	62.5		97.7	70-130			
Surrogate: 4-Bromofluorobenzene	64		"	62.5		103	70-130			

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LT Environmental, Inc.
4600 West 60th Avenue
Arvada CO 80003

Brian Sulzberger
Project Number: 014217098
Project: KMG - UPRC 33-4J5

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B7E0503 - EPA 5030 (soil)

Matrix Spike Dup (B7E0503-MSD1)		Source: Y705038-01			Prepared: 05/05/2017 Analyzed: 05/05/2017					
Benzene	0.091	0.002	mg/kg	0.100	ND	91.4	71.8-126	8.13	11.3	
Toluene	0.089	0.002	"	0.100	ND	88.8	65.1-130	10.7	15.4	
Ethylbenzene	0.107	0.002	"	0.100	ND	107	62.2-130	16.7	19.6	
m,p-Xylene	0.214	0.004	"	0.200	ND	107	46.5-137	18.4	19.2	
o-Xylene	0.099	0.002	"	0.100	ND	99.3	54.2-134	17.3	17.9	
Surrogate: 1,2-Dichloroethane-d4	66		ug/kg	62.5		105	70-130			
Surrogate: Toluene-d8	62		"	62.5		99.4	70-130			
Surrogate: 4-Bromofluorobenzene	69		"	62.5		110	70-130			

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Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B7E0503 - EPA 5030 (soil)

Matrix Spike Dup (B7E0503-MSD2)		Source: Y705042-02			Prepared: 05/05/2017 Analyzed: 05/05/2017					
Benzene	0.096	0.002	mg/kg	0.100	ND	95.7	71.8-126	0.978	11.3	
Toluene	0.094	0.002	"	0.100	ND	93.5	65.1-130	1.53	15.4	
Ethylbenzene	0.102	0.002	"	0.100	ND	102	62.2-130	3.84	19.6	
m,p-Xylene	0.204	0.004	"	0.200	ND	102	46.5-137	3.07	19.2	
o-Xylene	0.095	0.002	"	0.100	ND	95.4	54.2-134	2.40	17.9	
Surrogate: 1,2-Dichloroethane-d4	65		ug/kg	62.5		105	70-130			
Surrogate: Toluene-d8	62		"	62.5		98.8	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	70-130			

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Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B7E0503 - EPA 5030 (soil)

Matrix Spike Dup (B7E0503-MSD3)		Source: Y705042-03			Prepared: 05/05/2017 Analyzed: 05/05/2017					
Benzene	0.098	0.002	mg/kg	0.100	ND	97.8	71.8-126	0.895	11.3	
Toluene	0.095	0.002	"	0.100	ND	95.2	65.1-130	0.484	15.4	
Ethylbenzene	0.103	0.002	"	0.100	ND	103	62.2-130	1.21	19.6	
m,p-Xylene	0.204	0.004	"	0.200	ND	102	46.5-137	2.76	19.2	
o-Xylene	0.096	0.002	"	0.100	ND	96.0	54.2-134	1.28	17.9	
Surrogate: 1,2-Dichloroethane-d4	63		ug/kg	62.5		101	70-130			
Surrogate: Toluene-d8	62		"	62.5		99.5	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	70-130			

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Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Extractable Petroleum Hydrocarbons by 8015C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B7E0504 - EPA 3550B

Blank (B7E0504-BLK1)

Prepared: 05/05/2017 Analyzed: 05/05/2017

Diesel (C10-C28)	ND	50.0	mg/kg							U
Residual Range Organics (C28-C40)	ND	200	"							U
Surrogate: o-Terphenyl	35		"	50.0		69.3	59-131			

Blank (B7E0504-BLK2)

Prepared: 05/05/2017 Analyzed: 05/05/2017

Diesel (C10-C28)	ND	50.0	mg/kg							U
Residual Range Organics (C28-C40)	ND	200	"							U
Surrogate: o-Terphenyl	43		"	50.0		86.4	59-131			

Blank (B7E0504-BLK3)

Prepared: 05/05/2017 Analyzed: 05/05/2017

Diesel (C10-C28)	ND	50.0	mg/kg							U
Residual Range Organics (C28-C40)	ND	200	"							U
Surrogate: o-Terphenyl	43		"	50.0		86.1	59-131			

LCS (B7E0504-BS1)

Prepared: 05/05/2017 Analyzed: 05/05/2017

Diesel (C10-C28)	902	50.0	mg/kg	1000		90.2	64-121			
Residual Range Organics (C28-C40)	933	200	"	1000		93.3	58-124			
Surrogate: o-Terphenyl	46		"	50.0		91.3	59-131			

LCS (B7E0504-BS2)

Prepared: 05/05/2017 Analyzed: 05/05/2017

Diesel (C10-C28)	964	50.0	mg/kg	1000		96.4	64-121			
Residual Range Organics (C28-C40)	1060	200	"	1000		106	58-124			

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Brian Sulzberger
Project Number: 014217098
Project: KMG - UPRC 33-4J5

Extractable Petroleum Hydrocarbons by 8015C - Quality Control Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B7E0504 - EPA 3550B										
LCS (B7E0504-BS2)					Prepared: 05/05/2017 Analyzed: 05/05/2017					
Surrogate: o-Terphenyl	52		mg/kg	50.0		103	59-131			
LCS (B7E0504-BS3)					Prepared: 05/05/2017 Analyzed: 05/05/2017					
Diesel (C10-C28)	943	50.0	mg/kg	1000		94.3	64-121			
Residual Range Organics (C28-C40)	1020	200	"	1000		102	58-124			
Surrogate: o-Terphenyl	49		"	50.0		98.1	59-131			
Matrix Spike (B7E0504-MS1)					Source: Y705038-01		Prepared: 05/05/2017 Analyzed: 05/05/2017			
Diesel (C10-C28)	1040	50.0	mg/kg	1000	ND	104	53-125			
Residual Range Organics (C28-C40)	1120	200	"	1000	15.6	110	47-133			
Surrogate: o-Terphenyl	56		"	50.0		113	59-131			
Matrix Spike (B7E0504-MS2)					Source: Y705042-02		Prepared: 05/05/2017 Analyzed: 05/05/2017			
Diesel (C10-C28)	1020	50.0	mg/kg	1000	44.1	98.0	53-125			
Residual Range Organics (C28-C40)	1130	200	"	1000	75.8	105	47-133			
Surrogate: o-Terphenyl	52		"	50.0		103	59-131			
Matrix Spike (B7E0504-MS3)					Source: Y705042-03		Prepared: 05/05/2017 Analyzed: 05/05/2017			
Diesel (C10-C28)	988	50.0	mg/kg	1000	58.1	93.0	53-125			
Residual Range Organics (C28-C40)	1110	200	"	1000	100	101	47-133			
Surrogate: o-Terphenyl	53		"	50.0		107	59-131			
Matrix Spike Dup (B7E0504-MSD1)					Source: Y705038-01		Prepared: 05/05/2017 Analyzed: 05/05/2017			
Diesel (C10-C28)	969	50.0	mg/kg	1000	ND	96.9	53-125	6.65	20	
Residual Range Organics (C28-C40)	1050	200	"	1000	15.6	104	47-133	6.20	20	
Surrogate: o-Terphenyl	54		"	50.0		107	59-131			
Matrix Spike Dup (B7E0504-MSD2)					Source: Y705042-02		Prepared: 05/05/2017 Analyzed: 05/05/2017			

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Project Number: 014217098
Project: KMG - UPRC 33-4J5

Extractable Petroleum Hydrocarbons by 8015C - Quality Control Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B7E0504 - EPA 3550B										
Matrix Spike Dup (B7E0504-MSD2)		Source: Y705042-02			Prepared: 05/05/2017 Analyzed: 05/05/2017					
Diesel (C10-C28)	1010	50.0	mg/kg	1000	44.1	96.9	53-125	1.08	20	
Residual Range Organics (C28-C40)	1180	200	"	1000	75.8	110	47-133	4.22	20	
Surrogate: o-Terphenyl	51		"	50.0		102	59-131			
Matrix Spike Dup (B7E0504-MSD3)		Source: Y705042-03			Prepared: 05/05/2017 Analyzed: 05/05/2017					
Diesel (C10-C28)	967	50.0	mg/kg	1000	58.1	90.9	53-125	2.30	20	
Residual Range Organics (C28-C40)	1090	200	"	1000	100	98.8	47-133	1.82	20	
Surrogate: o-Terphenyl	52		"	50.0		103	59-131			

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Classical Chemistry Parameters - Quality Control Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B7E0506 - NO PREP										
Duplicate (B7E0506-DUP1)	Source: Y705042-01				Prepared: 05/05/2017 Analyzed: 05/06/2017					
pH	8.62		pH Units		8.12			5.97	25	
Duplicate (B7E0506-DUP2)	Source: Y705098-01				Prepared: 05/05/2017 Analyzed: 05/06/2017					
pH	8.46		pH Units		8.45			0.118	25	
Duplicate (B7E0506-DUP3)	Source: Y705099-01				Prepared: 05/05/2017 Analyzed: 05/06/2017					
pH	8.74		pH Units		8.47			3.14	25	
Batch B7E0507 - NO PREP										
Blank (B7E0507-BLK1)	Prepared: 05/05/2017 Analyzed: 05/06/2017									
Specific Conductance (EC)	0.00330		mmhos/cm							
Blank (B7E0507-BLK2)	Prepared: 05/05/2017 Analyzed: 05/06/2017									
Specific Conductance (EC)	0.00350		mmhos/cm							
Blank (B7E0507-BLK3)	Prepared: 05/05/2017 Analyzed: 05/06/2017									
Specific Conductance (EC)	0.00340		mmhos/cm							
Duplicate (B7E0507-DUP1)	Source: Y705042-01				Prepared: 05/05/2017 Analyzed: 05/06/2017					
Specific Conductance (EC)	0.0158		mmhos/cm		0.0201			24.0	25	
Duplicate (B7E0507-DUP2)	Source: Y705098-01				Prepared: 05/05/2017 Analyzed: 05/06/2017					
Specific Conductance (EC)	0.115		mmhos/cm		0.118			2.14	25	
Duplicate (B7E0507-DUP3)	Source: Y705099-01				Prepared: 05/05/2017 Analyzed: 05/06/2017					
Specific Conductance (EC)	0.111		mmhos/cm		0.114			3.12	25	

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Notes and Definitions

U Sample is Non-Detect.

ND Analyte NOT DETECTED at or above the reporting limit

RPD Relative Percent Difference

All soil results are reported at a wet weight basis.

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