



March 31, 2015

Mr. Sam LaRue
Senior HSE Representative
Kerr-McGee Oil & Gas Onshore LP
501 N. Division Blvd
Platteville, CO 80651

Re: Sump Excavation Letter Report
UIV 6, 18-20
API# 05-123-24074
NWNW 20-T5N-R67W
Remediation Project #8961

Dear Mr. LaRue:

LT Environmental, Inc. (LTE) was contracted by Kerr-McGee Oil & Gas Onshore LP (Kerr-McGee) to perform environmental oversight activities at the above referenced site. The oversight activities included collection of a confirmation soil sample from the sump excavation, documentation of field activities, and analytical results review.

The objective of the soil sampling was to determine if petroleum hydrocarbon impacts to subsurface soil resulted from Kerr-McGee operating a produced water sump at the site. The soil sampling activities, laboratory analytical results, and conclusions are summarized below. The general site layout, sump excavation dimensions, and soil sample location are displayed on the attached hand-sketched map.

After removing the produced water sump, one representative confirmation soil sample (B01@6') was collected from the base of the excavation. The soil sample was submitted for laboratory analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) by United States Environmental Protection Agency (USEPA) Method 8260C, total petroleum hydrocarbons (TPH) by USEPA Method 8015C, pH by USEPA Method 9045D, and specific conductance (EC) by USEPA Method 9050A. The laboratory analytical results are summarized in Table 1 and the laboratory analytical report is attached.

The sump excavation measured approximately 15 feet north to south by 20 feet east to west to an approximate depth of 6 feet below ground surface (bgs). No indication of petroleum hydrocarbon impact, including soil staining or odor was observed beneath the water sump. In addition, TPH, BTEX, pH, and EC levels were below or within Colorado Oil and Gas Conservation Commission (COGCC) Table 910-1 allowable levels in soil sample B01@6'. Based on the field observations and laboratory analytical results, no



remedial action is required at this site. The produced water sump will be replaced at this site.

Please call us at (303) 433-9788 if you have any questions regarding this Sump Excavation Letter Report or if you require additional information.

Sincerely,
LT ENVIRONMENTAL, INC.

A blue ink signature of Kristofer Shepherd, written in a cursive style.

Kristofer Shepherd
Staff Geologist

Reviewed by

A blue ink signature of Michael J. Furtaw, written in a cursive style.

Michael J. Furtaw, P.G.
Project Geologist

Attachments



PROJECT UIV 6, 18-20

PROJECT MANAGER J. Cocroft

JOB No. 014215036

LOCATION WCR 56 x 15, S 1/4, E into

DATE 3/31/2015

CONT. No.

BY Kris Shepherd CHK'D

SHEET No. 1 OF 1

95LT0038 10/1997

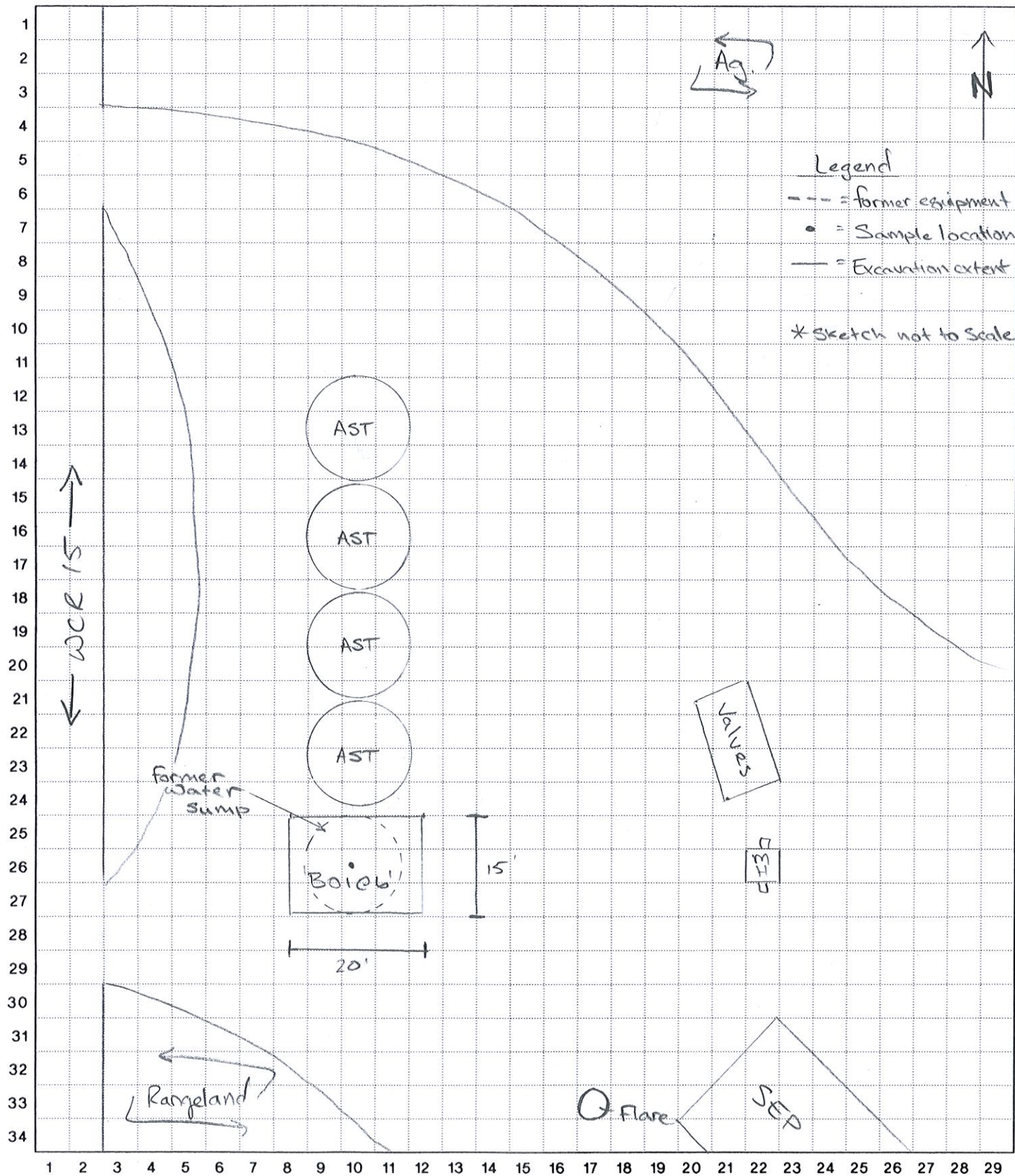


TABLE 1
SOIL SAMPLE ANALYTICAL RESULTS
UIV 6, 18-20
WELD COUNTY, COLORADO
KERR-MCGEE OIL & GAS ONSHORE LP

Soil Sample ID	Depth (bgs)	Date	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	DRO (mg/kg)	GRO (mg/kg)	ORO (mg/kg)	pH (su)	Specific Conductance (mmhos/cm)
B01 @ 6'	6'	03/06/2015	<0.002	<0.002	<0.002	<0.002	<50	<50	<200	7.63	0.183
COGCC Standards			0.17	85	100	175	500*	500*	500*	6-9	4

Notes: bgs - below ground surface
mg/kg - milligrams per kilogram
DRO - Diesel Range Organics
GRO - Gasoline Range Organics
ORO - Oil Range Organics
su - standard units

mmhos/cm - millimhos per centimeter
< - less than laboratory reporting limit
Bold numbers indicate result equaled or exceeded standard.
NA - Not Analyzed/Not Available
COGCC - Colorado Oil and Gas Conservation Commission
* - Standard applies to combined DRO-GRO-ORO





March 09, 2015

LT Environmental, Inc.

John Cocroft

4600 West 60th Avenue

Arvada

CO 80003

Project Name - KMG - UIV 6, 8-20

Project Number - 014215036

Attached are your analytical results for KMG - UIV 6, 8-20 received by Origins Laboratory, Inc. March 06, 2015. This project is associated with Origins project number X503057-01.

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

John Cocroft

Project Number: 014215036

Project: KMG - UIV 6, 8-20

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B01 @ 6'	X503057-01	Soil	March 6, 2015 14:20	03/06/2015 17:23

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.

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

John Cocroft
Project Number: 014215036
Project: KMG - UIV 6, 8-20

www.originslaboratory.com

page 1 of 1

X503057

ORIGINS
LABORATORY, INC

Client: KMG LTE
Address: 4600 W 60th AVE
Telephone Number: 303-433-9788
Email Address: Jcocroft@ltenv.com

Project Manager: John Cocroft
Project Name: UIV 6, 8-20
Project Number: 014215036
Samples Collected By: KYAN JERNIGAN

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix			Analysis			Sample Instructions
				Unpreserved	HCl	HNO ₃	Other	Groundwater	Soil	Air Summa #	Other	Other	Other	
B01@ 6'	3/6/15	1420	2	X				X					X	1
N01@ 4'		1430	2	X				X					X	2
E01@ 4'		1435	2	X				X					X	3
S01@ 4'		1440	2	X				X					X	4
W01@ 4'		1445	2	X				X					X	5
														6
														7
														8
														9
														10
Relinquished By: <u>Kyan Jernigan</u>	Date: <u>3/6/15</u>	Time: <u>1600</u>		Received By: <u>[Signature]</u>	Date: <u>3/6/15</u>	Time: <u>1600</u>		Turnaround Time: <u>24 Hr</u>						
Relinquished By: <u>[Signature]</u>	Date: <u>3/6/15</u>	Time: <u>1723</u>		Received By: <u>[Signature]</u>	Date: <u>3/6/15</u>	Time: <u>1723</u>		Turnaround Time: <u>48 Hr</u>						
								Standard: <u>50</u>						

Date Results Needed: Monday Morning 9/11

Origins Laboratory, Inc.

Jefe Pellegrini

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

John Cocroft
Project Number: 014215036
Project: KMG - UIV 6, 8-20

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: X503057

Client: LTE

Client Project ID: UIV 6, 8-20

Checklist Completed by: Jeff Smith

Shipped Via: H/D - Courier
(UPS, FedEx, Hand Delivered, Pick-up, etc.)

Date/time completed: 3/6/15

Airbill #: NA

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

Cooler Number/Temperature: 1 / 5.0 °C 1 / _____ °C 1 / _____ °C (Describe)

Thermometer ID: 1203

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"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is there ice present (document if blue ice is used)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are custody seals present on cooler? (if so, document in comments if they are signed and dated, broken or intact)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input 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 type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Were all samples received intact ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was adequate sample volume provided ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are short holding time analytes or samples with HTs due within 48 hours present ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>PH</u>
Is a chain-of-custody (COC) present and filled out completely ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is the COC properly relinquished by the client with date and time recorded ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
For volatiles in water – is there headspace (> ¼ inch bubble) present? If yes, contact client and note in narrative.	<input type="checkbox"/>	<input type="checkbox"/>	<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 type="checkbox"/>	<input type="checkbox"/>	<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.

Jeff Smith
Reviewed by (Project Manager)

3/6/15
Date/Time Reviewed

Origins Laboratory, Inc.

Jen Pellegrini

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.

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

John Cocroft
Project Number: 014215036
Project: KMG - UIV 6, 8-20

B01 @ 6'
3/6/2015 2:20:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X503057-01 (Soil)

BTEX by EPA 8260C

Benzene	ND	0.002	mg/kg	1	5C06012	03/06/2015	03/07/2015
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	ND	0.002	"	"	"	"	"
Xylenes, total	ND	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	97.5 %	70-130			"	"	"
Surrogate: Toluene-d8	104 %	70-130			"	"	"
Surrogate: 4-Bromofluorobenzene	98.7 %	70-130			"	"	"

pH in Soil by EPA 9045D

pH	7.63		pH Units	1	5C06015	03/06/2015	03/06/2015
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.183		mmhos/cm	"	5C06016	"	03/06/2015
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TPH-Carbon Chain by EPA Method 8015C

Gasoline (C6-C10)	ND	50	mg/kg	1	5C06011	03/06/2015	03/07/2015
Diesel (C10-C28)	ND	50	"	"	"	"	"
Residual Range Organics (C28-C36)	ND	200	"	"	"	"	"

Surrogate: o-Terphenyl	66.4 %	65-146			"	"	"
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Origins Laboratory, Inc.



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

John Cocroft
Project Number: 014215036
Project: KMG - UIV 6, 8-20

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 5C06012 - EPA 5030 (soil)

Blank (5C06012-BLK1)

Prepared: 03/06/2015 Analyzed: 03/06/2015

Benzene	ND	0.002	mg/kg							
Toluene	ND	0.002	"							
Ethylbenzene	ND	0.002	"							
Xylenes, total	ND	0.002	"							
Surrogate: 1,2-Dichloroethane-d4	58		ug/kg	62.5		93.5	70-130			
Surrogate: Toluene-d8	63		"	62.5		100	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		100	70-130			

Origins Laboratory, Inc.



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John Cocroft
Project Number: 014215036
Project: KMG - UIV 6, 8-20

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 5C06012 - EPA 5030 (soil)										
LCS (5C06012-BS1)					Prepared: 03/06/2015 Analyzed: 03/06/2015					
Benzene	0.111	0.002	mg/kg	0.100		111	77.1-124			
Toluene	0.108	0.002	"	0.100		108	74.5-128			
Ethylbenzene	0.101	0.002	"	0.100		101	66.4-127			
m,p-Xylene	0.216	0.004	"	0.200		108	76.6-124			
o-Xylene	0.099	0.002	"	0.100		98.6	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	59		ug/kg	62.5		94.7	70-130			
Surrogate: Toluene-d8	64		"	62.5		102	70-130			
Surrogate: 4-Bromofluorobenzene	65		"	62.5		104	70-130			

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

John Cocroft
Project Number: 014215036
Project: KMG - UIV 6, 8-20

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 5C06012 - EPA 5030 (soil)										
Matrix Spike (5C06012-MS1)		Source: X503052-01			Prepared: 03/06/2015 Analyzed: 03/06/2015					
Benzene	0.099	0.002	mg/kg	0.100	ND	98.8	71.8-126			
Toluene	0.099	0.002	"	0.100	ND	99.3	65.1-130			
Ethylbenzene	0.092	0.002	"	0.100	ND	92.2	62.2-130			
m,p-Xylene	0.178	0.004	"	0.200	ND	88.9	46.5-137			
o-Xylene	0.092	0.002	"	0.100	ND	91.6	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	60		ug/kg	62.5		95.2	70-130			
Surrogate: Toluene-d8	63		"	62.5		100	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	70-130			

Origins Laboratory, Inc.



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

John Cocroft
Project Number: 014215036
Project: KMG - UIV 6, 8-20

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 5C06012 - EPA 5030 (soil)										
Matrix Spike Dup (5C06012-MSD1)		Source: X503052-01			Prepared: 03/06/2015 Analyzed: 03/06/2015					
Benzene	0.090	0.002	mg/kg	0.100	ND	90.3	71.8-126	8.95	11.3	
Toluene	0.097	0.002	"	0.100	ND	96.8	65.1-130	2.55	15.4	
Ethylbenzene	0.094	0.002	"	0.100	ND	93.6	62.2-130	1.48	19.6	
m,p-Xylene	0.194	0.004	"	0.200	ND	96.8	46.5-137	8.54	19.2	
o-Xylene	0.095	0.002	"	0.100	ND	95.2	54.2-134	3.88	17.9	
Surrogate: 1,2-Dichloroethane-d4	54		ug/kg	62.5		87.1	70-130			
Surrogate: Toluene-d8	63		"	62.5		101	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

John Cocroft
Project Number: 014215036
Project: KMG - UIV 6, 8-20

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 8015M - 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 5C06011 - EPA 3580

Blank (5C06011-BLK1)

Prepared: 03/06/2015 Analyzed: 03/08/2015

Gasoline (C6-C10)	ND	50	mg/kg
Diesel (C10-C28)	ND	50	"
Residual Range Organics (C28-C36)	ND	200	"

Surrogate: o-Terphenyl

53.3

"

50.0

107

65-146

LCS (5C06011-BS1)

Prepared: 03/06/2015 Analyzed: 03/06/2015

Gasoline (C6-C10)	1100	50	mg/kg	1000	108	66.7-119
Diesel (C10-C28)	990	50	"	1000	99.4	70.1-127
Residual Range Organics (C28-C36)	1000	200	"	1000	100	54.5-139

Surrogate: o-Terphenyl

49.8

"

50.0

99.5

65-146

Matrix Spike (5C06011-MS1)

Source: X503052-01

Prepared: 03/06/2015 Analyzed: 03/06/2015

Gasoline (C6-C10)	1100	50	mg/kg	1000	ND	112	56.4-132
Diesel (C10-C28)	1000	50	"	1000	34	98.3	57.4-138
Residual Range Organics (C28-C36)	1000	200	"	1000	37	99.5	47.7-129

Surrogate: o-Terphenyl

48.5

"

50.0

97.0

65-146

Matrix Spike Dup (5C06011-MSD1)

Source: X503052-01

Prepared: 03/06/2015 Analyzed: 03/06/2015

Gasoline (C6-C10)	1100	50	mg/kg	1000	ND	107	56.4-132	4.65	22
Diesel (C10-C28)	970	50	"	1000	34	93.8	57.4-138	4.47	18.3
Residual Range Organics (C28-C36)	980	200	"	1000	37	94.6	47.7-129	4.94	30.1

Surrogate: o-Terphenyl

46.2

"

50.0

92.3

65-146

Origins Laboratory, Inc.



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

John Cocroft
Project Number: 014215036
Project: KMG - UIV 6, 8-20

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 5C06015 - NO PREP										
Duplicate (5C06015-DUP1)		Source: X503054-01			Prepared: 03/06/2015 Analyzed: 03/06/2015					
pH	8.37		pH Units		8.45			0.951	25	
Batch 5C06016 - NO PREP										
Blank (5C06016-BLK1)		Prepared: 03/06/2015 Analyzed: 03/06/2015								
Specific Conductance (EC)	0.00210		mmhos/cm							
Duplicate (5C06016-DUP1)		Source: X503054-01			Prepared: 03/06/2015 Analyzed: 03/06/2015					
Specific Conductance (EC)	0.0836		mmhos/cm		0.0859			2.71	25	

Origins Laboratory, Inc.



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LT Environmental, Inc.

4600 West 60th Avenue

Arvada CO 80003

John Cocroft

Project Number: 014215036

Project: KMG - UIV 6, 8-20

Notes and Definitions

ND Analyte NOT DETECTED at or above the reporting limit

RPD Relative Percent Difference

All soil results are reported at a wet weight basis.

Origins Laboratory, Inc.



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Jen Pellegrini For Noelle Doyle Mathis, President