



September 23, 2015

Mr. Sam LaRue
Senior HSE Representative
Kerr-McGee Oil & Gas Onshore LP
501 North Division Boulevard
Platteville, Colorado 80651

**RE: Sump Excavation Report
KING, ADDIE M. G U TRUE-61N66W 4SWSE
Weld County, Colorado
API #05-123-11204
Location ID #319408
SWSE Sec 4-T1N-R66W
Remediation #8961**

Dear Mr. LaRue:

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 field screening soils using a photo-ionization detector (PID), collecting confirmation soil samples from the sump excavation, documenting field activities, and laboratory 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 depicted on the Excavation Site Map attached as Figure 1.

On August 31, 2015, after removing the produced water sump, confirmation soil samples were collected from the sidewalls of the excavation at approximately 2 feet below ground surface (bgs), and a base soil sample was collected at 3 feet bgs. Soil samples were field screened for volatile organic compounds using a PID. LTE personnel did not observe soil staining or odor in any of the confirmation soil samples. The confirmation soil sample collected from the base of the excavation (B01@3') 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 and USEPA Method 8260C, pH by USEPA Method 9045D, and specific conductance (EC) by USEPA Method 9050A. Laboratory analytical results for confirmation soil sample B01@3' indicated that BTEX, TPH, pH, and EC levels were less than or within COGCC Table 910-1 allowable levels. The soil sample laboratory analytical results are summarized in Table 1 and the laboratory analytical report is attached.



The final sump excavation measured approximately 15 feet north to south by 15 feet east to west to an approximate depth of 3 feet bgs. No soil was excavated during the process of removing the produced water sump. The produced water sump at this facility will be replaced.

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

Sincerely,

LT ENVIRONMENTAL, INC.

A handwritten signature in black ink that reads 'R. ZERNIS'.

Ryan Zernis
Staff Geologist

A handwritten signature in blue ink that reads 'Michael J. Furtaw'.

Michael J. Furtaw, P.G.
Project Geologist

Attachments:

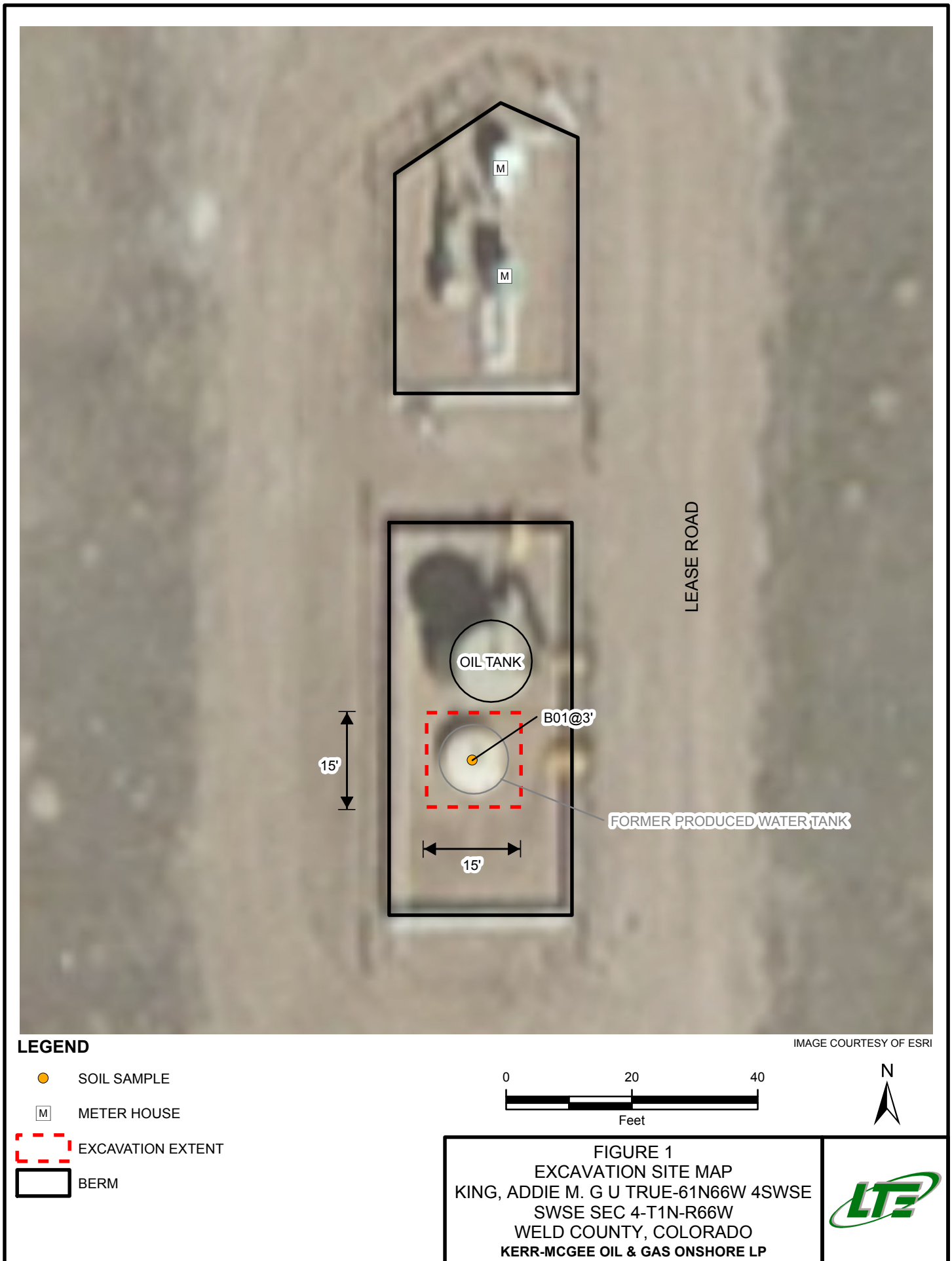


TABLE 1
SOIL SAMPLE ANALYTICAL RESULTS
KING, ADDIE M. G U TRUE-61N66W 4SWSE
WELD COUNTY, COLORADO
KERR-MCGEE OIL & GAS ONSHORE LP

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 @ 3'	3'	08/31/2015	<0.002	<0.002	<0.002	<0.002	<50	<0.200	<200	7.79	0.0139
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

* - Standard applies to combined DRO-GRO-ORO

< - less than laboratory reporting limit

Bold indicates result exceeds allowable level





September 01, 2015

LT Environmental, Inc.

John Cocroft

4600 West 60th Avenue

Arvada

CO 80003

Project Name - KMG - Addie King Gu True #1

Project Number - 014215162

Attached are your analytical results for KMG - Addie King Gu True #1 received by Origins Laboratory, Inc. August 31, 2015. This project is associated with Origins project number X508371-05.

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: 014215162

Project: KMG - Addie King Gu True #1

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B01 @ 3'	X508371-05	Soil	August 31, 2015 14:50	08/31/2015 16:45

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: 014215162
Project: KMG - Addie King Gu True #1

www.originslaboratory.com

X508371

ORIGINS
LABORATORY, INC

page of

Client: LTC
Address: 4600 W 60th Ave
Arvada CO 80003
Telephone Number: 303 433-9788
Email Address: SCocroft@LTENV.com

Project Manager: John Cocroft
Project Name: Addie King Gu True #1
Project Number: KS
Samples Collected By: KS

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix				Analysis				Sample Instructions	
				Unpreserved	HCl	HNO ₃	Other	Groundwater	Soil	Air Summa #	Other	G BTEX (TPH only)	P#	EC	SAR		
N0102'	8/31/15	1430	2	X				X								Hold	1
F0102'		1435	2	X				X								Hold	2
S0102'		1440	2	X				X								Hold	3
N0102'		1445	2	X				X								Hold	4
B0103'		1450	2	X				X				X	X	X	X	Hold SAR	5
B061		1455	2	X				X								Hold	6
																	7
																	8
																	9
																	10

Relinquished By: *CLZ* Date: 8/31/15 Time: 1645
Relinquished By: *Off Audit* Date: 8/31/15 Time: 1645

Turnaround Time: Same Day ☒ 24 Hr ☐ 48 Hr ☐ 72 Hr ☐ Standard ☐

Date Results Needed

Temp Received: 11.1

Origins Laboratory, Inc.

Jefe Pellegrini

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

John Cocroft
Project Number: 014215162
Project: KMG - Addie King Gu True #1

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: X508371

Client: LTE

Client Project ID: Addie King Gu True #1

Checklist Completed by: Jeff Smith

Shipped Via: HRD

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

Date/time completed: 8/31/15

Airbill #: NA

Matrix(s) Received: (Check all that apply): X Soil/Solid Water Other:

Cooler Number/Temperature: 1 / 111 °C °C °C (Describe) °C

Thermometer ID: T005

Requirement Description	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature between 0°C to ≤ 6°C ⁽¹⁾ ?		X		Sampled Same Day
Is there ice present (document if blue ice is used)	X			
Are custody seals present on cooler? (if so, document in comments if they are signed and dated, broken or intact)		X		
Are custody seals present on each sample container? (if so, document in comments if they are signed and dated, broken or intact)		X		
Were all samples received intact ⁽¹⁾ ?	X			
Was adequate sample volume provided ⁽¹⁾ ?	X			
Are short holding time analytes or samples with HTs due within 48 hours present ⁽¹⁾ ?	X			PH
Is a chain-of-custody (COC) present and filled out completely ⁽¹⁾ ?	X			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	X			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	8/31/15			2 sets of bottles, missing 2 jars for water
Is the COC properly relinquished by the client with date and time recorded ⁽¹⁾ ?	X			
For volatiles in water – is there headspace (> ¼ inch bubble) present? If yes, contact client and note in narrative.			X	
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)			X	
Additional Comments (if any): Confirmed with KMG by phone conversation that second set of jars labeled as ECIS 2' (1445) is actually water 2' (1445).				

⁽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)

8/31/15
Date/Time Reviewed

Origins Laboratory, Inc.

Jen Pellegrini

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

John Cocroft
Project Number: 014215162
Project: KMG - Addie King Gu True #1

B01 @ 3'
8/31/2015 2:50:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X508371-05 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	ND	50	mg/kg	1	5H31007	08/31/2015	08/31/2015
Residual Range Organics (C28-C36)	ND	200	"	"	"	"	"

Surrogate: o-Terphenyl	77.3 %	59-131			"	"	"
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GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	5H31006	08/31/2015	08/31/2015
Benzene	ND	0.002	"	"	"	"	"
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	ND	0.002	"	"	"	"	"
Xylenes, total	ND	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	105 %	70-130			"	"	"
Surrogate: Toluene-d8	99.8 %	70-130			"	"	"
Surrogate: 4-Bromofluorobenzene	101 %	70-130			"	"	"

pH in Soil by EPA 9045D

pH	7.79		pH Units	1	5H31008	08/31/2015	08/31/2015
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.0139		mmhos/cm	"	5H31009	08/31/2015	08/31/2015
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LT Environmental, Inc.
4600 West 60th Avenue
Arvada CO 80003

John Cocroft
Project Number: 014215162
Project: KMG - Addie King Gu True #1

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 5H31006 - EPA 5030 (soil)

Blank (5H31006-BLK1)

Prepared: 08/31/2015 Analyzed: 08/31/2015

Gasoline Range Hydrocarbons	ND	0.200	mg/kg							
Benzene	ND	0.002	"							
Toluene	ND	0.002	"							
Ethylbenzene	ND	0.002	"							
Xylenes, total	ND	0.002	"							
Surrogate: 1,2-Dichloroethane-d4	66.5		ug/kg	62.5		106	70-130			
Surrogate: Toluene-d8	63.1		"	62.5		101	70-130			
Surrogate: 4-Bromofluorobenzene	64.4		"	62.5		103	70-130			

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John Cocroft
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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 5H31006 - EPA 5030 (soil)										
LCS (5H31006-BS1)					Prepared: 08/31/2015 Analyzed: 08/31/2015					
Benzene	0.091	0.002	mg/kg	0.100		91.3	77.1-124			
Toluene	0.096	0.002	"	0.100		95.7	74.5-128			
Ethylbenzene	0.101	0.002	"	0.100		101	66.4-127			
m,p-Xylene	0.201	0.004	"	0.200		100	76.6-124			
o-Xylene	0.101	0.002	"	0.100		101	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	62.1		ug/kg	62.5		99.3	70-130			
Surrogate: Toluene-d8	64.4		"	62.5		103	70-130			
Surrogate: 4-Bromofluorobenzene	62.8		"	62.5		100	70-130			

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Project Number: 014215162
Project: KMG - Addie King Gu True #1

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 5H31006 - EPA 5030 (soil)

Matrix Spike (5H31006-MS1)		Source: X508336-01			Prepared: 08/31/2015 Analyzed: 08/31/2015					
Benzene	0.091	0.002	mg/kg	0.100	ND	91.3	71.8-126			
Toluene	0.093	0.002	"	0.100	0.003	90.6	65.1-130			
Ethylbenzene	0.089	0.002	"	0.100	ND	89.4	62.2-130			
m,p-Xylene	0.178	0.004	"	0.200	0.001	88.1	46.5-137			
o-Xylene	0.089	0.002	"	0.100	ND	89.4	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	68.5		ug/kg	62.5		110	70-130			
Surrogate: Toluene-d8	62.3		"	62.5		99.7	70-130			
Surrogate: 4-Bromofluorobenzene	63.2		"	62.5		101	70-130			

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Arvada CO 80003

John Cocroft
Project Number: 014215162
Project: KMG - Addie King Gu True #1

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 5H31006 - EPA 5030 (soil)

Matrix Spike Dup (5H31006-MSD1)		Source: X508336-01			Prepared: 08/31/2015 Analyzed: 08/31/2015					
Benzene	0.086	0.002	mg/kg	0.100	ND	85.5	71.8-126	6.54	11.3	
Toluene	0.088	0.002	"	0.100	0.003	84.9	65.1-130	6.31	15.4	
Ethylbenzene	0.084	0.002	"	0.100	ND	83.9	62.2-130	6.35	19.6	
m,p-Xylene	0.166	0.004	"	0.200	0.001	82.6	46.5-137	6.50	19.2	
o-Xylene	0.085	0.002	"	0.100	ND	84.9	54.2-134	5.12	17.9	
Surrogate: 1,2-Dichloroethane-d4	66.9		ug/kg	62.5		107	70-130			
Surrogate: Toluene-d8	62.6		"	62.5		100	70-130			
Surrogate: 4-Bromofluorobenzene	62.9		"	62.5		101	70-130			

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

John Cocroft
Project Number: 014215162
Project: KMG - Addie King Gu True #1

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 5H31007 - EPA 3580

Blank (5H31007-BLK1)

Prepared: 08/31/2015 Analyzed: 08/31/2015

Diesel (C10-C28) ND 50 mg/kg

Residual Range Organics (C28-C36) ND 200 "

Surrogate: o-Terphenyl 44 " 50.0 87.6 59-131

LCS (5H31007-BS1)

Prepared: 08/31/2015 Analyzed: 08/31/2015

Diesel (C10-C28) 760 50 mg/kg 1000 76.5 64-121

Residual Range Organics (C28-C36) 760 200 " 1000 75.7 58-124

Surrogate: o-Terphenyl 41 " 50.0 82.9 59-131

Matrix Spike (5H31007-MS1)

Source: X508336-01

Prepared: 08/31/2015 Analyzed: 08/31/2015

Diesel (C10-C28) 720 50 mg/kg 1000 ND 72.1 53-125

Residual Range Organics (C28-C36) 800 200 " 1000 38 76.3 47-133

Surrogate: o-Terphenyl 43 " 50.0 86.0 59-131

Matrix Spike Dup (5H31007-MSD1)

Source: X508336-01

Prepared: 08/31/2015 Analyzed: 08/31/2015

Diesel (C10-C28) 910 50 mg/kg 1000 ND 91.0 53-125 23.2 20 QM-07

Residual Range Organics (C28-C36) 990 200 " 1000 38 94.9 47-133 20.8 20 QM-07

Surrogate: o-Terphenyl 52 " 50.0 105 59-131

Origins Laboratory, Inc.



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John Cocroft
Project Number: 014215162
Project: KMG - Addie King Gu True #1

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 5H31008 - NO PREP										
Duplicate (5H31008-DUP1)		Source: X508336-01			Prepared: 08/31/2015 Analyzed: 08/31/2015					
pH	8.04		pH Units		8.06			0.248	25	
Batch 5H31009 - NO PREP										
Blank (5H31009-BLK1)		Prepared: 08/31/2015 Analyzed: 08/31/2015								
Specific Conductance (EC)	0.00290		mmhos/cm							
Duplicate (5H31009-DUP1)		Source: X508336-02			Prepared: 08/31/2015 Analyzed: 08/31/2015					
Specific Conductance (EC)	0.138		mmhos/cm		0.136			1.17	25	

Origins Laboratory, Inc.



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Arvada CO 80003

John Cocroft
Project Number: 014215162
Project: KMG - Addie King Gu True #1

Notes and Definitions

QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.

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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