



January 12, 2015

Mr. Paul Schwarz  
HSE Representative  
Kerr-McGee Oil & Gas Onshore LP  
4000 Burlington Avenue  
Evans, Colorado 80620

**Re: Sump Excavation Summary Letter Report  
Barclay 44-14  
API# 05-123-15947  
SESE 14-T2N-R67W**

Dear Mr. Schwarz:

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@7') was collected from the base of the water sump excavation. The soil sample was submitted for laboratory analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) by Environmental Protection Agency (EPA) Method 8260C and total petroleum hydrocarbons (TPH) by EPA Method 8015C. 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 16 feet east to west to an approximate depth of 7 feet below ground surface. No indication of petroleum hydrocarbon impact, including soil staining or odor was observed in the excavation base or sidewalls. In addition, TPH and BTEX concentrations were compliant with Colorado Oil and Gas Conservation Commission allowable levels in soil sample B01@7'. Based on the field observations and laboratory analytical results, no remedial action is required at this site.



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

Sincerely,  
LT ENVIRONMENTAL, INC.

A handwritten signature in blue ink that reads "Kristofer Shepherd". The signature is fluid and cursive, with the first name being the most prominent.

Kristofer Shepherd  
Staff Geologist

Reviewed by

A handwritten signature in black ink that reads "Justin Solomon". The signature is written in a cursive style with a large, looping initial "J".

Justin Solomon  
Senior Environmental Scientist

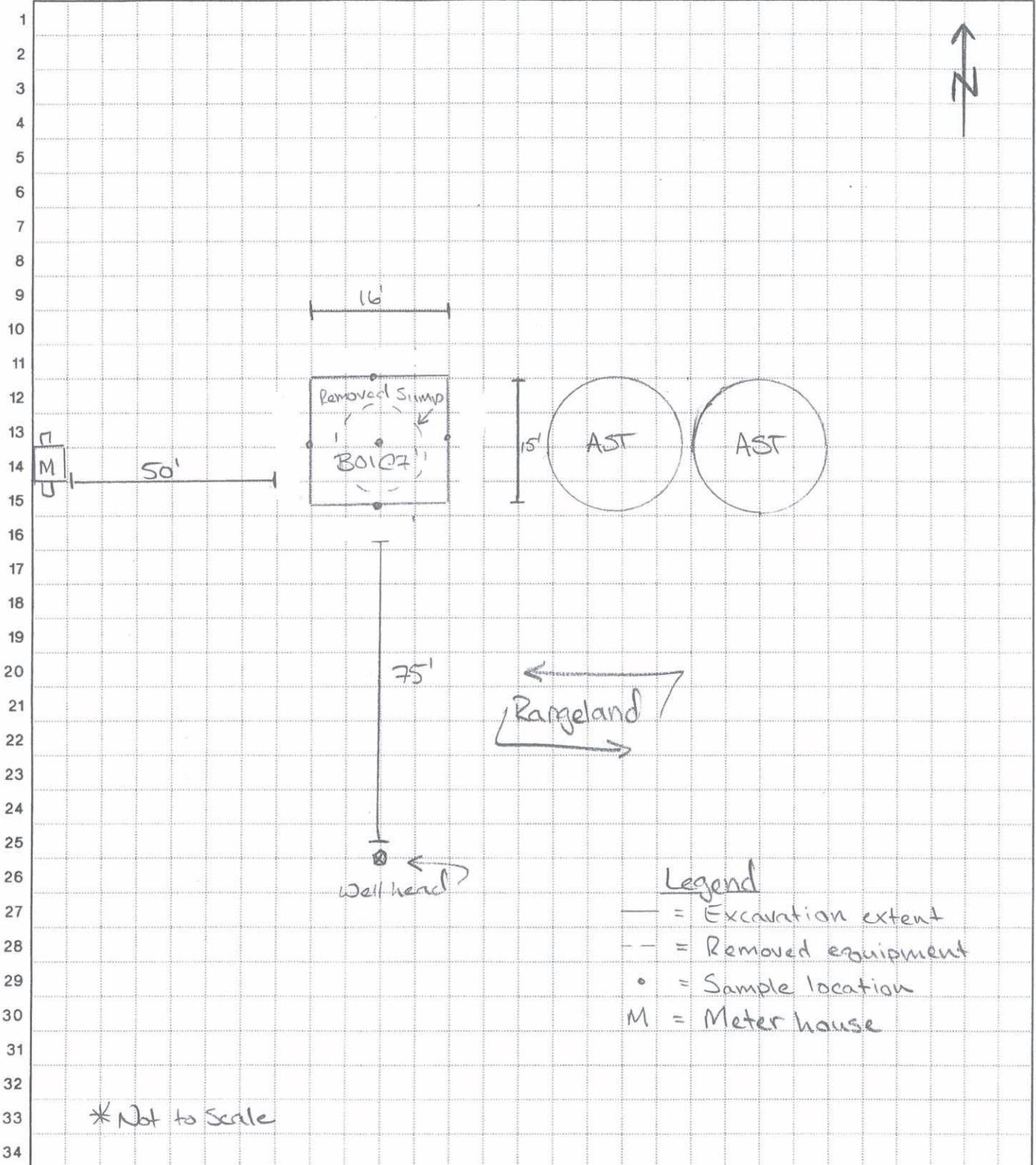
Attachments



PROJECT Barclay 44-14  
PROJECT MANAGER J. Cocroft  
JOB No. 0147 14379  
LOCATION SESE 14-T2N-R67W

DATE 11/13/2014  
CONT. No. \_\_\_\_\_  
BY KS CHK'D \_\_\_\_\_  
SHEET No. 1 OF 1

95L T0038 10/1997



- Legend
- = Excavation extent
  - - = Removed equipment
  - = Sample location
  - M = Meter house

\* Not to Scale

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29

**TABLE 1**  
**SOIL SAMPLE ANALYTICAL RESULTS**  
**BARCLAY 44-14**  
**WELD COUNTY, COLORADO**  
**KERR-MCGEE OIL & GAS ONSHORE LP**

<b>Soil Sample ID</b>	<b>Depth (bgs)</b>	<b>Date</b>	<b>Benzene (mg/kg)</b>	<b>Toluene (mg/kg)</b>	<b>Ethylbenzene (mg/kg)</b>	<b>Xylenes (mg/kg)</b>	<b>DRO (mg/kg)</b>	<b>GRO (mg/kg)</b>	<b>ORO (mg/kg)</b>
B01 @ 7'	7'	10/30/2014	<0.002	<0.002	<0.002	<0.002	<50.0	<50.0	<200
<b>COGCC Standards</b>			<b>0.17</b>	<b>85</b>	<b>100</b>	<b>175</b>	<b>500*</b>	<b>500*</b>	<b>500*</b>

Notes: bgs - below ground surface

< - less than

DRO - Diesel Range Organics

ORO - Oil Range Organics

GRO - Gasoline Range Organics

\* - Standard applies to combined DRO-GRO-ORO

mg/kg - milligrams per kilogram

NA - Not Analyzed/Not Available

Bold numbers indicate result equaled or exceeded standard.

COGCC - Colorado Oil and Gas Conservation Commission



October 31, 2014

LT Environmental, Inc.

John Cocroft

4600 West 60th Avenue

Arvada CO 80003

Project Name - KMG - Barclay 44-14

Project Number - [none]

Attached are your analytical results for KMG - Barclay 44-14 received by Origins Laboratory, Inc. October 30, 2014. This project is associated with Origins project number X410356-01.

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



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

John Cocroft  
Project Number: [none]  
Project: KMG - Barclay 44-14

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B01 @ 7'	X410356-01	Soil	October 30, 2014 12:25	10/30/2014 17:02

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.*

Ross S Hutto For Noelle Doyle Mathis, President



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

John Cocroft  
 Project Number: [none]  
 Project: KMG - Barclay 44-14

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: X410356

Client: LTE

Client Project ID: Barclay 44-14

Checklist Completed by: Jeff Smith

Shipped Via: Pick Up  
 (UPS, FedEx, Hand Delivered, Pick-up, etc.)

Date/time completed: 10/30/14

Airbill #: NA

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

Cooler Number/Temperature: \_\_\_\_\_ / 15.5 °C \_\_\_\_\_ / \_\_\_\_\_ °C \_\_\_\_\_ / \_\_\_\_\_ °C (Describe)

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 <sup>(1)</sup> ?	X			
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 <sup>(1)</sup> ?	X			
Was adequate sample volume provided <sup>(1)</sup> ?	X			
Are short holding time analytes or samples with HTs due within 48 hours present <sup>(1)</sup> ?		X		
Is a chain-of-custody (COC) present and filled out completely <sup>(1)</sup> ?	X			
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	X			
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	X			
Is the COC properly relinquished by the client with date and time recorded <sup>(1)</sup> ?	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 <sup>(1)</sup> ? (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 HNO3, HCL, H2SO4) / (pH >10 for samples preserved with NaAsO2+NaOH, ZnAc+NaOH)			X	
Additional Comments (if any):				

<sup>(1)</sup>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.

[Signature]  
 Reviewed by (Project Manager)

10/30/14 5:20  
 Date/Time Reviewed

Origins Laboratory, Inc.



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

John Cocroft  
 Project Number: [none]  
 Project: KMG - Barclay 44-14

**B01 @ 7'**  
**10/30/2014 12:25:00PM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**X410356-01 (Soil)**

**BTEX by EPA 8260C**

Benzene	ND	0.002	mg/kg	1	4J30004	10/30/2014	10/30/2014	
Toluene	ND	0.002	"	"	"	"	"	
Ethylbenzene	ND	0.002	"	"	"	"	"	
Xylenes, total	ND	0.002	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	93.1 %	70-130			"	"	"	
Surrogate: Toluene-d8	104 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	111 %	70-130			"	"	"	

**TPH-Carbon Chain by EPA Method 8015C**

Gasoline (C6-C10)	ND	50.0	mg/kg	1	4J30001	10/30/2014	10/30/2014	
Diesel (C10-C28)	ND	50.0	"	"	"	"	"	
Residual Range Organics (C28-C36)	ND	200	"	"	"	"	"	
TPH - Carbon Chain Total	ND	50.0	"	"	"	"	"	

Surrogate: o-Terphenyl	99.8 %	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: [none]  
 Project: KMG - Barclay 44-14

**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 4J30004 - EPA 5030 (soil)**

**Blank (4J30004-BLK1)**

Prepared: 10/30/2014 Analyzed: 10/30/2014

Benzene	ND	0.002	mg/kg							
Toluene	ND	0.002	"							
Ethylbenzene	ND	0.002	"							
Xylenes, total	ND	0.002	"							
Surrogate: 1,2-Dichloroethane-d4	56		ug/kg	62.5		90.1	70-130			
Surrogate: Toluene-d8	64		"	62.5		103	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	70-130			

Origins Laboratory, Inc.



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Ross S Hutto For Noelle Doyle Mathis, President

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

John Cocroft  
 Project Number: [none]  
 Project: KMG - Barclay 44-14

**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 4J30004 - EPA 5030 (soil)**

**LCS (4J30004-BS1)**

Prepared: 10/30/2014 Analyzed: 10/30/2014

Benzene	0.09	0.002	mg/kg	0.100		92.3	77.1-124			
Toluene	0.09	0.002	"	0.100		92.6	74.5-128			
Ethylbenzene	0.09	0.002	"	0.100		88.0	66.4-127			
m,p-Xylene	0.17	0.004	"	0.200		85.2	76.6-124			
o-Xylene	0.08	0.002	"	0.100		80.6	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	57		ug/kg	62.5		91.6	70-130			
Surrogate: Toluene-d8	64		"	62.5		102	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	70-130			

Origins Laboratory, Inc.



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LT Environmental, Inc.  
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 Arvada CO 80003

John Cocroft  
 Project Number: [none]  
 Project: KMG - Barclay 44-14

**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 4J30004 - EPA 5030 (soil)

Matrix Spike (4J30004-MS1)	Source: X410282-01			Prepared: 10/30/2014 Analyzed: 10/30/2014						
Benzene	0.09	0.002	mg/kg	0.100	ND	89.4	71.8-126			
Toluene	0.10	0.002	"	0.100	ND	95.1	65.1-130			
Ethylbenzene	0.09	0.002	"	0.100	ND	87.7	62.2-130			
m,p-Xylene	0.18	0.004	"	0.200	ND	89.0	46.5-137			
o-Xylene	0.08	0.002	"	0.100	ND	83.4	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	57		ug/kg	62.5		91.6	70-130			
Surrogate: Toluene-d8	64		"	62.5		103	70-130			
Surrogate: 4-Bromofluorobenzene	66		"	62.5		106	70-130			

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

John Cocroft  
 Project Number: [none]  
 Project: KMG - Barclay 44-14

**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 4J30004 - EPA 5030 (soil)

Matrix Spike Dup (4J30004-MSD1)	Source: X410282-01			Prepared: 10/30/2014 Analyzed: 10/30/2014						
Benzene	0.09	0.002	mg/kg	0.100	ND	90.2	71.8-126	0.935	11.3	
Toluene	0.09	0.002	"	0.100	ND	94.3	65.1-130	0.908	15.4	
Ethylbenzene	0.09	0.002	"	0.100	ND	88.4	62.2-130	0.818	19.6	
m,p-Xylene	0.17	0.004	"	0.200	ND	84.9	46.5-137	4.73	19.2	
o-Xylene	0.08	0.002	"	0.100	ND	78.3	54.2-134	6.33	17.9	
Surrogate: 1,2-Dichloroethane-d4	57		ug/kg	62.5		91.9	70-130			
Surrogate: Toluene-d8	65		"	62.5		104	70-130			
Surrogate: 4-Bromofluorobenzene	67		"	62.5		107	70-130			

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 Arvada CO 80003

John Cocroft  
 Project Number: [none]  
 Project: KMG - Barclay 44-14

**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 4J30001 - EPA 3580**

**Blank (4J30001-BLK1)**

Prepared: 10/29/2014 Analyzed: 10/30/2014

Gasoline (C6-C10)	ND	50.0	mg/kg							
Diesel (C10-C28)	ND	50.0	"							
Residual Range Organics (C28-C36)	ND	200	"							
TPH - Carbon Chain Total	ND	50.0	"							

Surrogate: *o*-Terphenyl 54 g 50.0 109 65-146

**LCS (4J30001-BS1)**

Prepared: 10/29/2014 Analyzed: 10/30/2014

Gasoline (C6-C10)	917	50.0	mg/kg	1000		91.7	66.7-119			
Diesel (C10-C28)	1100	50.0	"	1000		110	70.1-127			
Residual Range Organics (C28-C36)	580	200	"	1000		58.0	54.5-139			

Surrogate: *o*-Terphenyl 48 g 50.0 96.3 65-146

**Matrix Spike (4J30001-MS1)**

Source: X410298-01

Prepared: 10/29/2014 Analyzed: 10/30/2014

Gasoline (C6-C10)	913	50.0	mg/kg	1000	ND	91.3	56.4-132			
Diesel (C10-C28)	1080	50.0	"	1000	15.2	107	57.4-138			
Residual Range Organics (C28-C36)	578	200	"	1000	23.2	55.5	47.7-129			

Surrogate: *o*-Terphenyl 45 g 50.0 89.9 65-146

**Matrix Spike Dup (4J30001-MSD1)**

Source: X410298-01

Prepared: 10/29/2014 Analyzed: 10/30/2014

Gasoline (C6-C10)	971	50.0	mg/kg	1000	ND	97.1	56.4-132	6.13	22	
Diesel (C10-C28)	1130	50.0	"	1000	15.2	112	57.4-138	4.27	18.3	
Residual Range Organics (C28-C36)	595	200	"	1000	23.2	57.2	47.7-129	2.87	30.1	

Origins Laboratory, Inc.



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

John Cocroft  
 Project Number: [none]  
 Project: KMG - Barclay 44-14

**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 4J30001 - EPA 3580

Matrix Spike Dup (4J30001-MSD1)

Source: X410298-01

Prepared: 10/29/2014 Analyzed: 10/30/2014

Surrogate: o-Terphenyl	47		g	50.0		93.5	65-146			
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LT Environmental, Inc.  
4600 West 60th Avenue  
Arvada CO 80003

John Cocroft  
Project Number: [none]  
Project: KMG - Barclay 44-14

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**Notes and Definitions**

ND Analyte NOT DETECTED at or above the reporting limit  
RPD Relative Percent Difference

Origins Laboratory, Inc.



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Ross S Hutto For Noelle Doyle Mathis, President