



May 15, 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**  
**ACCO-TERRA-STATE-61N65W /16SESW**  
**Location ID #317723**  
**SWSW 16-T1N-R65W**  
**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, a representative confirmation soil sample (B01@5') 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 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 11 feet north to south by 21 feet east to west to an approximate depth of 5 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, and EC levels were less than or within Colorado Oil and Gas Conservation Commission (COGCC) Table 910-1 allowable levels in soil sample B01@5'. The pH level in soil sample B01@5' exceeded the upper limit of the COGCC Table 910-1 allowable range. However, based on the sample collection depth



(>3 feet bgs), field observations, and laboratory analytical results, no remedial action is required for this site. The produced water sump at the site will not be replaced.

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 handwritten signature in blue ink, appearing to read "Kristofer Shepherd". The signature is fluid and cursive, with a large, sweeping initial "K".

Kristofer Shepherd  
Staff Geologist

Reviewed by

A handwritten signature in blue ink, appearing to read "Michael J. Furtaw". The signature is cursive and clearly legible.

Michael J. Furtaw, P.G.  
Project Geologist

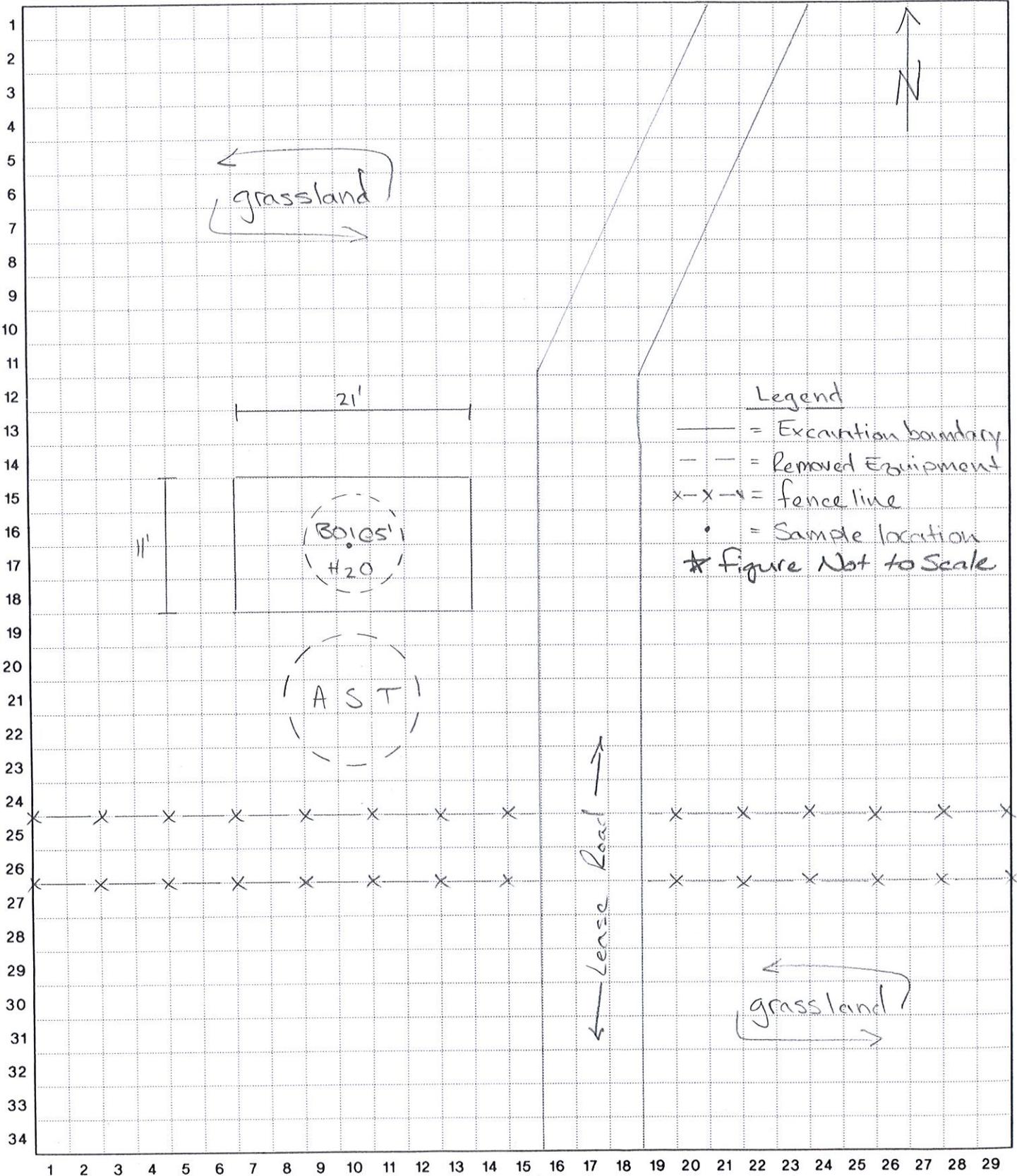
Attachments



PROJECT Acco-Terra-State-61N65W  
PROJECT MANAGER Tom Cocroft  
JOB No. 014215109  
LOCATION S2SW 16-T1N-R65W

DATE 5/4/2015  
CONT. No. \_\_\_\_\_  
BY K.S. CHK'D \_\_\_\_\_  
SHEET No. 1 OF 1

95LT0038 10/1997



**TABLE 1**  
**SOIL SAMPLE ANALYTICAL RESULTS**  
**ACCO-TERRA-STATE-61N65W /16SESW**  
**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)
B01 @ 5'	5'	04/30/2015	<0.002	<0.002	<0.002	<0.002	<50	<50	<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 laboratory reporting limit  
 DRO - Diesel Range Organics  
 ORO - Oil Range Organics  
 GRO - Gasoline Range Organics

\* - Standard applies to combined DRO-GRO-ORO  
 COGCC - Colorado Oil and Gas Conservation Commission  
 mg/kg - milligrams per kilogram  
 NA - Not Analyzed/Not Available  
 Bold numbers indicate result equaled or exceeded standard.





May 01, 2015

LT Environmental, Inc.

John Cocroft

4600 West 60th Avenue

Arvada CO 80003

Project Name - KMG - State #5

Project Number - [none]

Attached are your analytical results for KMG - State #5 received by Origins Laboratory, Inc. April 30, 2015. This project is associated with Origins project number X504358-01.

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: [none]  
Project: KMG - State #5

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B01 @ 5'	X504358-01	Soil	April 30, 2015 15:15	04/30/2015 16:55

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: [none]  
 Project: KMG - State #5

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: XSO4358

Client: LTE

Client Project ID: State #5

Checklist Completed by: Jeff Smith

Shipped Via: 4D  
 (UPS, FedEx, Hand Delivered, Pick-up, etc.)

Date/time completed: 4/30/15

Airbill #: N/A

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

Cooler Number/Temperature: 1 / 13.7 °C 1 / \_\_\_\_\_ °C 1 / \_\_\_\_\_ °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		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 <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			PH
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.

Jeff Smith  
 Reviewed by (Project Manager)

4/30/15  
 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 - State #5

**B01 @ 5'**  
**4/30/2015 3:15:00PM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**X504358-01 (Soil)**

**BTEX by EPA 8260C**

Benzene	ND	0.002	mg/kg	1	5D30005	04/30/2015	04/30/2015	
Toluene	ND	0.002	"	"	"	"	"	
Ethylbenzene	ND	0.002	"	"	"	"	"	
Xylenes, total	ND	0.002	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	110 %	70-130			"	"	"	
Surrogate: Toluene-d8	95.2 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	102 %	70-130			"	"	"	

**pH in Soil by EPA 9045D**

pH	9.53		pH Units	1	5D30014	04/30/2015	04/30/2015	
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**Specific Conductance by Modified 9050A**

Specific Conductance (EC)	0.0593		mmhos/cm	"	5D30015	04/30/2015	04/30/2015	
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**TPH-Carbon Chain by EPA Method 8015C**

Gasoline (C6-C10)	ND	50	mg/kg	1	5D30006	04/30/2015	05/01/2015	
Diesel (C10-C28)	ND	50	"	"	"	"	"	
Residual Range Organics (C28-C36)	ND	200	"	"	"	"	"	

Surrogate: o-Terphenyl	78.0 %	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 - State #5

**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 5D30005 - EPA 5030 (soil)**

**Blank (5D30005-BLK1)**

Prepared: 04/30/2015 Analyzed: 04/30/2015

Benzene	ND	0.002	mg/kg							
Toluene	ND	0.002	"							
Ethylbenzene	ND	0.002	"							
Xylenes, total	ND	0.002	"							
Surrogate: 1,2-Dichloroethane-d4	66		ug/kg	62.5		106	70-130			
Surrogate: Toluene-d8	60		"	62.5		95.9	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: [none]  
 Project: KMG - State #5

**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 5D30005 - EPA 5030 (soil)**

**LCS (5D30005-BS1)**

Prepared: 04/30/2015 Analyzed: 04/30/2015

Benzene	0.100	0.002	mg/kg	0.100		100	77.1-124			
Toluene	0.092	0.002	"	0.100		92.0	74.5-128			
Ethylbenzene	0.094	0.002	"	0.100		93.5	66.4-127			
m,p-Xylene	0.186	0.004	"	0.200		93.0	76.6-124			
o-Xylene	0.094	0.002	"	0.100		93.6	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	62		ug/kg	62.5		100	70-130			
Surrogate: Toluene-d8	60		"	62.5		95.6	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		100	70-130			

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LT Environmental, Inc.  
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 Arvada CO 80003

John Cocroft  
 Project Number: [none]  
 Project: KMG - State #5

**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 5D30005 - EPA 5030 (soil)

Matrix Spike (5D30005-MS1)	Source: X504324-01			Prepared: 04/30/2015 Analyzed: 04/30/2015						
Benzene	0.096	0.002	mg/kg	0.100	ND	95.7	71.8-126			
Toluene	0.089	0.002	"	0.100	ND	89.1	65.1-130			
Ethylbenzene	0.096	0.002	"	0.100	ND	95.8	62.2-130			
m,p-Xylene	0.192	0.004	"	0.200	ND	96.2	46.5-137			
o-Xylene	0.098	0.002	"	0.100	ND	97.8	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	62		ug/kg	62.5		99.9	70-130			
Surrogate: Toluene-d8	61		"	62.5		97.3	70-130			
Surrogate: 4-Bromofluorobenzene	66		"	62.5		105	70-130			

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John Cocroft  
 Project Number: [none]  
 Project: KMG - State #5

**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 5D30005 - EPA 5030 (soil)**

<b>Matrix Spike Dup (5D30005-MSD1)</b>	<b>Source: X504324-01</b>			<b>Prepared: 04/30/2015 Analyzed: 04/30/2015</b>						
Benzene	0.098	0.002	mg/kg	0.100	ND	97.6	71.8-126	2.01	11.3	
Toluene	0.090	0.002	"	0.100	ND	90.5	65.1-130	1.60	15.4	
Ethylbenzene	0.095	0.002	"	0.100	ND	94.8	62.2-130	0.986	19.6	
m,p-Xylene	0.190	0.004	"	0.200	ND	95.2	46.5-137	1.07	19.2	
o-Xylene	0.096	0.002	"	0.100	ND	96.4	54.2-134	1.42	17.9	
Surrogate: 1,2-Dichloroethane-d4	64		ug/kg	62.5		103	70-130			
Surrogate: Toluene-d8	61		"	62.5		96.9	70-130			
Surrogate: 4-Bromofluorobenzene	64		"	62.5		103	70-130			

Origins Laboratory, Inc.



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

John Cocroft  
 Project Number: [none]  
 Project: KMG - State #5

**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 5D30006 - EPA 3580**

**Blank (5D30006-BLK1)**

Prepared: 04/30/2015 Analyzed: 04/30/2015

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

Surrogate: o-Terphenyl 41.8 " 50.0 83.6 65-146

**LCS (5D30006-BS1)**

Prepared: 04/30/2015 Analyzed: 04/30/2015

Gasoline (C6-C10)	930	50	mg/kg	1000		92.6	66.7-119			
Diesel (C10-C28)	940	50	"				70.1-127			
Residual Range Organics (C28-C36)	1000	200	"	1000		101	54.5-139			

Surrogate: o-Terphenyl 49.2 " 50.0 98.5 65-146

**Matrix Spike (5D30006-MS1)**

Source: X504324-01

Prepared: 04/30/2015 Analyzed: 04/30/2015

Gasoline (C6-C10)	920	50	mg/kg	1000	ND	92.0	56.4-132			
Diesel (C10-C28)	950	50	"		17		57.4-138			
Residual Range Organics (C28-C36)	1100	200	"	1000	ND	111	47.7-129			

Surrogate: o-Terphenyl 47.9 " 50.0 95.8 65-146

**Matrix Spike Dup (5D30006-MSD1)**

Source: X504324-01

Prepared: 04/30/2015 Analyzed: 04/30/2015

Gasoline (C6-C10)	920	50	mg/kg	1000	ND	92.4	56.4-132	0.420	22	
Diesel (C10-C28)	920	50	"		17		57.4-138	4.11	18.3	
Residual Range Organics (C28-C36)	1100	200	"	1000	ND	110	47.7-129	0.738	30.1	

Surrogate: o-Terphenyl 48.6 " 50.0 97.3 65-146

Origins Laboratory, Inc.



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

John Cocroft  
 Project Number: [none]  
 Project: KMG - State #5

**Classical Chemistry Parameters - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5D30014 - NO PREP</b>										
<b>Duplicate (5D30014-DUP1)</b>		<b>Source: X504355-01</b>			Prepared: 04/30/2015 Analyzed: 04/30/2015					
pH	8.08		pH Units		8.13			0.617	25	
<b>Batch 5D30015 - NO PREP</b>										
<b>Blank (5D30015-BLK1)</b>		Prepared: 04/30/2015 Analyzed: 04/30/2015								
Specific Conductance (EC)	0.00270		mmhos/cm							
<b>Duplicate (5D30015-DUP1)</b>		<b>Source: X504355-01</b>			Prepared: 04/30/2015 Analyzed: 04/30/2015					
Specific Conductance (EC)	0.204		mmhos/cm		0.180			12.5	25	

Origins Laboratory, Inc.



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

John Cocroft  
Project Number: [none]  
Project: KMG - State #5

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**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