



June 5, 2017

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

**RE: Sump Closure Report  
Moser 28-8  
API #05-123-16021  
Location ID #328463  
Remediation # 10777  
SENE SEC 28-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 field-screening soil, collecting soil samples, documenting field activities, and reviewing laboratory analytical results.

The objective of the soil sampling was to determine if petroleum hydrocarbon impact 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, soil sample location, and sump excavation dimensions are depicted on the Excavation Site Map provided as Figure 1.

On April 6, 2017, following removal of the produced water sump, soil samples were collected from the sidewalls and base of the sump 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 0.6 parts per million. Based on the field-screening results, the excavation base soil sample (B01@6') 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 modified Method 9050A. Laboratory analytical results for soil sample B01@6' indicated that BTEX, TPH, and EC levels were compliant with Colorado Oil and Gas Conservation Commission (COGCC) Table 910-1 allowable levels. Laboratory analytical results indicated soil sample B01@6' exceeded the COGCC Table 910-1 allowable level of 9.00 standard units (su) at 9.80 su. However, this sample was collected below the root zone (greater than 3 feet below ground surface (bgs)); therefore, no



further excavation was required. The soil sample analytical results are summarized in Table 1, and the laboratory analytical report is attached.

The sump excavation measured approximately 25 feet north to south by 20 feet east to west and was completed to a depth of 6 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, and the excavation area was backfilled with clean fill and contoured to match pre-existing site conditions.

LTE appreciates the opportunity to provide environmental services to Kerr-McGee. Please contact us 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

A handwritten signature in black ink that reads "Brian Sulzberger".

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

Attachments

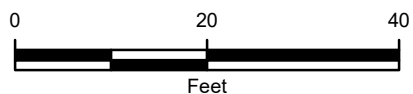
## ATTACHMENTS



# **LEGEND**

- SOIL SAMPLE
  - M METER HOUSE
  - EXCAVATION EXTENT
  - FORMER BERM
- AST: ABOVEGROUND STORAGE TANK

IMAGE COURTESY OF ESRI



**FIGURE 1**  
**EXCAVATION SITE MAP**  
**MOSER 28-8**  
**SENE SEC 28-T3N-R65W**  
**WELD COUNTY, COLORADO**  
**KERR-MCGEE OIL & GAS ONSHORE LP**



**TABLE 1**  
**SOIL SAMPLE ANALYTICAL RESULTS**  
**MOSER 28-8**  
**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@6'	6'	04/06/2017	<0.050	<0.050	<0.050	<0.050	27.1	<5.00	<100	<b>9.80</b> †	0.0533
<b>COGCC Allowable Levels</b>			<b>0.17</b>	<b>85</b>	<b>100</b>	<b>175</b>	<b>500*</b>	<b>500*</b>	<b>500*</b>	<b>6-9</b>	<b>4</b>

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

† - Sample was collected below the designated root zone (>3' bgs)

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

< - less than laboratory reporting limit

Bold indicates result exceeds allowable level.





April 07, 2017

LT Environmental, Inc.

Brian Sulzberger

4600 West 60th Avenue

Arvada

CO 80003

Project Name - KMG - Moser 28-8

Project Number - [none]

Attached are your analytical results for KMG - Moser 28-8 received by Origins Laboratory, Inc. April 06, 2017. This project is associated with Origins project number Y704058-01.

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: [none]

Project: KMG - Moser 28-8

## CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B01@6'	Y704058-01	Soil	April 6, 2017 15:50	04/06/2017 17:56

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: [none]  
Project: KMG - Moser 28-8

[illegible]

Origins Laboratory, Inc.

Jeff Pellgrini

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

Brian Sulzberger  
Project Number: [none]  
Project: KMG - Moser 28-8

Origins Laboratory

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

## Sample Receipt Checklist

Origins Work Order: 704056

Client: LTE

Client Project ID: KMG- Moser 28-8

Checklist Completed by: Dan Lu

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

Date/time completed: 4-6-17 1756

Airbill #: N/A

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

Cooler Number/Temperature: 1 / 1.2 °C        /        °C        /        °C (Describe)

Thermometer ID: 7007

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> ?	<input checked="" type="checkbox"/>			
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 <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Are short holding time analytes or samples with HTs due within 48 hours present <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			pH
Is a chain-of-custody (COC) present and filled out completely <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client with date and time recorded <sup>(1)</sup> ?	<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 <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 HNO <sub>3</sub> , HCL, H <sub>2</sub> SO <sub>4</sub> ) / (pH > 10 for samples preserved with NaAsO <sub>2</sub> +NaOH, ZnAc+NaOH)		<input checked="" type="checkbox"/>		
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.

Reviewed by (Project Manager)

4-6-17 1803  
Date/Time Reviewed

Origins Laboratory, Inc.

*Jen Pellegrini*

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

Brian Sulzberger  
Project Number: [none]  
Project: KMG - Moser 28-8

B01@6'  
4/6/2017 3:50:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**Y704058-01 (Soil)**

**DRO/RRO by EPA8015C**

Diesel (C10-C28)	27.1	25.0	mg/kg	1	B7D0604	04/06/2017	04/06/2017	
Residual Range Organics (C28-C40)	ND	100	"	"	"	"	"	U

Surrogate: o-Terphenyl	78.6 %	59-131			"	"	"	
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**GBTEX by EPA 8260C**

Gasoline Range Hydrocarbons	ND	5.00	mg/kg	25	B7D0603	"	04/06/2017	U
Benzene	ND	0.050	"	"	"	"	"	U
Toluene	ND	0.050	"	"	"	"	"	U
Ethylbenzene	ND	0.050	"	"	"	"	"	U
Xylenes, total	ND	0.050	"	"	"	"	"	U

Surrogate: 1,2-Dichloroethane-d4	82.9 %	70-130			"	"	"	
Surrogate: Toluene-d8	101 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	105 %	70-130			"	"	"	

**pH in Soil by EPA 9045D**

pH	9.80		pH Units	1	B7D0606	04/06/2017	04/06/2017	
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**Specific Conductance by Modified 9050A**

Specific Conductance (EC)	0.0533		mmhos/cm	"	B7D0607	04/06/2017	04/06/2017	
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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: [none]  
Project: KMG - Moser 28-8

**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
<b>Batch B7D0603 - EPA 5030 (soil)</b>										
<b>Blank (B7D0603-BLK1)</b>					Prepared: 04/06/2017 Analyzed: 04/06/2017					
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		101	70-130			
Surrogate: 4-Bromofluorobenzene	61		"	62.5		97.6	70-130			

Origins Laboratory, Inc.



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

Brian Sulzberger  
Project Number: [none]  
Project: KMG - Moser 28-8

**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
<b>Batch B7D0603 - EPA 5030 (soil)</b>										
<b>Blank (B7D0603-BLK2)</b>					Prepared: 04/06/2017 Analyzed: 04/06/2017					
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	63		ug/kg	62.5		100	70-130			
Surrogate: Toluene-d8	63		"	62.5		101	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  
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Brian Sulzberger  
Project Number: [none]  
Project: KMG - Moser 28-8

**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
<b>Batch B7D0603 - EPA 5030 (soil)</b>										
<b>Blank (B7D0603-BLK3)</b>					Prepared: 04/06/2017 Analyzed: 04/06/2017					
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	63		ug/kg	62.5		101	70-130			
Surrogate: Toluene-d8	64		"	62.5		102	70-130			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		98.6	70-130			

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

Brian Sulzberger  
Project Number: [none]  
Project: KMG - Moser 28-8

**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 B7D0603 - EPA 5030 (soil)

**LCS (B7D0603-BS1)**

Prepared: 04/06/2017 Analyzed: 04/06/2017

Benzene	0.099	0.002	mg/kg	0.100		99.1	77.1-124			
Toluene	0.099	0.002	"	0.100		99.0	74.5-128			
Ethylbenzene	0.103	0.002	"	0.100		103	66.4-127			
m,p-Xylene	0.206	0.004	"	0.200		103	76.6-124			
o-Xylene	0.101	0.002	"	0.100		101	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	53		ug/kg	62.5		84.7	70-130			
Surrogate: Toluene-d8	64		"	62.5		102	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	70-130			

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

Brian Sulzberger  
Project Number: [none]  
Project: KMG - Moser 28-8

**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
<b>Batch B7D0603 - EPA 5030 (soil)</b>										
<b>LCS (B7D0603-BS2)</b>					Prepared: 04/06/2017 Analyzed: 04/06/2017					
Benzene	0.099	0.002	mg/kg	0.100		99.2	77.1-124			
Toluene	0.099	0.002	"	0.100		98.8	74.5-128			
Ethylbenzene	0.106	0.002	"	0.100		106	66.4-127			
m,p-Xylene	0.210	0.004	"	0.200		105	76.6-124			
o-Xylene	0.104	0.002	"	0.100		104	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	70		ug/kg	62.5		112	70-130			
Surrogate: Toluene-d8	63		"	62.5		100	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: [none]  
Project: KMG - Moser 28-8

**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 B7D0603 - EPA 5030 (soil)

**LCS (B7D0603-BS3)**

Prepared: 04/06/2017 Analyzed: 04/06/2017

Benzene	0.101	0.002	mg/kg	0.100		101	77.1-124			
Toluene	0.103	0.002	"	0.100		103	74.5-128			
Ethylbenzene	0.106	0.002	"	0.100		106	66.4-127			
m,p-Xylene	0.214	0.004	"	0.200		107	76.6-124			
o-Xylene	0.106	0.002	"	0.100		106	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	69		ug/kg	62.5		110	70-130			
Surrogate: Toluene-d8	63		"	62.5		102	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	70-130			

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

Brian Sulzberger  
Project Number: [none]  
Project: KMG - Moser 28-8

**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
<b>Batch B7D0603 - EPA 5030 (soil)</b>										
<b>Matrix Spike (B7D0603-MS1)</b>		<b>Source: Y704050-01</b>			Prepared: 04/06/2017 Analyzed: 04/06/2017					
Benzene	2.54	0.050	mg/kg	2.50	ND	101	71.8-126			
Toluene	1.59	0.050	"	2.50	ND	63.8	65.1-130			QM-07
Ethylbenzene	2.90	0.050	"	2.50	ND	116	62.2-130			
m,p-Xylene	7.50	0.100	"	5.00	ND	150	46.5-137			QM-07
o-Xylene	3.09	0.050	"	2.50	ND	124	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	67		ug/kg	62.5		107	70-130			
Surrogate: Toluene-d8	44		"	62.5		69.7	70-130			S-04
Surrogate: 4-Bromofluorobenzene	120		"	62.5		190	70-130			S-04

Origins Laboratory, Inc.



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4600 West 60th Avenue  
Arvada CO 80003

Brian Sulzberger  
Project Number: [none]  
Project: KMG - Moser 28-8

**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 B7D0603 - EPA 5030 (soil)**

Matrix Spike (B7D0603-MS2)		Source: Y704050-02			Prepared: 04/06/2017 Analyzed: 04/06/2017					
Benzene	0.094	0.002	mg/kg	0.100	ND	94.1	71.8-126			
Toluene	0.096	0.002	"	0.100	ND	95.9	65.1-130			
Ethylbenzene	0.101	0.002	"	0.100	ND	101	62.2-130			
m,p-Xylene	0.197	0.004	"	0.200	ND	98.6	46.5-137			
o-Xylene	0.104	0.002	"	0.100	ND	104	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	51		ug/kg	62.5		81.9	70-130			
Surrogate: Toluene-d8	63		"	62.5		101	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

Brian Sulzberger  
Project Number: [none]  
Project: KMG - Moser 28-8

**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 B7D0603 - EPA 5030 (soil)**

Matrix Spike (B7D0603-MS3)		Source: Y704054-01			Prepared: 04/06/2017 Analyzed: 04/06/2017					
Benzene	0.104	0.002	mg/kg	0.100	ND	104	71.8-126			
Toluene	0.102	0.002	"	0.100	ND	102	65.1-130			
Ethylbenzene	0.102	0.002	"	0.100	ND	102	62.2-130			
m,p-Xylene	0.207	0.004	"	0.200	ND	104	46.5-137			
o-Xylene	0.103	0.002	"	0.100	ND	103	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	73		ug/kg	62.5		117	70-130			
Surrogate: Toluene-d8	62		"	62.5		99.4	70-130			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		100	70-130			

Origins Laboratory, Inc.



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

Brian Sulzberger  
Project Number: [none]  
Project: KMG - Moser 28-8

**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
<b>Batch B7D0603 - EPA 5030 (soil)</b>										
<b>Matrix Spike Dup (B7D0603-MSD1)</b>	<b>Source: Y704050-01</b>				Prepared: 04/06/2017 Analyzed: 04/06/2017					
Benzene	2.50	0.050	mg/kg	2.50	ND	100	71.8-126	1.33	11.3	
Toluene	1.62	0.050	"	2.50	ND	64.6	65.1-130	1.31	15.4	QM-07
Ethylbenzene	2.88	0.050	"	2.50	ND	115	62.2-130	0.795	19.6	
m,p-Xylene	7.40	0.100	"	5.00	ND	148	46.5-137	1.38	19.2	QM-07
o-Xylene	3.02	0.050	"	2.50	ND	121	54.2-134	2.26	17.9	
Surrogate: 1,2-Dichloroethane-d4	68		ug/kg	62.5		109	70-130			
Surrogate: Toluene-d8	44		"	62.5		71.1	70-130			
Surrogate: 4-Bromofluorobenzene	120		"	62.5		188	70-130			S-04

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

Brian Sulzberger  
Project Number: [none]  
Project: KMG - Moser 28-8

**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 B7D0603 - EPA 5030 (soil)**

Matrix Spike Dup (B7D0603-MSD2)		Source: Y704050-02			Prepared: 04/06/2017 Analyzed: 04/06/2017					
Benzene	0.095	0.002	mg/kg	0.100	ND	95.5	71.8-126	1.43	11.3	
Toluene	0.097	0.002	"	0.100	ND	96.8	65.1-130	0.913	15.4	
Ethylbenzene	0.101	0.002	"	0.100	ND	101	62.2-130	0.575	19.6	
m,p-Xylene	0.197	0.004	"	0.200	ND	98.4	46.5-137	0.274	19.2	
o-Xylene	0.103	0.002	"	0.100	ND	103	54.2-134	0.733	17.9	
Surrogate: 1,2-Dichloroethane-d4	52		ug/kg	62.5		83.8	70-130			
Surrogate: Toluene-d8	63		"	62.5		101	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	70-130			

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Jen Pellegrini For Noelle Doyle Mathis, President

LT Environmental, Inc.  
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Arvada CO 80003

Brian Sulzberger  
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Project: KMG - Moser 28-8

**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 B7D0603 - EPA 5030 (soil)**

Matrix Spike Dup (B7D0603-MSD3)		Source: Y704054-01			Prepared: 04/06/2017 Analyzed: 04/06/2017					
Benzene	0.093	0.002	mg/kg	0.100	ND	93.0	71.8-126	11.3	11.3	
Toluene	0.093	0.002	"	0.100	ND	92.7	65.1-130	9.87	15.4	
Ethylbenzene	0.094	0.002	"	0.100	ND	93.9	62.2-130	8.70	19.6	
m,p-Xylene	0.189	0.004	"	0.200	ND	94.5	46.5-137	9.24	19.2	
o-Xylene	0.095	0.002	"	0.100	ND	95.0	54.2-134	8.21	17.9	
Surrogate: 1,2-Dichloroethane-d4	73		ug/kg	62.5		117	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 B7D0604 - EPA 3550B

#### Blank (B7D0604-BLK1)

Prepared: 04/06/2017 Analyzed: 04/06/2017

Diesel (C10-C28)	ND	50.0	mg/kg							U
Residual Range Organics (C28-C40)	ND	200	"							U
Surrogate: o-Terphenyl	35		"	50.0		69.0	59-131			

#### Blank (B7D0604-BLK2)

Prepared: 04/06/2017 Analyzed: 04/06/2017

Diesel (C10-C28)	ND	50.0	mg/kg							U
Residual Range Organics (C28-C40)	ND	200	"							U
Surrogate: o-Terphenyl	48		"	50.0		95.6	59-131			

#### LCS (B7D0604-BS1)

Prepared: 04/06/2017 Analyzed: 04/06/2017

Diesel (C10-C28)	1030	50.0	mg/kg	1000		103	64-121			
Residual Range Organics (C28-C40)	1090	200	"	1000		109	58-124			
Surrogate: o-Terphenyl	50		"	50.0		100	59-131			

#### LCS (B7D0604-BS2)

Prepared: 04/06/2017 Analyzed: 04/06/2017

Diesel (C10-C28)	992	50.0	mg/kg	1000		99.2	64-121			
Residual Range Organics (C28-C40)	918	200	"	1000		91.8	58-124			
Surrogate: o-Terphenyl	48		"	50.0		96.0	59-131			

#### Matrix Spike (B7D0604-MS1)

Source: Y704050-02

Prepared: 04/06/2017 Analyzed: 04/06/2017

Diesel (C10-C28)	1040	50.0	mg/kg	1000	30.4	101	53-125			
Residual Range Organics (C28-C40)	1070	200	"	1000	21.2	105	47-133			

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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
<b>Batch B7D0604 - EPA 3550B</b>										
<b>Matrix Spike (B7D0604-MS1)</b>		<b>Source: Y704050-02</b>			Prepared: 04/06/2017 Analyzed: 04/06/2017					
Surrogate: o-Terphenyl	46		mg/kg	50.0		92.4	59-131			
<b>Matrix Spike (B7D0604-MS2)</b>		<b>Source: Y704055-01</b>			Prepared: 04/06/2017 Analyzed: 04/06/2017					
Diesel (C10-C28)	995	50.0	mg/kg	1000	21.3	97.4	53-125			
Residual Range Organics (C28-C40)	946	200	"	1000	55.1	89.1	47-133			
Surrogate: o-Terphenyl	48		"	50.0		95.5	59-131			
<b>Matrix Spike Dup (B7D0604-MSD1)</b>		<b>Source: Y704050-02</b>			Prepared: 04/06/2017 Analyzed: 04/06/2017					
Diesel (C10-C28)	827	50.0	mg/kg	1000	30.4	79.6	53-125	23.4	20	QR-02
Residual Range Organics (C28-C40)	821	200	"	1000	21.2	80.0	47-133	26.8	20	QR-02
Surrogate: o-Terphenyl	39		"	50.0		77.8	59-131			
<b>Matrix Spike Dup (B7D0604-MSD2)</b>		<b>Source: Y704055-01</b>			Prepared: 04/06/2017 Analyzed: 04/06/2017					
Diesel (C10-C28)	999	50.0	mg/kg	1000	21.3	97.7	53-125	0.381	20	
Residual Range Organics (C28-C40)	954	200	"	1000	55.1	89.9	47-133	0.865	20	
Surrogate: o-Terphenyl	48		"	50.0		96.2	59-131			

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Project: KMG - Moser 28-8

## 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 B7D0606 - NO PREP</b>										
<b>Duplicate (B7D0606-DUP1)</b>		<b>Source: Y704058-01</b>			Prepared: 04/06/2017 Analyzed: 04/06/2017					
pH	9.77		pH Units		9.80			0.307	25	
<b>Batch B7D0607 - NO PREP</b>										
<b>Blank (B7D0607-BLK1)</b>		Prepared: 04/06/2017 Analyzed: 04/06/2017								
Specific Conductance (EC)	0.00370		mmhos/cm							
<b>Duplicate (B7D0607-DUP1)</b>		<b>Source: Y704058-01</b>			Prepared: 04/06/2017 Analyzed: 04/06/2017					
Specific Conductance (EC)	0.0627		mmhos/cm		0.0533			16.2	25	

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LT Environmental, Inc.  
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Arvada CO 80003

Brian Sulzberger  
Project Number: [none]  
Project: KMG - Moser 28-8

### Notes and Definitions

- U Sample is Non-Detect.
- S-04 The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect.
- QR-02 The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC batch were accepted based on percent recoveries and completeness of QC data.
- 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.

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