



April 24, 2017

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

**RE: Sump Closure Report
Cannon Land 28-16J
API #05-123-15365
Location ID #327957
Remediation # 10777
SENE & NESE 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 two produced water sumps at the site. The soil sampling activities, laboratory analytical results, and conclusions are summarized below. The general site layout, soil sample locations, and sump excavation dimensions are depicted on the Excavation Site Map provided as Figure 1.

On February 8, 2017, following removal of two produced water sumps, 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 PID headspace readings were not observed or identified through PID screening; the highest PID reading recorded was 2.5 parts per million. Based on the field-screening results, the excavation base soil samples B01@4.5' and B02@4.5' were 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 samples B01@4.5' and B02@4.5' indicated that BTEX, TPH, pH, and EC levels were compliant with Colorado Oil and Gas Conservation Commission (COGCC) Table 910-1 allowable levels. The soil sample analytical results are summarized in Table 1, and the laboratory analytical report is attached.



The sump excavation measured approximately 21 feet north to south by 27 feet east to west and completed to a depth of 4.5 feet below ground surface. Groundwater and impacted soil were not encountered in the excavation. A liner was not present beneath the sump excavation at this site. The produced water sumps at this facility have 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". The signature is written in a cursive, flowing style.

Katharine Howe, E.I.
Staff Engineer

A handwritten signature in black ink that reads "Brian Sulzberger". The signature is written in a cursive, flowing style.

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

Attachments

ATTACHMENTS





IMAGE COURTESY OF GOOGLE EARTH 2015

LEGEND

- SOIL SAMPLE
- METER HOUSE
- FORMER FENCE
- EXCAVATION EXTENT
- FORMER BERM
- AST: ABOVEGROUND STORAGE TANK
- ECD: EMISSION CONTROL DEVICE

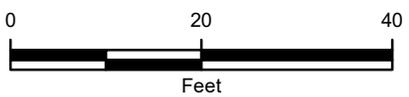


FIGURE 1
EXCAVATION SITE MAP
CANNON LAND 28-16J
SENE & NESE SEC 28-T3N-R65W
WELD COUNTY, COLORADO
KERR-MCGEE OIL & GAS ONSHORE LP



TABLE 1
SOIL SAMPLE ANALYTICAL RESULTS
CANNON LAND 28-16J
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@4.5'	4.5'	02/08/2017	<0.002	<0.002	<0.002	<0.002	<25.0	<0.200	<100	7.85	0.0287
B02@4.5'	4.5'	02/08/2017	<0.002	<0.002	<0.002	<0.002	<25.0	<0.200	<100	7.76	0.0342
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
TPH - total petroleum hydrocarbons
* - TPH standard applies to combined DRO-GRO-ORO
< - less than laboratory reporting limit
Bold indicates result exceeds allowable level.



February 09, 2017

LT Environmental, Inc.

Justin Solomon

4600 West 60th Avenue

Arvada CO 80003

Project Name - KMG - Cannon Land 28-16T

Project Number - 014217018

Attached are your analytical results for KMG - Cannon Land 28-16T received by Origins Laboratory, Inc. February 08, 2017. This project is associated with Origins project number X702182-01.

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

Justin Solomon
Project Number: 014217018
Project: KMG - Cannon Land 28-16T

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B01@4.5'	X702182-01	Soil	February 8, 2017 14:10	02/08/2017 17:15
B02@4.5'	X702182-02	Soil	February 8, 2017 14:15	02/08/2017 17:15

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

Justin Solomon
 Project Number: 014217018
 Project: KMG - Cannon Land 28-16T

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: X 702182

Client: LT Env.

Client Project ID: KMG - Cannon Land 28-16T

Checklist Completed by: D. Lee

Shipped Via: HD

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

Date/time completed: 2-8-17 1801

Airbill #: _____

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

Cooler Number/Temperature: 1 / 5.2 °C 1 °C 1 °C (Describe) °C

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 ⁽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"/>	pH
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 HNO3, HCL, H2SO4) / (pH >10 for samples preserved with NaAsO2+NaOH, ZnAc+NaOH)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input 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.

D. Lee
 Reviewed by (Project Manager)

2-8-17 1802
 Date/Time Reviewed

Origins Laboratory, Inc.



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

Justin Solomon
 Project Number: 014217018
 Project: KMG - Cannon Land 28-16T

B01@4.5'
2/8/2017 2:10:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X702182-01 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	ND	25.0	mg/kg	1	B7B0803	02/08/2017	02/09/2017	U
Residual Range Organics (C28-C40)	ND	100	"	"	"	"	"	U

Surrogate: o-Terphenyl 81.0 % 59-131 " " "

GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	B7B0805	02/08/2017	02/09/2017	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 98.1 % 70-130 " " "
Surrogate: Toluene-d8 101 % 70-130 " " "
Surrogate: 4-Bromofluorobenzene 98.6 % 70-130 " " "

pH in Soil by EPA 9045D

pH	7.85		pH Units	1	B7B0807	02/08/2017	02/08/2017	
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.0287		mmhos/cm	"	B7B0808	02/08/2017	02/08/2017	
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Origins Laboratory, Inc.



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

Justin Solomon
 Project Number: 014217018
 Project: KMG - Cannon Land 28-16T

B02@4.5'
2/8/2017 2:15:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X702182-02 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	ND	25.0	mg/kg	1	B7B0803	02/08/2017	02/09/2017	U
Residual Range Organics (C28-C40)	ND	100	"	"	"	"	"	U

Surrogate: o-Terphenyl 87.9 % 59-131 " " "

GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	B7B0805	02/08/2017	02/09/2017	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 104 % 70-130 " " "
Surrogate: Toluene-d8 105 % 70-130 " " "
Surrogate: 4-Bromofluorobenzene 103 % 70-130 " " "

pH in Soil by EPA 9045D

pH	7.76		pH Units	1	B7B0807	02/08/2017	02/08/2017	
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.0342		mmhos/cm	"	B7B0808	02/08/2017	02/08/2017	
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LT Environmental, Inc.
 4600 West 60th Avenue
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Justin Solomon
 Project Number: 014217018
 Project: KMG - Cannon Land 28-16T

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 B7B0805 - EPA 5030 (soil)

Blank (B7B0805-BLK1)

Prepared: 02/08/2017 Analyzed: 02/08/2017

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	62		ug/kg	62.5		99.1	70-130			
Surrogate: Toluene-d8	59		"	62.5		94.1	70-130			
Surrogate: 4-Bromofluorobenzene	59		"	62.5		94.3	70-130			

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

Justin Solomon
 Project Number: 014217018
 Project: KMG - Cannon Land 28-16T

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 B7B0805 - EPA 5030 (soil)

Blank (B7B0805-BLK2)

Prepared: 02/08/2017 Analyzed: 02/08/2017

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	60		ug/kg	62.5		96.7	70-130			
Surrogate: Toluene-d8	64		"	62.5		102	70-130			
Surrogate: 4-Bromofluorobenzene	59		"	62.5		95.1	70-130			

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Justin Solomon
 Project Number: 014217018
 Project: KMG - Cannon Land 28-16T

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 B7B0805 - EPA 5030 (soil)										
Blank (B7B0805-BLK3)										
					Prepared: 02/08/2017 Analyzed: 02/08/2017					
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	62		ug/kg	62.5		98.8	70-130			
Surrogate: Toluene-d8	70		"	62.5		112	70-130			
Surrogate: 4-Bromofluorobenzene	59		"	62.5		94.4	70-130			

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 Project Number: 014217018
 Project: KMG - Cannon Land 28-16T

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 B7B0805 - EPA 5030 (soil)

LCS (B7B0805-BS1)

Prepared: 02/08/2017 Analyzed: 02/08/2017

Benzene	0.098	0.002	mg/kg	0.100		97.9	77.1-124			
Toluene	0.109	0.002	"	0.100		109	74.5-128			
Ethylbenzene	0.094	0.002	"	0.100		94.1	66.4-127			
m,p-Xylene	0.197	0.004	"	0.200		98.6	76.6-124			
o-Xylene	0.091	0.002	"	0.100		90.6	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	66		ug/kg	62.5		106	70-130			
Surrogate: Toluene-d8	68		"	62.5		108	70-130			
Surrogate: 4-Bromofluorobenzene	54		"	62.5		86.6	70-130			

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LT Environmental, Inc.
 4600 West 60th Avenue
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Justin Solomon
 Project Number: 014217018
 Project: KMG - Cannon Land 28-16T

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 B7B0805 - EPA 5030 (soil)

LCS (B7B0805-BS2)

Prepared: 02/08/2017 Analyzed: 02/08/2017

Benzene	0.086	0.002	mg/kg	0.100		85.5	77.1-124			
Toluene	0.099	0.002	"	0.100		99.5	74.5-128			
Ethylbenzene	0.115	0.002	"	0.100		115	66.4-127			
m,p-Xylene	0.231	0.004	"	0.200		116	76.6-124			
o-Xylene	0.116	0.002	"	0.100		116	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	45		ug/kg	62.5		71.7	70-130			
Surrogate: Toluene-d8	62		"	62.5		99.1	70-130			
Surrogate: 4-Bromofluorobenzene	66		"	62.5		105	70-130			

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 4600 West 60th Avenue
 Arvada CO 80003

Justin Solomon
 Project Number: 014217018
 Project: KMG - Cannon Land 28-16T

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 B7B0805 - EPA 5030 (soil)

LCS (B7B0805-BS3)

Prepared: 02/08/2017 Analyzed: 02/08/2017

Benzene	0.099	0.002	mg/kg	0.100		98.8	77.1-124			
Toluene	0.120	0.002	"	0.100		120	74.5-128			
Ethylbenzene	0.108	0.002	"	0.100		108	66.4-127			
m,p-Xylene	0.224	0.004	"	0.200		112	76.6-124			
o-Xylene	0.117	0.002	"	0.100		117	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	64		ug/kg	62.5		102	70-130			
Surrogate: Toluene-d8	70		"	62.5		112	70-130			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		100	70-130			

Origins Laboratory, Inc.



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 Arvada CO 80003

Justin Solomon
 Project Number: 014217018
 Project: KMG - Cannon Land 28-16T

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 B7B0805 - EPA 5030 (soil)

Matrix Spike (B7B0805-MS1)	Source: X702178-01			Prepared: 02/08/2017 Analyzed: 02/08/2017						
Benzene	0.115	0.002	mg/kg	0.100	ND	115	71.8-126			
Toluene	0.116	0.002	"	0.100	ND	116	65.1-130			
Ethylbenzene	0.112	0.002	"	0.100	ND	112	62.2-130			
m,p-Xylene	0.228	0.004	"	0.200	ND	114	46.5-137			
o-Xylene	0.114	0.002	"	0.100	ND	114	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	57		ug/kg	62.5		91.4	70-130			
Surrogate: Toluene-d8	66		"	62.5		106	70-130			
Surrogate: 4-Bromofluorobenzene	60		"	62.5		96.0	70-130			

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

Justin Solomon
 Project Number: 014217018
 Project: KMG - Cannon Land 28-16T

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 B7B0805 - EPA 5030 (soil)

Matrix Spike (B7B0805-MS2)	Source: X702178-02			Prepared: 02/08/2017 Analyzed: 02/08/2017						
Benzene	0.102	0.002	mg/kg	0.100	ND	102	71.8-126			
Toluene	0.114	0.002	"	0.100	ND	114	65.1-130			
Ethylbenzene	0.117	0.002	"	0.100	ND	117	62.2-130			
m,p-Xylene	0.238	0.004	"	0.200	ND	119	46.5-137			
o-Xylene	0.121	0.002	"	0.100	ND	121	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	49		ug/kg	62.5		78.6	70-130			
Surrogate: Toluene-d8	65		"	62.5		105	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

Justin Solomon
 Project Number: 014217018
 Project: KMG - Cannon Land 28-16T

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 B7B0805 - EPA 5030 (soil)

Matrix Spike (B7B0805-MS3)	Source: X702179-01			Prepared: 02/08/2017 Analyzed: 02/08/2017						
Benzene	0.091	0.002	mg/kg	0.100	ND	91.4	71.8-126			
Toluene	0.111	0.002	"	0.100	ND	111	65.1-130			
Ethylbenzene	0.130	0.002	"	0.100	ND	130	62.2-130			
m,p-Xylene	0.260	0.004	"	0.200	ND	130	46.5-137			
o-Xylene	0.124	0.002	"	0.100	ND	124	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	46		ug/kg	62.5		73.6	70-130			
Surrogate: Toluene-d8	66		"	62.5		106	70-130			
Surrogate: 4-Bromofluorobenzene	68		"	62.5		108	70-130			

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

Justin Solomon
 Project Number: 014217018
 Project: KMG - Cannon Land 28-16T

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 B7B0805 - EPA 5030 (soil)

Matrix Spike Dup (B7B0805-MSD1)	Source: X702178-01			Prepared: 02/08/2017 Analyzed: 02/08/2017						
Benzene	0.089	0.002	mg/kg	0.100	ND	88.7	71.8-126	25.7	11.3	QR-02
Toluene	0.117	0.002	"	0.100	ND	117	65.1-130	1.37	15.4	
Ethylbenzene	0.114	0.002	"	0.100	ND	114	62.2-130	1.95	19.6	
m,p-Xylene	0.230	0.004	"	0.200	ND	115	46.5-137	0.839	19.2	
o-Xylene	0.117	0.002	"	0.100	ND	117	54.2-134	2.78	17.9	
Surrogate: 1,2-Dichloroethane-d4	56		ug/kg	62.5		90.3	70-130			
Surrogate: Toluene-d8	65		"	62.5		105	70-130			
Surrogate: 4-Bromofluorobenzene	54		"	62.5		85.8	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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Batch B7B0805 - EPA 5030 (soil)

Matrix Spike Dup (B7B0805-MSD2)	Source: X702178-02			Prepared: 02/08/2017 Analyzed: 02/08/2017						
Benzene	0.095	0.002	mg/kg	0.100	ND	95.0	71.8-126	6.97	11.3	
Toluene	0.128	0.002	"	0.100	ND	128	65.1-130	11.5	15.4	
Ethylbenzene	0.105	0.002	"	0.100	ND	105	62.2-130	10.6	19.6	
m,p-Xylene	0.224	0.004	"	0.200	ND	112	46.5-137	5.75	19.2	
o-Xylene	0.119	0.002	"	0.100	ND	119	54.2-134	1.96	17.9	
Surrogate: 1,2-Dichloroethane-d4	50		ug/kg	62.5		79.5	70-130			
Surrogate: Toluene-d8	77		"	62.5		124	70-130			
Surrogate: 4-Bromofluorobenzene	55		"	62.5		88.4	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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Batch B7B0805 - EPA 5030 (soil)

Matrix Spike Dup (B7B0805-MSD3)	Source: X702179-01			Prepared: 02/08/2017 Analyzed: 02/08/2017						
Benzene	0.102	0.002	mg/kg	0.100	ND	102	71.8-126	11.1	11.3	
Toluene	0.122	0.002	"	0.100	ND	122	65.1-130	9.91	15.4	
Ethylbenzene	0.108	0.002	"	0.100	ND	108	62.2-130	18.5	19.6	
m,p-Xylene	0.220	0.004	"	0.200	ND	110	46.5-137	16.6	19.2	
o-Xylene	0.110	0.002	"	0.100	ND	110	54.2-134	12.0	17.9	
Surrogate: 1,2-Dichloroethane-d4	67		ug/kg	62.5		108	70-130			
Surrogate: Toluene-d8	70		"	62.5		112	70-130			
Surrogate: 4-Bromofluorobenzene	54		"	62.5		86.5	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 B7B0803 - EPA 3580

Blank (B7B0803-BLK1)

Prepared: 02/08/2017 Analyzed: 02/08/2017

Diesel (C10-C28)	ND	50.0	mg/kg							U
Residual Range Organics (C28-C40)	ND	200	"							U
Surrogate: o-Terphenyl	62		"	50.0		125	59-131			

Blank (B7B0803-BLK2)

Prepared: 02/08/2017 Analyzed: 02/08/2017

Diesel (C10-C28)	ND	50.0	mg/kg							U
Residual Range Organics (C28-C40)	ND	200	"							U
Surrogate: o-Terphenyl	47		"	50.0		94.7	59-131			

Blank (B7B0803-BLK3)

Prepared: 02/08/2017 Analyzed: 02/08/2017

Diesel (C10-C28)	ND	50.0	mg/kg							U
Residual Range Organics (C28-C40)	ND	200	"							U
Surrogate: o-Terphenyl	57		"	50.0		114	59-131			

LCS (B7B0803-BS1)

Prepared: 02/08/2017 Analyzed: 02/08/2017

Diesel (C10-C28)	937	50.0	mg/kg	1000		93.7	64-121			
Residual Range Organics (C28-C40)	809	200	"	1000		80.9	58-124			
Surrogate: o-Terphenyl	48		"	50.0		95.2	59-131			

LCS (B7B0803-BS2)

Prepared: 02/08/2017 Analyzed: 02/08/2017

Diesel (C10-C28)	904	50.0	mg/kg	1000		90.4	64-121			
Residual Range Organics (C28-C40)	742	200	"	1000		74.2	58-124			

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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
Batch B7B0803 - EPA 3580										
LCS (B7B0803-BS2)					Prepared: 02/08/2017 Analyzed: 02/08/2017					
Surrogate: o-Terphenyl	47		mg/kg	50.0		94.2	59-131			
LCS (B7B0803-BS3)					Prepared: 02/08/2017 Analyzed: 02/08/2017					
Diesel (C10-C28)	954	50.0	mg/kg	1000		95.4	64-121			
Residual Range Organics (C28-C40)	1020	200	"	1000		102	58-124			
Surrogate: o-Terphenyl	45		"	50.0		89.6	59-131			
Matrix Spike (B7B0803-MS1)		Source: X702165-01			Prepared: 02/08/2017 Analyzed: 02/08/2017					
Diesel (C10-C28)	1490	50.0	mg/kg	1000	1180	31.4	53-125			QM-07
Residual Range Organics (C28-C40)	952	200	"	1000	201	75.2	47-133			
Surrogate: o-Terphenyl	47		"	50.0		93.3	59-131			
Matrix Spike (B7B0803-MS2)		Source: X702125-01			Prepared: 02/08/2017 Analyzed: 02/08/2017					
Diesel (C10-C28)	893	50.0	mg/kg	1000	ND	89.3	53-125			
Residual Range Organics (C28-C40)	758	200	"	1000	ND	75.8	47-133			
Surrogate: o-Terphenyl	47		"	50.0		94.8	59-131			
Matrix Spike (B7B0803-MS3)		Source: X702178-05			Prepared: 02/08/2017 Analyzed: 02/08/2017					
Diesel (C10-C28)	1200	50.0	mg/kg	1000	89.0	111	53-125			
Residual Range Organics (C28-C40)	1170	200	"	1000	ND	117	47-133			
Surrogate: o-Terphenyl	47		"	50.0		94.0	59-131			
Matrix Spike Dup (B7B0803-MSD1)		Source: X702165-01			Prepared: 02/08/2017 Analyzed: 02/08/2017					
Diesel (C10-C28)	1460	50.0	mg/kg	1000	1180	27.8	53-125	12.1	20	QM-07
Residual Range Organics (C28-C40)	943	200	"	1000	201	74.3	47-133	1.22	20	
Surrogate: o-Terphenyl	49		"	50.0		97.8	59-131			
Matrix Spike Dup (B7B0803-MSD2)		Source: X702125-01			Prepared: 02/08/2017 Analyzed: 02/08/2017					

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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
Batch B7B0803 - EPA 3580										
Matrix Spike Dup (B7B0803-MSD2)			Source: X702125-01		Prepared: 02/08/2017 Analyzed: 02/08/2017					
Diesel (C10-C28)	913	50.0	mg/kg	1000	ND	91.3	53-125	2.21	20	
Residual Range Organics (C28-C40)	785	200	"	1000	ND	78.5	47-133	3.54	20	
Surrogate: o-Terphenyl	46		"	50.0		92.1	59-131			
Matrix Spike Dup (B7B0803-MSD3)			Source: X702178-05		Prepared: 02/08/2017 Analyzed: 02/08/2017					
Diesel (C10-C28)	1220	50.0	mg/kg	1000	89.0	113	53-125	1.65	20	
Residual Range Organics (C28-C40)	1150	200	"	1000	ND	115	47-133	1.64	20	
Surrogate: o-Terphenyl	48		"	50.0		96.8	59-131			

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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 B7B0807 - NO PREP										
Duplicate (B7B0807-DUP1)		Source: X702179-01			Prepared: 02/08/2017 Analyzed: 02/08/2017					
pH	8.29		pH Units		8.32			0.361	25	
Duplicate (B7B0807-DUP2)		Source: X702179-02			Prepared: 02/08/2017 Analyzed: 02/08/2017					
pH	8.47		pH Units		8.54			0.823	25	
Duplicate (B7B0807-DUP3)		Source: X702179-03			Prepared: 02/08/2017 Analyzed: 02/08/2017					
pH	8.48		pH Units		8.34			1.66	25	
Batch B7B0808 - NO PREP										
Blank (B7B0808-BLK1)					Prepared: 02/08/2017 Analyzed: 02/08/2017					
Specific Conductance (EC)	0.00350		mmhos/cm							
Blank (B7B0808-BLK2)					Prepared: 02/08/2017 Analyzed: 02/08/2017					
Specific Conductance (EC)	0.00350		mmhos/cm							
Blank (B7B0808-BLK3)					Prepared: 02/08/2017 Analyzed: 02/08/2017					
Specific Conductance (EC)	0.00350		mmhos/cm							
Duplicate (B7B0808-DUP1)		Source: X702179-01			Prepared: 02/08/2017 Analyzed: 02/08/2017					
Specific Conductance (EC)	0.300		mmhos/cm		0.275			8.70	25	
Duplicate (B7B0808-DUP2)		Source: X702179-02			Prepared: 02/08/2017 Analyzed: 02/08/2017					
Specific Conductance (EC)	0.184		mmhos/cm		0.175			4.62	25	
Duplicate (B7B0808-DUP3)		Source: X702179-03			Prepared: 02/08/2017 Analyzed: 02/08/2017					
Specific Conductance (EC)	0.249		mmhos/cm		0.227			9.24	25	

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Notes and Definitions

U Sample is Non-Detect.

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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