

TABLE 1
SOIL SAMPLE ANALYTICAL RESULTS
CLACK 1-2A, OLSON 2-2
WELD COUNTY, COLORADO
KERR-MCGEE OIL & GAS ONSHORE, LP

COGCC Allowable Concentration (Soil) -->				Organics (mg/kg)							
				500			0.17	85	100	175	23
Sample ID:	Sample Date:	Sample Depth (feet bgs):	Photoionization Detector Reading (ppm):	TPH-GRO (C6-C10) Low Fraction	TPH-DRO (C10-C28) High Fraction	TPH-RRO (C28-C40) High Fraction	Benzene	Toluene	Ethylbenzene	Xylenes - total	Naphthalene
SB01 @ 5'	08/04/2015	5'	NA	<25	67	<100	<0.050	<0.050	<0.050	<0.050	NA
SB02 @ 1'	08/04/2015	1'	NA	<25	<25	<100	<0.002	<0.002	<0.002	<0.002	NA
SB02 @ 5'	08/04/2015	5'	NA	<25	38	<100	<0.050	<0.050	<0.050	<0.050	NA
SB03 @ 1'	08/04/2015	1'	NA	<25	<25	<100	<0.002	<0.002	<0.002	<0.002	NA
SB04 @ 3'	08/04/2015	3'	NA	<25	<25	<100	<0.002	<0.002	<0.002	<0.002	NA
SB05 @ 3'	08/04/2015	3'	NA	<25	<25	<100	<0.002	<0.002	<0.002	<0.002	NA
SB05 @ 5'	08/04/2015	5'	NA	<25	<25	<100	<0.002	<0.002	<0.002	<0.002	NA
SB06 @ 3'	08/04/2015	3'	NA	45	<25	<100	<0.002	<0.002	<0.002	<0.002	NA
SB06 @ 5'	08/04/2015	5'	NA	<25	<25	<100	<0.002	<0.002	<0.002	<0.002	NA
SB07 @ 3'	08/04/2015	3'	NA	<25	<25	<100	<0.002	<0.002	<0.002	<0.002	NA
SB07 @ 5'	08/04/2015	5'	NA	<25	<25	<100	<0.002	<0.002	<0.002	<0.002	NA
UTSB01 West@3'	08/04/2015	3'	NA	100	150	<100	2.61	<0.050	1.21	8.48	NA
UTSB02 East@3'	08/04/2015	3'	NA	880	730	140	9.05	4.90	4.83	63.6	NA
SB08@1'	08/06/2015	1'	NA	<25	<25	<100	<0.002	<0.002	<0.002	<0.002	NA
SB08@3'	08/06/2015	3'	NA	<25	<25	<100	<0.002	<0.002	<0.002	<0.002	NA
UTSB03 West@3'	05/20/2020	3'	NA	1280	283	<100	6.26	<0.0500	4.95	45.2	NA
UTSB04 East@3'	05/20/2020	3'	NA	347	32.7	<100	1.34	<0.0500	0.856	1.16	NA

Notes: mg/kg - milligrams per kilogram
COGCC - Colorado Oil and Gas Conservation Commission
bgs - below ground surface
ppm - parts per million
TPH - total petroleum hydrocarbons

GRO - gasoline range organics
DRO - diesel range organics
RRO - residual range organics
NA - not analyzed
Bold indicates result exceeds allowable level





May 28, 2020

LT Environmental, Inc.

Brian Sulzberger

4600 West 60th Avenue

Arvada CO 80003

Project Name - KMG - Clack 1-2A, Olson 2-2

Project Number - 014213044/WO #883375

Attached are your analytical results for KMG - Clack 1-2A, Olson 2-2 received by Origins Laboratory, Inc. May 20, 2020. This project is associated with Origins project number Y005278-01.

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: 014213044/WO #88337562
Project: KMG - Clack 1-2A, Olson 2-2

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
UTSB03West@3'	Y005278-01	Soil	May 20, 2020 10:05	05/20/2020 12:40
UTSB04East@3'	Y005278-02	Soil	May 20, 2020 11:00	05/20/2020 12:40

Origins Laboratory, Inc.



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

Brian Sulzberger
 Project Number: 014213044/WO #88337562
 Project: KMG - Clack 1-2A, Olson 2-2

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: Y005278

Client: LTE

Client Project ID: Clack 1-2A, Olson 2-2

Checklist Completed by: JG

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

Date/time completed: 5/20/2020

Airbill #: N/A

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

Cooler Number/Temperature: 1 21.3 °C 1 °C 1 °C (Describe) 1 °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"/>		<u>Some Day</u>
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 ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Are short holding time analytes or samples with HTs due within 48 hours present ⁽¹⁾ ?		<input checked="" type="checkbox"/>		
Is a chain-of-custody (COC) present and filled out completely ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client with date and time recorded ⁽¹⁾ ?	<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 ⁽¹⁾ ? (note ID of confirmation instrument used in comments) / (preservation is not confirmed for subcontracted analyses in order to insure sample integrity)(pH < 2 for samples preserved with HNO ₃ , HCL, H ₂ SO ₄) / (pH > 10 for samples preserved with NaAsO ₂ +NaOH, ZnAc+NaOH)			<input checked="" 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.

JM
 Reviewed by (Project Manager)

5-21-20
 Date/Time Reviewed

Origins Laboratory, Inc.



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

Brian Sulzberger
 Project Number: 014213044/WO #88337562
 Project: KMG - Clack 1-2A, Olson 2-2

UTSB03West@3'
5/20/2020 10:05:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y005278-01 (Soil)

BTEX/TVPH by EPA 8260D

Benzene	6.26	0.500	mg/kg	250	B0E2001	KDK	05/20/2020	05/20/2020	
Toluene	ND	0.0500	"	25	"	KDK	"	05/20/2020	U
Ethylbenzene	4.95	0.500	"	250	"	KDK	"	05/20/2020	
Xylenes, total	45.2	0.500	"	"	"	KDK	"	"	
Gasoline Range Hydrocarbons	1280	50.0	"	"	"	KDK	"	"	

Surrogate: 1,2-Dichloroethane-d4	93.5 %	70-130			"	"	"	"	
Surrogate: Toluene-d8	105 %	70-130			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	108 %	70-130			"	"	"	"	

DRO/ORO by EPA 8015D

Diesel (C10-C28)	283	25.0	mg/kg	1	B0E2002	TEM	05/20/2020	05/21/2020	
Residual Range Organics (C28-C40)	ND	100	"	"	"	TEM	"	"	U

Surrogate: o-Terphenyl	101 %	50-150			"	"	"	"	
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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: 014213044/WO #88337562
 Project: KMG - Clack 1-2A, Olson 2-2

UTSB04East@3'
5/20/2020 11:00:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y005278-02 (Soil)

BTEX/TVPH by EPA 8260D

Benzene	1.34	0.0500	mg/kg	25	B0E2001	KDK	05/20/2020	05/20/2020	
Toluene	ND	0.0500	"	"	"	KDK	"	"	U
Ethylbenzene	0.856	0.0500	"	"	"	KDK	"	"	
Xylenes, total	1.16	0.0500	"	"	"	KDK	"	05/21/2020	
Gasoline Range Hydrocarbons	347	5.00	"	"	"	KDK	"	"	

Surrogate: 1,2-Dichloroethane-d4	88.0 %	70-130			"	"		05/20/2020	
Surrogate: Toluene-d8	102 %	70-130			"	"		"	
Surrogate: 4-Bromofluorobenzene	116 %	70-130			"	"		"	

DRO/ORO by EPA 8015D

Diesel (C10-C28)	32.7	25.0	mg/kg	1	B0E2002	TEM	05/20/2020	05/21/2020	
Residual Range Organics (C28-C40)	ND	100	"	"	"	TEM	"	"	U

Surrogate: o-Terphenyl	95.0 %	50-150			"	"		"	
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LT Environmental, Inc.
 4600 West 60th Avenue
 Arvada CO 80003

Brian Sulzberger
 Project Number: 014213044/WO #88337562
 Project: KMG - Clack 1-2A, Olson 2-2

Volatile Organic Compounds by GC/MS SW846 8260D - 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 B0E2001 - EPA 5030 (soil)

Blank (B0E2001-BLK1)

Prepared: 05/20/2020 Analyzed: 05/20/2020

Benzene	ND	0.00200	mg/kg							U
Toluene	ND	0.00200	"							U
Ethylbenzene	ND	0.00200	"							U
Xylenes, total	ND	0.00200	"							U
Gasoline Range Hydrocarbons	ND	0.200	"							U
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.11</i>		<i>"</i>	<i>0.125</i>		<i>89.4</i>	<i>70-130</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.13</i>		<i>"</i>	<i>0.125</i>		<i>100</i>	<i>70-130</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.13</i>		<i>"</i>	<i>0.125</i>		<i>104</i>	<i>70-130</i>			

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 Project Number: 014213044/WO #88337562
 Project: KMG - Clack 1-2A, Olson 2-2

Volatile Organic Compounds by GC/MS SW846 8260D - 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 B0E2001 - EPA 5030 (soil)

LCS (B0E2001-BS1)

Prepared: 05/20/2020 Analyzed: 05/20/2020

Benzene	0.0452	0.00200	mg/kg	0.0500		90.3	70-130			
Toluene	0.0483	0.00200	"	0.0500		96.7	70-130			
Ethylbenzene	0.0474	0.00200	"	0.0500		94.7	70-130			
m,p-Xylene	0.0957	0.00400	"	0.100		95.7	70-130			
o-Xylene	0.0488	0.00200	"	0.0500		97.7	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.11		"	0.125		92.0	70-130			
Surrogate: Toluene-d8	0.13		"	0.125		104	70-130			
Surrogate: 4-Bromofluorobenzene	0.13		"	0.125		102	70-130			

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Brian Sulzberger
 Project Number: 014213044/WO #88337562
 Project: KMG - Clack 1-2A, Olson 2-2

Volatile Organic Compounds by GC/MS SW846 8260D - 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 B0E2001 - EPA 5030 (soil)

Matrix Spike (B0E2001-MS1)	Source: Y005269-01			Prepared: 05/20/2020 Analyzed: 05/20/2020						
Benzene	0.0566	0.00200	mg/kg	0.0500	ND	113	70-130			
Toluene	0.0620	0.00200	"	0.0500	ND	124	70-130			
Ethylbenzene	0.0628	0.00200	"	0.0500	ND	126	70-130			
m,p-Xylene	0.126	0.00400	"	0.100	ND	126	70-130			
o-Xylene	0.0674	0.00200	"	0.0500	ND	135	70-130			QM-07
Surrogate: 1,2-Dichloroethane-d4	0.11		"	0.125		91.2	70-130			
Surrogate: Toluene-d8	0.13		"	0.125		107	70-130			
Surrogate: 4-Bromofluorobenzene	0.12		"	0.125		99.2	70-130			

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 Project Number: 014213044/WO #88337562
 Project: KMG - Clack 1-2A, Olson 2-2

Volatile Organic Compounds by GC/MS SW846 8260D - 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 B0E2001 - EPA 5030 (soil)

Matrix Spike Dup (B0E2001-MSD1)	Source: Y005269-01			Prepared: 05/20/2020 Analyzed: 05/20/2020						
Benzene	0.0590	0.00200	mg/kg	0.0500	ND	118	70-130	4.12	20	
Toluene	0.0640	0.00200	"	0.0500	ND	128	70-130	3.20	20	
Ethylbenzene	0.0634	0.00200	"	0.0500	ND	127	70-130	0.856	20	
m,p-Xylene	0.127	0.00400	"	0.100	ND	127	70-130	0.836	20	
o-Xylene	0.0665	0.00200	"	0.0500	ND	133	70-130	1.37	20	QM-07
Surrogate: 1,2-Dichloroethane-d4	0.11		"	0.125		88.2	70-130			
Surrogate: Toluene-d8	0.13		"	0.125		107	70-130			
Surrogate: 4-Bromofluorobenzene	0.13		"	0.125		101	70-130			

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 4600 West 60th Avenue
 Arvada CO 80003

Brian Sulzberger
 Project Number: 014213044/WO #88337562
 Project: KMG - Clack 1-2A, Olson 2-2

Volatile Organic Compounds by GC/MS SW846 8260D - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B0E2002 - EPA 3580										
Blank (B0E2002-BLK1)										
					Prepared: 05/20/2020 Analyzed: 05/20/2020					
Diesel (C10-C28)	ND	25.0	mg/kg							U
Residual Range Organics (C28-C40)	ND	100	"							U
Surrogate: o-Terphenyl	22		"	25.0		88.6	50-150			

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 Arvada CO 80003

Brian Sulzberger
 Project Number: 014213044/WO #88337562
 Project: KMG - Clack 1-2A, Olson 2-2

Extractable Petroleum Hydrocarbons by 8015D - 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 B0E2002 - EPA 3580

LCS (B0E2002-BS1)

Prepared: 05/20/2020 Analyzed: 05/20/2020

Diesel (C10-C28)	1220	50.0	mg/kg	1000		122	70-130			
Residual Range Organics (C28-C40)	1140	200	"	1000		114	70-130			
Surrogate: o-Terphenyl	62		"	50.0		124	50-150			

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Brian Sulzberger
 Project Number: 014213044/WO #88337562
 Project: KMG - Clack 1-2A, Olson 2-2

Extractable Petroleum Hydrocarbons by 8015D - 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 B0E2002 - EPA 3580

Matrix Spike (B0E2002-MS1)	Source: Y005269-01			Prepared: 05/20/2020 Analyzed: 05/20/2020						
Diesel (C10-C28)	1180	50.0	mg/kg	1000	ND	118	70-130			
Residual Range Organics (C28-C40)	1130	200	"	1000	ND	113	70-130			
Surrogate: o-Terphenyl	61		"	50.0		123	50-150			

Origins Laboratory, Inc.



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Brian Sulzberger
 Project Number: 014213044/WO #88337562
 Project: KMG - Clack 1-2A, Olson 2-2

Extractable Petroleum Hydrocarbons by 8015D - 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 B0E2002 - EPA 3580

Matrix Spike Dup (B0E2002-MSD1)	Source: Y005269-01			Prepared: 05/20/2020 Analyzed: 05/20/2020						
Diesel (C10-C28)	1170	50.0	mg/kg	1000	ND	117	70-130	1.16	35	
Residual Range Organics (C28-C40)	1150	200	"	1000	ND	115	70-130	1.76	35	
Surrogate: o-Terphenyl	59		"	50.0		117	50-150			

Origins Laboratory, Inc.



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Arvada CO 80003

Brian Sulzberger
Project Number: 014213044/WO #88337562
Project: KMG - Clack 1-2A, Olson 2-2

Notes and Definitions

U Sample is Non-Detect.

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

ND Analyte NOT DETECTED at or above the reporting limit

RPD Relative Percent Difference

All soil results are reported at a wet weight basis.

Origins Laboratory, Inc.



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