

TABLE 1
SOIL SAMPLE ANALYTICAL RESULTS
UPRR 38 PAN AM O TRUE #1
WELD COUNTY, COLORADO
KERR-MCGEE OIL & GAS ONSHORE, LP

COGCC Allowable Concentration (Soil) -->				Organics (mg/kg)								
				500			0.17	85	100	175	4	(6-9)
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	EC (<4 mmhos/cm or 2x background)	pH (unit)
B01@5'	1/3/2019	5'	1.4	<0.200	<25.0	<100	<0.002	<0.002	<0.002	<0.002	0.0732	8.73
W01@4'	1/3/2019	4'	1.2	NA	NA	NA	NA	NA	NA	NA	NA	NA
E01@4'	1/3/2019	4'	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA
S01@4'	1/3/2019	4'	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA
N01@4'	1/3/2019	4'	0.4	NA	NA	NA	NA	NA	NA	NA	NA	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

mmhos/cm - millimhos per centimeter

NA - not analyzed



January 04, 2019

LT Environmental, Inc.

Brian Sulzberger

4600 West 60th Avenue

Arvada

CO 80003

Project Name - KMG - UPRR 38 Pan Am O True 1 Project Number - 014219002

Attached are your analytical results for KMG - UPRR 38 Pan Am O True 1 received by Origins Laboratory, Inc. January 03, 2019. This project is associated with Origins project number Y901022-01.

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: 014219002
Project: KMG - UPRR 38 Pan Am O True 1

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B01@5'	Y901022-01	Soil	January 3, 2019 15:00	01/03/2019 16:45

Per the email from Andy on 01/04/19, the project name was changed to UPRR 38 Pan Am O True 1.

Origins Laboratory, Inc.



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

Brian Sulzberger
Project Number: 014219002
Project: KMG - UPRR 38 Pan Am O True 1

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7901022

ORIGINS
LABORATORY, INC

Client: LT Environmental
Address: 4600 W. 60th Ave
Arvada, CO 80003
Telephone Number: 303-433-9788
Email Address: KMG Team

Project Manager: Brian Sulzberger
Project Name: UPRR Pan Am O True #1
Project Number: 014219002
Samples Collected By: Jeff Binden

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix			Analysis			Sample Instructions
				Unpreserved	HCl	HNO ₃	Other	Groundwater	Soil	Air/Sediment	Other	TPH	GC/MS	
B01@5'	1-3-19	1500	2	X					X			X	X	1
N01@4'		1505	2	1					X			X	X	2
E01@4'		1510	2	1					X			X	X	3
S01@4'		1515	2	1					X			X	X	4
W01@4'		1520	2	1					X			X	X	5
B501		1530	2	1					X			X	X	6
														7
														8
														9
														10

Requisitioned By: [Signature] Date: 1/3/19 Time: 1645
Requisitioned By: [Signature] Date: 1/3/19 Time: 1645

Received By: [Signature] Date: 1-3-19 Time: 1645
Received By: [Signature] Date: 1-3-19 Time: 1645

Turnaround Time: Same Day ☒ 24 Hr ☐ 48 Hr ☐ 72 Hr ☐ Standard ☐

Temp Received- 2.3 Date Results Needed

Origins Laboratory, Inc.

Jeff Pellegrini

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

Brian Sulzberger
Project Number: 014219002
Project: KMG - UPRR 38 Pan Am O True 1

Origins Laboratory:

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

Sample Receipt Checklist

Origins Work Order: 4901022

Client: LTE

Client Project ID: KMG-UPRR Pan Am O True #1

Checklist Completed by: Don Le

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

Date/time completed: 1-3-19

Airbill #: NA

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

Cooler Number/Temperature: 1 2.3 °C 1 °C 1 °C 1 °C

Thermometer ID: 1003

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 type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
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 HNO ₃ , HCL, H ₂ SO ₄) / (pH >10 for samples preserved with NaAsO ₂ +NaOH, ZnAc+NaOH)	<input type="checkbox"/>	<input type="checkbox"/>	<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.

Reviewed by (Project Manager) [Signature]

1-3-19
Date/Time Reviewed

Origins Laboratory, Inc.

Jefe Pellegrini

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

Brian Sulzberger
Project Number: 014219002
Project: KMG - UPRR 38 Pan Am O True 1

B01@5'

1/3/2019 3:00:00PM

Analyte	Result	Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y901022-01 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	ND	25.0	mg/kg	1	B9A0303	KDK	01/03/2019	01/03/2019	U
Residual Range Organics (C28-C40)	ND	100	"	"	"	KDK	"	"	U

Surrogate: o-Terphenyl 109 % 59-131 " " "

GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	B9A0208	KDK	01/03/2019	01/03/2019	U
Benzene	ND	0.002	"	"	"	KDK	"	"	U
Toluene	ND	0.002	"	"	"	KDK	"	"	U
Ethylbenzene	ND	0.002	"	"	"	KDK	"	"	U
Xylenes, total	ND	0.002	"	"	"	KDK	"	"	U

Surrogate: 1,2-Dichloroethane-d4 103 % 70-130 " " "
Surrogate: Toluene-d8 90.7 % 70-130 " " "
Surrogate: 4-Bromofluorobenzene 95.9 % 70-130 " " "

pH in Soil by EPA 9045D

pH	8.73		pH Units	1	B9A0305	OLAB	01/03/2019	01/03/2019	
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.0732	0.00500	mmhos/cm	"	B9A0306	OLAB	01/03/2019	"	
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LT Environmental, Inc.
4600 West 60th Avenue
Arvada CO 80003

Brian Sulzberger
Project Number: 014219002
Project: KMG - UPRR 38 Pan Am O True 1

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 B9A0208 - EPA 5030 (soil)										
Blank (B9A0208-BLK1)					Prepared: 01/02/2019 Analyzed: 01/03/2019					
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	0.12		"	0.125		99.5	70-130			
Surrogate: Toluene-d8	0.11		"	0.125		91.9	70-130			
Surrogate: 4-Bromofluorobenzene	0.12		"	0.125		96.7	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
Batch B9A0208 - EPA 5030 (soil)										
LCS (B9A0208-BS1)					Prepared: 01/02/2019 Analyzed: 01/03/2019					
Benzene	0.113	0.002	mg/kg	0.100		113	77.1-124			
Toluene	0.101	0.002	"	0.100		101	74.5-128			
Ethylbenzene	0.100	0.002	"	0.100		100	66.4-127			
m,p-Xylene	0.190	0.004	"	0.200		95.2	76.6-124			
o-Xylene	0.100	0.002	"	0.100		99.6	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	0.12		"	0.125		97.7	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		94.0	70-130			
Surrogate: 4-Bromofluorobenzene	0.12		"	0.125		99.9	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 B9A0208 - EPA 5030 (soil)

Matrix Spike (B9A0208-MS1)		Source: Y812433-03			Prepared: 01/02/2019 Analyzed: 01/03/2019					
Benzene	0.112	0.002	mg/kg	0.100	ND	112	71.8-126			
Toluene	0.099	0.002	"	0.100	ND	98.8	65.1-130			
Ethylbenzene	0.101	0.002	"	0.100	ND	101	62.2-130			
m,p-Xylene	0.191	0.004	"	0.200	0.002	94.7	46.5-137			
o-Xylene	0.099	0.002	"	0.100	0.0003	99.1	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	0.12		"	0.125		92.6	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		94.6	70-130			
Surrogate: 4-Bromofluorobenzene	0.13		"	0.125		101	70-130			

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Project Number: 014219002
Project: KMG - UPRR 38 Pan Am O True 1

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 B9A0208 - EPA 5030 (soil)

Matrix Spike Dup (B9A0208-MSD1)		Source: Y812433-03			Prepared: 01/02/2019 Analyzed: 01/03/2019					
Benzene	0.105	0.002	mg/kg	0.100	ND	105	71.8-126	6.67	11.3	
Toluene	0.093	0.002	"	0.100	ND	93.3	65.1-130	5.68	15.4	
Ethylbenzene	0.096	0.002	"	0.100	ND	95.9	62.2-130	5.68	19.6	
m,p-Xylene	0.180	0.004	"	0.200	0.002	88.9	46.5-137	6.32	19.2	
o-Xylene	0.092	0.002	"	0.100	0.0003	92.4	54.2-134	7.04	17.9	
Surrogate: 1,2-Dichloroethane-d4	0.11		"	0.125		87.0	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		95.7	70-130			
Surrogate: 4-Bromofluorobenzene	0.13		"	0.125		101	70-130			

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Brian Sulzberger
Project Number: 014219002
Project: KMG - UPRR 38 Pan Am O True 1

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 B9A0303 - EPA 3580

Blank (B9A0303-BLK1)

Prepared: 01/03/2019 Analyzed: 01/03/2019

Diesel (C10-C28)	ND	50.0	mg/kg							U
Residual Range Organics (C28-C40)	ND	200	"							U
Surrogate: o-Terphenyl	44		"	50.0		87.1	59-131			

LCS (B9A0303-BS1)

Prepared: 01/03/2019 Analyzed: 01/03/2019

Diesel (C10-C28)	968	50.0	mg/kg	1000		96.8	64-121			
Residual Range Organics (C28-C40)	914	200	"	1000		91.4	58-124			
Surrogate: o-Terphenyl	46		"	50.0		92.3	59-131			

Matrix Spike (B9A0303-MS1)

Source: Y901011-01

Prepared: 01/03/2019 Analyzed: 01/03/2019

Diesel (C10-C28)	972	50.0	mg/kg	1000	32.9	93.9	53-125			
Residual Range Organics (C28-C40)	991	200	"	1000	91.6	89.9	47-133			
Surrogate: o-Terphenyl	43		"	50.0		85.7	59-131			

Matrix Spike Dup (B9A0303-MSD1)

Source: Y901011-01

Prepared: 01/03/2019 Analyzed: 01/03/2019

Diesel (C10-C28)	990	50.0	mg/kg	1000	32.9	95.7	53-125	1.84	20	
Residual Range Organics (C28-C40)	964	200	"	1000	91.6	87.3	47-133	3.01	20	
Surrogate: o-Terphenyl	43		"	50.0		85.1	59-131			

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4600 West 60th Avenue
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Brian Sulzberger
Project Number: 014219002
Project: KMG - UPRR 38 Pan Am O True 1

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 B9A0305 - NO PREP										
Duplicate (B9A0305-DUP1)		Source: Y901022-01			Prepared: 01/03/2019 Analyzed: 01/03/2019					
pH	7.90		pH Units		8.73			9.98	25	
Batch B9A0306 - NO PREP										
Blank (B9A0306-BLK1)		Prepared: 01/03/2019 Analyzed: 01/03/2019								
Specific Conductance (EC)	0.00300	0.00500	mmhos/cm							
Duplicate (B9A0306-DUP1)		Source: Y901022-01			Prepared: 01/03/2019 Analyzed: 01/03/2019					
Specific Conductance (EC)	0.0784	0.00500	mmhos/cm		0.0732			6.86	25	

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

Brian Sulzberger
Project Number: 014219002
Project: KMG - UPRR 38 Pan Am O True 1

Notes and Definitions

U Sample is Non-Detect.

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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