



August 25, 2015

Mr. Sam LaRue
Senior HSE Representative
Kerr-McGee Oil & Gas Onshore LP
501 North Division Boulevard
Platteville, Colorado 80651

**RE: Sump Excavation Report
WCLI USX S 33-15P
Weld County, Colorado
API #05-123-31524
Location ID #416948
SWSE Sec 33-T4N-R68W
Remediation #8961**

Dear Mr. LaRue:

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 soils using a photo-ionization detector (PID), collecting confirmation soil samples from the sump excavation, documenting field activities, and laboratory 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 locations are depicted on the Excavation Site Map attached as Figure 1.

On July 27, 2015, after removing the produced water sump, confirmation soil samples were collected from the sidewalls of the excavation at approximately 4 feet below ground surface (bgs), and a base soil sample was collected at 4.5 feet bgs. LTE personnel observed geo-synthetic liner exposed at the northern sidewall of the excavation. A confirmation sidewall soil sample was not collected from the north extent of the excavation due to the presence of the geo-synthetic liner and no sample material present. Soil samples were field screened for volatile organic compounds using a PID. LTE personnel did not observe soil staining or odor in any of the confirmation soil samples. The confirmation soil sample collected from the base of the excavation (B01@4.5') was submitted for laboratory analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) by United States 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. Laboratory analytical results for confirmation soil sample B01@4.5' indicated that BTEX, TPH and EC levels were less than or within COGCC Table 910-1 allowable levels. Confirmation base soil sample B01@4.5'



exceeded the allowable pH concentration range of 6-9 with a pH concentration of 9.03; however, the soil sample was collected below the 3 foot root zone threshold, and no further action is required. The soil sample laboratory analytical results are summarized in Table 1 and the laboratory analytical report is attached.

The final sump excavation measured approximately 15 feet north to south by 15 feet east to west to an approximate depth of 4.5 feet bgs. Soil was not excavated per the direction of Kerr-McGee. The produced water sump at this facility will be replaced.

Please contact LTE at (303) 433-9788 if you have any questions regarding this Sump Excavation Report or if you require additional information.

Sincerely,

LT ENVIRONMENTAL, INC.

A handwritten signature in blue ink that reads 'R. ZERNIS'.

Ryan Zernis
Staff Geologist

A handwritten signature in blue ink that reads 'Michael J. Furtaw'.

Michael J. Furtaw, P.G.
Project Geologist

Attachments:

ATTACHMENTS



TABLE 1
SOIL SAMPLE ANALYTICAL RESULTS
WCLI USX S 33-15P
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'	07/27/2015	<0.002	<0.002	<0.002	<0.002	<50	<50	<200	9.03 †	0.0421
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

† - Sample was collected at a depth greater than 3 feet bgs

* - Standard applies to combined DRO-GRO-ORO

< - less than laboratory reporting limit

Bold indicates result exceeds allowable level





July 28, 2015

LT Environmental, Inc.

John Cocroft

4600 West 60th Avenue

Arvada CO 80003

Project Name - KMG - WCLI USX S 33-15P

Project Number - 014215151

Attached are your analytical results for KMG - WCLI USX S 33-15P received by Origins Laboratory, Inc. July 27, 2015. This project is associated with Origins project number X507360-03.

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: 014215151
Project: KMG - WCLI USX S 33-15P

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B01 @ 4.5'	X507360-03	Soil	July 27, 2015 15:45	07/27/2015 19:12

Origins Laboratory, Inc.



Jen Pellegrini For Noelle Doyle Mathis, President

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: 014215151
Project: KMG - WCLI USX S 33-15P

www.originslaboratory.com

X507360

page 1 of 1

ORIGINS
LABORATORY, INC

Client: LT
Address: 4600 W 60th Ave
Arvada CO 80003
Telephone Number: 303-433-9788
Email Address: Jcocroft@LTEnv.com

Project Manager: John Cocroft
Project Name: WCLI USX S 33-15P
Project Number: 014215151
Samples Collected By: RZ
W6# 88718654

1725 Elk Place | Denver, CO 80211 | Phone: 303.433.1322 | Fax: 303.265.9645

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix			Analysis				Sample Instructions
				Unpreserved	HCl	HNO ₃	Other	Groundwater	Soil	Air Summa Canister #	Other	Fe	As	Pb	
W01 @ 4'	7/27/15	1535	2	X				X				X	X	X	HOLD All HOLD S&C 1
E01 @ 4'		1546	2	X				X				X	X	X	HOLD All HOLD S&C 2
B01 @ 4.5'		1545	2	X				X				X	X	X	Run HOLD S&C 3
S01 @ 4'		1550	2	X				X				X	X	X	HOLD All HOLD S&C 4
B001		1555	2	X				X				X	X	X	HOLD All HOLD S&C 5
															6
															7
															8
															9
															10
Relinquished By: <u>[Signature]</u>	Date: <u>7/27/15</u>	Time: <u>1735</u>	Received By: <u>[Signature]</u>	Date: <u>7-27-15</u>	Time: <u>17:35</u>	Turnaround Time: Same Day <input checked="" type="checkbox"/> 24 Hr <input type="checkbox"/> 48 Hr <input type="checkbox"/> 72 Hr <input type="checkbox"/> Standard <input type="checkbox"/>									
Relinquished By: <u>[Signature]</u>	Date: <u>7-27-15</u>	Time: <u>7:12</u>	Received By: <u>[Signature]</u>	Date: <u>7/27/15</u>	Time: <u>1912</u>										

Date Results Needed TUE 7/28/15 8AM

Temp Received: 3.4

Origins Laboratory, Inc.

Jefe Pellegrini

Jen Pellegrini For Noelle Doyle Mathis, President

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

John Cocroft
Project Number: 014215151
Project: KMG - WCLI USX S 33-15P

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: X507360

Client: LTE

Client Project ID: WCLI USX S33-15P

Checklist Completed by: Jeff Smith

Shipped Via: H/D

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

Date/time completed: 7/27/15

Airbill #: N/A

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

Cooler Number/Temperature: 1 / 3.4 °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 ⁽¹⁾ ?	<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 ⁽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.

Reviewed by (Project Manager) [Signature]

Date/Time Reviewed 7/28/15

Origins Laboratory, Inc.

[Signature]

Jen Pellegrini For Noelle Doyle Mathis, President

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

John Cocroft
Project Number: 014215151
Project: KMG - WCLI USX S 33-15P

B01 @ 4.5'

7/27/2015 3:45:00PM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X507360-03 (Soil)

BTEX by EPA 8260C

Benzene	ND	0.002	mg/kg	1	5G27005	07/27/2015	07/28/2015
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	ND	0.002	"	"	"	"	"
Xylenes, total	ND	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	111 %	70-130	"	"	"
Surrogate: Toluene-d8	101 %	70-130	"	"	"
Surrogate: 4-Bromofluorobenzene	103 %	70-130	"	"	"

pH in Soil by EPA 9045D

pH	9.03	pH Units	1	5G27007	07/27/2015	07/27/2015
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.0421	mmhos/cm	"	5G27008	07/27/2015	07/27/2015
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TPH-Carbon Chain by EPA Method 8015C

Gasoline (C6-C10)	ND	17	50	mg/kg	1	5G27006	07/27/2015	07/28/2015
Diesel (C10-C28)	29	13	50	"	"	"	"	"
Residual Range Organics (C28-C36)	ND	4.6	200	"	"	"	"	"
Surrogate: o-Terphenyl	85.3 %	65-146	"	"	"	"	"	"

Origins Laboratory, Inc.



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Jen Pellegrini For Noelle Doyle Mathis, President

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

John Cocroft
Project Number: 014215151
Project: KMG - WCLI USX S 33-15P

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 5G27005 - EPA 5030 (soil)

Blank (5G27005-BLK1)

Prepared: 07/27/2015 Analyzed: 07/27/2015

Benzene	ND	0.002	mg/kg							
Toluene	ND	0.002	"							
Ethylbenzene	ND	0.002	"							
Xylenes, total	ND	0.002	"							
Surrogate: 1,2-Dichloroethane-d4	71		ug/kg	62.5	113		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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John Cocroft
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Project: KMG - WCLI USX S 33-15P

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 5G27005 - EPA 5030 (soil)

LCS (5G27005-BS1)

Prepared: 07/27/2015 Analyzed: 07/27/2015

Benzene	0.096	0.002	mg/kg	0.100		96.1	77.1-124			
Toluene	0.102	0.002	"	0.100		102	74.5-128			
Ethylbenzene	0.098	0.002	"	0.100		98.2	66.4-127			
m,p-Xylene	0.204	0.004	"	0.200		102	76.6-124			
o-Xylene	0.104	0.002	"	0.100		104	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	72		ug/kg	62.5		116	70-130			
Surrogate: Toluene-d8	64		"	62.5		103	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		100	70-130			

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

John Cocroft
Project Number: 014215151
Project: KMG - WCLI USX S 33-15P

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 5G27005 - EPA 5030 (soil)

Matrix Spike (5G27005-MS1)		Source: X507351-01			Prepared: 07/27/2015 Analyzed: 07/27/2015					
Benzene	0.085	0.002	mg/kg	0.100	ND	85.3	71.8-126			
Toluene	0.090	0.002	"	0.100	0.002	87.8	65.1-130			
Ethylbenzene	0.084	0.002	"	0.100	ND	84.5	62.2-130			
m,p-Xylene	0.163	0.004	"	0.200	0.002	80.6	46.5-137			
o-Xylene	0.085	0.002	"	0.100	0.0004	84.3	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	76		ug/kg	62.5		121	70-130			
Surrogate: Toluene-d8	65		"	62.5		103	70-130			
Surrogate: 4-Bromofluorobenzene	65		"	62.5		104	70-130			

Origins Laboratory, Inc.



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

John Cocroft
Project Number: 014215151
Project: KMG - WCLI USX S 33-15P

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 5G27005 - EPA 5030 (soil)										
Matrix Spike Dup (5G27005-MSD1)		Source: X507351-01			Prepared: 07/27/2015 Analyzed: 07/27/2015					
Benzene	0.099	0.002	mg/kg	0.100	ND	99.0	71.8-126	14.9	11.3	QR-02
Toluene	0.101	0.002	"	0.100	0.002	99.5	65.1-130	12.2	15.4	
Ethylbenzene	0.091	0.002	"	0.100	ND	91.4	62.2-130	7.87	19.6	
m,p-Xylene	0.190	0.004	"	0.200	0.002	94.5	46.5-137	15.7	19.2	
o-Xylene	0.096	0.002	"	0.100	0.0004	95.6	54.2-134	12.5	17.9	
Surrogate: 1,2-Dichloroethane-d4	77		ug/kg	62.5		123	70-130			
Surrogate: Toluene-d8	63		"	62.5		100	70-130			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.9	70-130			

Origins Laboratory, Inc.



Jen Pellegrini For Noelle Doyle Mathis, President

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

John Cocroft
Project Number: 014215151
Project: KMG - WCLI USX S 33-15P

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 5G27006 - EPA 3580

Blank (5G27006-BLK1)

Prepared: 07/27/2015 Analyzed: 07/27/2015

Gasoline (C6-C10)	ND	50	mg/kg
Diesel (C10-C28)	23	50	"
Residual Range Organics (C28-C36)	ND	200	"

Surrogate: o-Terphenyl

43.8

"

50.0

87.7

65-146

LCS (5G27006-BS1)

Prepared: 07/27/2015 Analyzed: 07/27/2015

Gasoline (C6-C10)	1000	50	mg/kg	1000	103	66.7-119
Diesel (C10-C28)	850	50	"			70.1-127
Residual Range Organics (C28-C36)	990	200	"	1000	99.3	54.5-139

Surrogate: o-Terphenyl

47.5

"

50.0

95.1

65-146

Matrix Spike (5G27006-MS1)

Source: X507351-01

Prepared: 07/27/2015 Analyzed: 07/27/2015

Gasoline (C6-C10)	950	50	mg/kg	1000	ND	95.4	56.4-132
Diesel (C10-C28)	780	50	"		21		57.4-138
Residual Range Organics (C28-C36)	900	200	"	1000	ND	90.1	47.7-129

Surrogate: o-Terphenyl

44.4

"

50.0

88.8

65-146

Matrix Spike Dup (5G27006-MSD1)

Source: X507351-01

Prepared: 07/27/2015 Analyzed: 07/27/2015

Gasoline (C6-C10)	1000	50	mg/kg	1000	ND	102	56.4-132	6.90	22
Diesel (C10-C28)	830	50	"		21		57.4-138	7.06	18.3
Residual Range Organics (C28-C36)	950	200	"	1000	ND	94.8	47.7-129	5.09	30.1

Surrogate: o-Terphenyl

46.5

"

50.0

93.0

65-146

Origins Laboratory, Inc.



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Jen Pellegrini For Noelle Doyle Mathis, President

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

John Cocroft
Project Number: 014215151
Project: KMG - WCLI USX S 33-15P

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 5G27007 - NO PREP										
Duplicate (5G27007-DUP1)		Source: X507321-01			Prepared: 07/27/2015 Analyzed: 07/27/2015					
pH	7.98		pH Units		7.96			0.251	25	
Batch 5G27008 - NO PREP										
Blank (5G27008-BLK1)		Prepared: 07/27/2015 Analyzed: 07/27/2015								
Specific Conductance (EC)	0.00360		mmhos/cm							
Duplicate (5G27008-DUP1)		Source: X507321-01			Prepared: 07/27/2015 Analyzed: 07/27/2015					
Specific Conductance (EC)	0.171		mmhos/cm		0.180			4.84	25	

Origins Laboratory, Inc.



Jen Pellegrini For Noelle Doyle Mathis, President

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

John Cocroft
Project Number: 014215151
Project: KMG - WCLI USX S 33-15P

Notes and Definitions

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.

ND Analyte NOT DETECTED at or above the reporting limit

RPD Relative Percent Difference

All soil results are reported on a wet weight basis.

Origins Laboratory, Inc.



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Jen Pellegrini For Noelle Doyle Mathis, President