



July 6, 2015

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

Re: Sump Excavation Letter Report
Moser Farms UPRR-62N65W/9SWNE
API # 05-123-14616
Location ID # 327392
SWNE 9-T2N-R65W
Remediation Project #8961

Dear Mr. LaRue:

LT Environmental, Inc. (LTE) was contracted by Kerr-McGee Oil & Gas Onshore LP (Kerr-McGee) to perform environmental oversight activities at the above referenced site. The oversight activities included collection of a confirmation soil sample from the sump excavation, documentation of 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 location are displayed on the Excavation Site Map attached as Figure 1.

On June 3, 2015, confirmation soil samples were collected from the excavation sidewalls at approximately 4 feet below ground surface (bgs). LTE personnel observed a liner underneath the produced water sump; therefore, a confirmation soil base sample was not collected. Soil samples were field screened for volatile organic compound concentrations using a photoionization detector. LTE personnel did not observe soil staining or odor in the confirmation soil samples. The confirmation soil sample collected from the north sidewall (N01@4') of the final extent of the excavation 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 the confirmation soil sample N01@4' indicated that TPH, BTEX, pH, and EC levels were less than or within COGCC Table 910-1 allowable levels. The confirmation soil



sample laboratory analytical results are summarized in Table 1 and the laboratory analytical report is attached.

The final sump excavation measured approximately 25 feet north to south by 20 feet east to west to an approximate depth of 5 feet bgs. The produced water sump will be replaced.

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

Sincerely,
LT ENVIRONMENTAL, INC.

Reviewed by:

A handwritten signature in black 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



IMAGE COURTESY OF ESRI

LEGEND

- SOIL SAMPLE
- EXCAVATION EXTENT
- M METER HOUSE
- BERM

AST: ABOVEGROUND STORAGE TANK
ECD: EMISSION CONTROL DEVICE

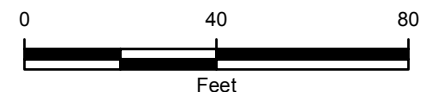


FIGURE 1
EXCAVATION SITE MAP
 MOSER FARMS UPRR-62N65W/9SWNE
 SWNE SEC 9-T2N-R65W
 WELD COUNTY, COLORADO
 KERR-MCGEE OIL & GAS ONSHORE LP



TABLE 1
SOIL SAMPLE ANALYTICAL RESULTS
MOSER FARMS UPRR-62N65W/9SWNE
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)
N01 @ 4'	4'	06/03/2015	<0.002	<0.002	<0.002	<0.002	<25	<25	<100	8.71	0.0636
COGCC Allowable Levels			0.17	85	100	175	500*	500*	500*	6-9	4

Notes: bgs - below ground surface

< - less than laboratory reporting limit

DRO - Diesel Range Organics

ORO - Oil Range Organics

GRO - Gasoline Range Organics

* - Standard applies to combined DRO-GRO-ORO

COGCC - Colorado Oil and Gas Conservation Commission

mg/kg - milligrams per kilogram

NA - Not Analyzed/Not Available

Bold numbers indicate result equaled or exceeded allowable level.

su - standard units

mmhos/cm - millimhos per centimeter



June 04, 2015

LT Environmental, Inc.

John Cocroft

4600 West 60th Avenue

Arvada

CO

80003

**Project Name - KMG - Moser Farms UPRR
62N65W/9SWNE**

Project Number - [none]

Attached are your analytical results for KMG - Moser Farms UPRR 62N65W/9SWNE received by Origins Laboratory, Inc. June 03, 2015. This project is associated with Origins project number X506050-01.

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

John Cocroft
Project Number: [none]
Project: KMG - Moser Farms UPRR
62N65W/9SWNE

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
N01 @ 4'	X506050-01	Soil	June 3, 2015 14:30	06/03/2015 17:00

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: [none]
Project: KMG - Moser Farms UPRR
62N65W/9SWNE

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: X506050

Client: LTE

Client Project ID: Moser Farms UPRR

Checklist Completed by: Jefe Smith

Shipped Via: H/D

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

Date/time completed: 6/3/15

Airbill #: NA

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

Cooler Number/Temperature: 1 12.8 °C 1 °C 1 °C (Describe)

Thermometer ID: TRX53

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) Jefe Smith

Date/Time Reviewed 6/3/15

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: [none]
Project: KMG - Moser Farms UPRR
62N65W/9SWNE

N01 @ 4'

6/3/2015 2:30:00PM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X506050-01 (Soil)

BTEX by EPA 8260C

Benzene	ND	0.002	mg/kg	1	5F03005	06/03/2015	06/03/2015
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	ND	0.002	"	"	"	"	"
Xylenes, total	ND	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	107 %	70-130	"	"	"
Surrogate: Toluene-d8	95.6 %	70-130	"	"	"
Surrogate: 4-Bromofluorobenzene	100 %	70-130	"	"	"

pH in Soil by EPA 9045D

pH	8.71	pH Units	1	5F03012	06/03/2015	06/03/2015
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.0636	mmhos/cm	"	5F03013	06/03/2015	06/03/2015
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TPH-Carbon Chain by EPA Method 8015C

Gasoline (C6-C10)	ND	8.4	25	mg/kg	1	5F03010	06/03/2015	06/03/2015
Diesel (C10-C28)	ND	6.5	25	"	"	"	"	"
Residual Range Organics (C28-C36)	ND	2.3	100	"	"	"	"	"
Surrogate: o-Terphenyl	85.9 %		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: [none]
Project: KMG - Moser Farms UPRR
62N65W/9SWNE

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 5F03005 - Default Prep VOC

Blank (5F03005-BLK1)

Prepared: 06/03/2015 Analyzed: 06/03/2015

Benzene	ND	0.002	mg/kg							
Toluene	ND	0.002	"							
Ethylbenzene	ND	0.002	"							
Xylenes, total	ND	0.002	"							
Surrogate: 1,2-Dichloroethane-d4	68		ug/kg	62.5	109		70-130			
Surrogate: Toluene-d8	63		"	62.5	101		70-130			
Surrogate: 4-Bromofluorobenzene	61		"	62.5	97.5		70-130			

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: [none]
Project: KMG - Moser Farms UPRR
62N65W/9SWNE

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 5F03005 - Default Prep VOC

LCS (5F03005-BS1)

Prepared: 06/03/2015 Analyzed: 06/03/2015

Benzene	0.104	0.002	mg/kg	0.100		104	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	0.103	0.002	"	0.100		103	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	74		ug/kg	62.5		118	70-130			
Surrogate: Toluene-d8	62		"	62.5		99.9	70-130			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.5	70-130			

Origins Laboratory, Inc.



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

John Cocroft
Project Number: [none]
Project: KMG - Moser Farms UPRR
62N65W/9SWNE

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 5F03005 - Default Prep VOC

Matrix Spike (5F03005-MS1)		Source: X506032-01			Prepared: 06/03/2015 Analyzed: 06/03/2015					
Benzene	0.109	0.002	mg/kg	0.100	ND	109	71.8-126			
Toluene	0.102	0.002	"	0.100	ND	102	65.1-130			
Ethylbenzene	0.103	0.002	"	0.100	ND	103	62.2-130			
m,p-Xylene	0.207	0.004	"	0.200	ND	103	46.5-137			
o-Xylene	0.103	0.002	"	0.100	ND	103	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	66		ug/kg	62.5		106	70-130			
Surrogate: Toluene-d8	59		"	62.5		94.2	70-130			
Surrogate: 4-Bromofluorobenzene	61		"	62.5		97.2	70-130			

Origins Laboratory, Inc.



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

John Cocroft
Project Number: [none]
Project: KMG - Moser Farms UPRR
62N65W/9SWNE

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 5F03005 - Default Prep VOC

Matrix Spike Dup (5F03005-MSD1)		Source: X506032-01			Prepared: 06/03/2015 Analyzed: 06/03/2015					
Benzene	0.106	0.002	mg/kg	0.100	ND	106	71.8-126	2.91	11.3	
Toluene	0.099	0.002	"	0.100	ND	99.3	65.1-130	2.80	15.4	
Ethylbenzene	0.099	0.002	"	0.100	ND	98.6	62.2-130	4.70	19.6	
m,p-Xylene	0.197	0.004	"	0.200	ND	98.6	46.5-137	4.71	19.2	
o-Xylene	0.095	0.002	"	0.100	ND	95.0	54.2-134	8.10	17.9	
Surrogate: 1,2-Dichloroethane-d4	68		ug/kg	62.5		109	70-130			
Surrogate: Toluene-d8	64		"	62.5		102	70-130			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		98.4	70-130			

Origins Laboratory, Inc.



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

John Cocroft
Project Number: [none]
Project: KMG - Moser Farms UPRR
62N65W/9SWNE

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 5F03010 - EPA 3580

Blank (5F03010-BLK1)

Prepared: 06/03/2015 Analyzed: 06/03/2015

Gasoline (C6-C10)	ND	50	mg/kg							
Diesel (C10-C28)	19	50	"							
Residual Range Organics (C28-C36)	ND	200	"							

Surrogate: o-Terphenyl

44.3

"

50.0

88.6

65-146

LCS (5F03010-BS1)

Prepared: 06/03/2015 Analyzed: 06/03/2015

Gasoline (C6-C10)	940	50	mg/kg	1000		93.8	66.7-119			
Diesel (C10-C28)	980	50	"	1000		97.6	70.1-127			
Residual Range Organics (C28-C36)	790	200	"	1000		79.4	54.5-139			

Surrogate: o-Terphenyl

50.4

"

50.0

101

65-146

LCS Dup (5F03010-BSD1)

Prepared: 06/03/2015 Analyzed: 06/03/2015

Gasoline (C6-C10)	1100	50	mg/kg	1000		106	66.7-119	12.6	28.2	
Diesel (C10-C28)	1100	50	"	1000		109	70.1-127	11.4	19.1	
Residual Range Organics (C28-C36)	870	200	"	1000		86.9	54.5-139	8.99	21.2	

Surrogate: o-Terphenyl

55.4

"

50.0

111

65-146

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: [none]
Project: KMG - Moser Farms UPRR
62N65W/9SWNE

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 5F03012 - NO PREP										
Duplicate (5F03012-DUP1)		Source: X506048-01			Prepared: 06/03/2015 Analyzed: 06/03/2015					
pH	8.57		pH Units		8.79			2.53	25	
Batch 5F03013 - NO PREP										
Blank (5F03013-BLK1)		Prepared: 06/03/2015 Analyzed: 06/03/2015								
Specific Conductance (EC)	0.00270		mmhos/cm							
Duplicate (5F03013-DUP1)		Source: X506048-01			Prepared: 06/03/2015 Analyzed: 06/03/2015					
Specific Conductance (EC)	0.132		mmhos/cm		0.122			8.58	25	

Origins Laboratory, Inc.



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

John Cocroft
Project Number: [none]
Project: KMG - Moser Farms UPRR
62N65W/9SWNE

Notes and Definitions

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