



July 8, 2015

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

RE: Sump Excavation Report
HSR-SHARKEY-64N67W/35SWNE
Weld County, Colorado
API #05-123-20416
Location ID #332574
NWNE Sec 35-T4N-R67W

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 confirmation soil and groundwater samples from the sump excavation, documentation of field activities, and laboratory analytical results review. In addition to the information provided below, Kerr-McGee has submitted a Form 19 – Spill/Release Report (Initial) to the Colorado Oil and Gas Conservation Commission (COGCC) on June 12, 2015.

The objective of the soil and groundwater sampling was to determine if petroleum hydrocarbon impacts to subsurface soil and groundwater resulted from Kerr-McGee operating a produced water sump at the site. The soil and groundwater sampling activities, laboratory analytical results, and conclusions are summarized below. The general site layout, sump excavation dimensions, and soil and groundwater sample locations are depicted on the Excavation Site Map attached as Figure 1.

After removing the produced water sump, four representative confirmation soil samples (N01@2.5', E01@2.5', S01@2.5', and W01@2.5') were collected from the sidewalls of the excavation. While conducting field screening activities, LTE personnel observed soil staining and odor in confirmation soil sample E01@2.5'. The soil samples were 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 samples (N01@2.5', E01@2.5', S01@2.5', and W01@2.5') indicated that TPH, BTEX, pH, and EC levels were less than or within COGCC Table 910-1 allowable levels. The soil sample laboratory analytical results are summarized in Table 1 and the laboratory analytical report is attached.



During excavation and sump removal activities, groundwater was encountered in the excavation extent at approximately 3 feet below ground surface (bgs). On June 9, 2015, a representative groundwater sample (GW01) was collected and submitted for laboratory analysis of BTEX by USEPA Method 8260C. While performing excavation groundwater sampling activities, LTE personnel observed odor from excavation groundwater sample GW01. Laboratory analytical results for excavation groundwater sample GW01 indicated that the benzene concentration of 66.5 micrograms per liter ($\mu\text{g/L}$) exceeded the Colorado Groundwater Quality Standards (CGWQS) of 5.0 $\mu\text{g/L}$. On June 10, 2015, approximately 5 barrels of impacted groundwater were removed from the excavation and transported to a licensed injection facility for disposal. Approximately 34 cubic yards of soil were excavated and transported to a licensed disposal facility. Prior to backfilling the excavation, fifty pounds of Chemically Oxygenated Granular Activated Carbon (COGAC[®]), a carbon-based bioremediation product, were applied to the open excavation. The excavation groundwater laboratory analytical results are summarized in Table 2 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 feet bgs. 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 blue ink signature of Kristofer Shepherd, written in a cursive style.

Kristofer Shepherd
Staff Geologist

A blue ink signature of Michael J. Furtaw, written in a cursive style.

Michael J. Furtaw, P.G.
Project Geologist

Attachments

ATTACHMENTS





GROUNDWATER SAMPLE ID
 B: BENZENE CONCENTRATION
 ALL RESULTS IN MICROGRAMS PER LITER
BOLD INDICATES RESULT EXCEEDS STANDARD

LEGEND

-  RELEASE LOCATION
-  SOIL SAMPLE
-  GROUNDWATER SAMPLE
-  EXCAVATION EXTENT
-  FORMER BERM

AST: ABOVEGROUND STORAGE TANK

IMAGE COURTESY OF ESRI

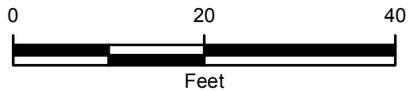


FIGURE 1
 EXCAVATION SITE MAP
 HSR-SHARKEY-64N67W/35SWNE
 NWNE SEC 35-T4N-R67W
 WELD COUNTY, COLORADO
 KERR-MCGEE OIL & GAS ONSHORE LP



TABLE 1
SOIL SAMPLE ANALYTICAL RESULTS
HSR-SHARKEY-64N67W/35SWNE
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)
E01 @ 2.5'	2.5'	06/09/2015	0.023	<0.002	<0.002	<0.002	<25	<25	<100	7.33	0.104
N01 @ 2.5'	2.5'	06/09/2015	<0.002	<0.002	<0.002	<0.002	<25	<25	<100	8.09	0.0974
S01 @ 2.5'	2.5'	06/09/2015	<0.002	<0.002	<0.002	<0.002	<25	<25	<100	8.09	0.112
W01 @ 2.5'	2.5'	06/09/2015	<0.002	<0.002	<0.002	<0.002	<25	<25	<100	8.15	0.0481
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

* - Standard applies to combined DRO-GRO-ORO

< - less than laboratory reporting limit

Bold indicates result exceeds allowable level



TABLE 2
GROUNDWATER ANALYTICAL AND FIELD RESULTS
HSR-SHARKEY-64N67W/35SWNE
WELD COUNTY, COLORADO
KERR-MCGEE OIL & GAS ONSHORE LP

Well Name	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Depth Water/ (Product Thickness) (ft bgs)
GW01	06/09/2015	66.5	101	19.8	238	3.00
CGWQS		5	1000	700	1400	

Notes: CGWQS - Colorado Groundwater Quality Standards
ft bgs - feet below ground surface
NA - not analyzed/not available
NM - not measured

µg/L - micrograms per liter
< - less than laboratory reporting limit
Bold indicates result exceeds allowable level
Excavation groundwater depth is approximate



June 11, 2015

LT Environmental, Inc.

John Cocroft

4600 West 60th Avenue

Arvada CO 80003

Project Name - **KMG - HSR-Sharkey-64N67W
/35SWNE**

Project Number - **014215131**

Attached are your analytical results for KMG - HSR-Sharkey-64N67W /35SWNE received by Origins Laboratory, Inc. June 09, 2015. This project is associated with Origins project number X506112-01.

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: 014215131
Project: KMG - HSR-Sharkey-64N67W /35SWNE

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
GW01	X506112-01	Water	June 9, 2015 14:00	06/09/2015 17:05
N01 @ 2.5'	X506112-02	Soil	June 9, 2015 14:10	06/09/2015 17:05
S01 @ 2.5'	X506112-03	Soil	June 9, 2015 14:15	06/09/2015 17:05
E01 @ 2.5'	X506112-04	Soil	June 9, 2015 14:20	06/09/2015 17:05
W01 @ 2.5'	X506112-05	Soil	June 9, 2015 14:25	06/09/2015 17:05

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: 014215131
 Project: KMG - HSR-Sharkey-64N67W /35SWNE

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

Sample Receipt Checklist

Origins Work Order: X50612 Client: LTE
 Checklist Completed by: JH Smith Client Project ID: Sharkey 7-35 Simp
 Date/time completed: 6/9/15 Shipped Via: HD
 (UPS, FedEx, Hand Delivered, Pick-up, etc.)
 Airbill #: NA
 Matrix(s) Received: (Check all that apply): Soil/Solid Water Other: _____
 Cooler Number/Temperature: 1 / 14.4 °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⁾ ?	X			
Is there ice present (document if blue ice is used)	X			
Are custody seals present on cooler? (if so, document in comments if they are signed and dated, broken or intact)		X		
Are custody seals present on each sample container? (if so, document in comments if they are signed and dated, broken or intact)		X		
Were all samples received intact ⁽¹⁾ ?	X			
Was adequate sample volume provided ⁽¹⁾ ?	X			
Are short holding time analytes or samples with HTs due within 48 hours present ⁽¹⁾ ?	X			PH
Is a chain-of-custody (COC) present and filled out completely ⁽¹⁾ ?	X			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	X			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	X			
Is the COC properly relinquished by the client with date and time recorded ⁽¹⁾ ?	X			
For volatiles in water – is there headspace (> ¼ inch bubble) present? If yes, contact client and note in narrative.		X		
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)		X		
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 6/9/15

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: 014215131
 Project: KMG - HSR-Sharkey-64N67W /35SWNE

GW01

6/9/2015 2:00:00PM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X506112-01 (Water)

BTEX by EPA 8260C

Benzene	66.5		1.0	ug/L	1	5F09009	06/09/2015	06/09/2015	
Toluene	101		1.0	"	"	"	"	"	
Ethylbenzene	19.8		1.0	"	"	"	"	"	
Xylenes, total	238		1.0	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	106 %		87.3-113			"	"	"	
Surrogate: Toluene-d8	105 %		90.9-108			"	"	"	
Surrogate: 4-Bromofluorobenzene	100 %		88.6-111			"	"	"	

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: 014215131
 Project: KMG - HSR-Sharkey-64N67W /35SWNE

N01 @ 2.5'

6/9/2015 2:10:00PM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X506112-02 (Soil)

BTEX by EPA 8260C

Benzene	ND		0.002	mg/kg	1	5F09010	06/09/2015	06/10/2015	
Toluene	ND		0.002	"	"	"	"	"	
Ethylbenzene	ND		0.002	"	"	"	"	"	
Xylenes, total	ND		0.002	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	114 %		70-130			"	"	"	
Surrogate: Toluene-d8	98.6 %		70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	99.6 %		70-130			"	"	"	

pH in Soil by EPA 9045D

pH	8.09			pH Units	1	5F09013	06/09/2015	06/09/2015	
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.0974			mmhos/cm	"	5F09014	06/09/2015	06/09/2015	
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TPH-Carbon Chain by EPA Method 8015C

Gasoline (C6-C10)	ND	8.4	25	mg/kg	1	5F09006	06/09/2015	06/09/2015	
Diesel (C10-C28)	9.9	6.5	25	"	"	"	"	"	
Residual Range Organics (C28-C36)	ND	2.3	100	"	"	"	"	"	
Surrogate: o-Terphenyl	83.7 %		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: 014215131
 Project: KMG - HSR-Sharkey-64N67W /35SWNE

S01 @ 2.5'
6/9/2015 2:15:00PM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X506112-03 (Soil)

BTEX by EPA 8260C

Benzene	ND		0.002	mg/kg	1	5F09010	06/09/2015	06/10/2015	
Toluene	ND		0.002	"	"	"	"	"	
Ethylbenzene	ND		0.002	"	"	"	"	"	
Xylenes, total	ND		0.002	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	111 %		70-130			"	"	"	
Surrogate: Toluene-d8	97.1 %		70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	97.2 %		70-130			"	"	"	

pH in Soil by EPA 9045D

pH	8.09			pH Units	1	5F09013	06/09/2015	06/09/2015	
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.112			mmhos/cm	"	5F09014	06/09/2015	06/09/2015	
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TPH-Carbon Chain by EPA Method 8015C

Gasoline (C6-C10)	ND	8.4	25	mg/kg	1	5F09006	06/09/2015	06/09/2015	
Diesel (C10-C28)	8.6	6.5	25	"	"	"	"	"	
Residual Range Organics (C28-C36)	ND	2.3	100	"	"	"	"	"	
Surrogate: o-Terphenyl	87.1 %		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: 014215131
 Project: KMG - HSR-Sharkey-64N67W /35SWNE

E01 @ 2.5'
6/9/2015 2:20:00PM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X506112-04 (Soil)

BTEX by EPA 8260C

Benzene	0.023		0.002	mg/kg	1	5F09010	06/09/2015	06/10/2015	
Toluene	ND		0.002	"	"	"	"	"	
Ethylbenzene	ND		0.002	"	"	"	"	"	
Xylenes, total	ND		0.002	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	114 %		70-130			"	"	"	
Surrogate: Toluene-d8	98.2 %		70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	100 %		70-130			"	"	"	

pH in Soil by EPA 9045D

pH	7.33			pH Units	1	5F09013	06/09/2015	06/09/2015	
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.104			mmhos/cm	"	5F09014	06/09/2015	06/09/2015	
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TPH-Carbon Chain by EPA Method 8015C

Gasoline (C6-C10)	ND	8.4	25	mg/kg	1	5F09006	06/09/2015	06/09/2015	
Diesel (C10-C28)	9.5	6.5	25	"	"	"	"	"	
Residual Range Organics (C28-C36)	ND	2.3	100	"	"	"	"	"	
Surrogate: o-Terphenyl	83.6 %		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: 014215131
 Project: KMG - HSR-Sharkey-64N67W /35SWNE

W01 @ 2.5'
6/9/2015 2:25:00PM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X506112-05 (Soil)

BTEX by EPA 8260C

Benzene	ND		0.002	mg/kg	1	5F09010	06/09/2015	06/10/2015	
Toluene	ND		0.002	"	"	"	"	"	
Ethylbenzene	ND		0.002	"	"	"	"	"	
Xylenes, total	ND		0.002	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	114 %		70-130			"	"	"	
Surrogate: Toluene-d8	93.5 %		70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	94.9 %		70-130			"	"	"	

pH in Soil by EPA 9045D

pH	8.15			pH Units	1	5F09013	06/09/2015	06/09/2015	
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.0481			mmhos/cm	"	5F09014	06/09/2015	06/09/2015	
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TPH-Carbon Chain by EPA Method 8015C

Gasoline (C6-C10)	ND	8.4	25	mg/kg	1	5F09006	06/09/2015	06/09/2015	
Diesel (C10-C28)	9.9	6.5	25	"	"	"	"	"	
Residual Range Organics (C28-C36)	ND	2.3	100	"	"	"	"	"	
Surrogate: o-Terphenyl	87.8 %		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: 014215131
 Project: KMG - HSR-Sharkey-64N67W /35SWNE

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 5F09009 - EPA 5030B (Water)

Blank (5F09009-BLK1)

Prepared: 06/09/2015 Analyzed: 06/09/2015

Benzene	ND	1.0	ug/L							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes, total	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	69		"	62.5	110		87.3-113			
Surrogate: Toluene-d8	63		"	62.5	101		90.9-108			
Surrogate: 4-Bromofluorobenzene	63		"	62.5	101		88.6-111			

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: 014215131
 Project: KMG - HSR-Sharkey-64N67W /35SWNE

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 5F09009 - EPA 5030B (Water)

Blank (5F09009-BLK2)

Prepared: 06/09/2015 Analyzed: 06/09/2015

Benzene	ND	1.0	ug/L							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes, total	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	68		"	62.5	109		87.3-113			
Surrogate: Toluene-d8	63		"	62.5	100		90.9-108			
Surrogate: 4-Bromofluorobenzene	61		"	62.5	98.3		88.6-111			

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: 014215131
 Project: KMG - HSR-Sharkey-64N67W /35SWNE

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 5F09009 - EPA 5030B (Water)

LCS (5F09009-BS1)

Prepared: 06/09/2015 Analyzed: 06/09/2015

Benzene	52.0	1.0	ug/L	50.0		104	75-126			
Toluene	52.5	1.0	"	50.0		105	78.7-126			
Ethylbenzene	53.5	1.0	"	50.0		107	80-130			
m,p-Xylene	106	2.0	"	100		106	77.2-133			
o-Xylene	52.8	1.0	"	50.0		106	77.9-126			
Surrogate: 1,2-Dichloroethane-d4	64		"	62.5		102	87.3-113			
Surrogate: Toluene-d8	63		"	62.5		102	90.9-108			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		100	88.6-111			

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: 014215131
 Project: KMG - HSR-Sharkey-64N67W /35SWNE

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 5F09009 - EPA 5030B (Water)

LCS (5F09009-BS2)

Prepared: 06/09/2015 Analyzed: 06/09/2015

Benzene	50.5	1.0	ug/L	50.0		101	75-126			
Toluene	51.2	1.0	"	50.0		102	78.7-126			
Ethylbenzene	51.0	1.0	"	50.0		102	80-130			
m,p-Xylene	103	2.0	"	100		103	77.2-133			
o-Xylene	51.3	1.0	"	50.0		103	77.9-126			
Surrogate: 1,2-Dichloroethane-d4	63		"	62.5		101	87.3-113			
Surrogate: Toluene-d8	64		"	62.5		102	90.9-108			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.0	88.6-111			

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

John Cocroft
 Project Number: 014215131
 Project: KMG - HSR-Sharkey-64N67W /35SWNE

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 5F09009 - EPA 5030B (Water)

Matrix Spike (5F09009-MS1)	Source: X506104-13			Prepared: 06/09/2015 Analyzed: 06/09/2015						
Benzene	55.7	1.0	ug/L	50.0	ND	111	74-130			
Toluene	56.4	1.0	"	50.0	ND	113	73-131			
Ethylbenzene	57.6	1.0	"	50.0	ND	115	76-132			
m,p-Xylene	115	2.0	"	100	ND	115	69-139			
o-Xylene	56.0	1.0	"	50.0	ND	112	74-131			
Surrogate: 1,2-Dichloroethane-d4	64		"	62.5		102	87.3-113			
Surrogate: Toluene-d8	64		"	62.5		102	90.9-108			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.2	88.6-111			

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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 5F09009 - EPA 5030B (Water)

Matrix Spike (5F09009-MS2)	Source: X506104-01			Prepared: 06/09/2015 Analyzed: 06/09/2015						
Benzene	56.0	1.0	ug/L	50.0	ND	112	74-130			
Toluene	57.8	1.0	"	50.0	ND	116	73-131			
Ethylbenzene	59.3	1.0	"	50.0	ND	119	76-132			
m,p-Xylene	119	2.0	"	100	ND	119	69-139			
o-Xylene	58.0	1.0	"	50.0	ND	116	74-131			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	63		"	62.5		101	87.3-113			
<i>Surrogate: Toluene-d8</i>	64		"	62.5		102	90.9-108			
<i>Surrogate: 4-Bromofluorobenzene</i>	62		"	62.5		99.4	88.6-111			

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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 5F09009 - EPA 5030B (Water)

Matrix Spike Dup (5F09009-MSD1)	Source: X506104-13			Prepared: 06/09/2015 Analyzed: 06/09/2015						
Benzene	56.2	1.0	ug/L	50.0	ND	112	74-130	0.930	20	
Toluene	56.7	1.0	"	50.0	ND	113	73-131	0.636	20	
Ethylbenzene	58.0	1.0	"	50.0	ND	116	76-132	0.761	20	
m,p-Xylene	116	2.0	"	100	ND	116	69-139	1.14	20	
o-Xylene	56.3	1.0	"	50.0	ND	113	74-131	0.659	20	
Surrogate: 1,2-Dichloroethane-d4	63		"	62.5		101	87.3-113			
Surrogate: Toluene-d8	62		"	62.5		99.9	90.9-108			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		100	88.6-111			

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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 5F09009 - EPA 5030B (Water)

Matrix Spike Dup (5F09009-MSD2)	Source: X506104-01			Prepared: 06/09/2015 Analyzed: 06/09/2015						
Benzene	51.9	1.0	ug/L	50.0	ND	104	74-130	7.58	20	
Toluene	52.2	1.0	"	50.0	ND	104	73-131	10.2	20	
Ethylbenzene	53.2	1.0	"	50.0	ND	106	76-132	10.9	20	
m,p-Xylene	106	2.0	"	100	ND	106	69-139	11.5	20	
o-Xylene	52.0	1.0	"	50.0	ND	104	74-131	10.8	20	
Surrogate: 1,2-Dichloroethane-d4	63		"	62.5		100	87.3-113			
Surrogate: Toluene-d8	63		"	62.5		100	90.9-108			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	88.6-111			

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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 5F09010 - EPA 5030 (soil)

Blank (5F09010-BLK1)

Prepared: 06/09/2015 Analyzed: 06/09/2015

Benzene	ND	0.002	mg/kg							
Toluene	ND	0.002	"							
Ethylbenzene	ND	0.002	"							
Xylenes, total	ND	0.002	"							
Surrogate: 1,2-Dichloroethane-d4	69		ug/kg	62.5		111	70-130			
Surrogate: Toluene-d8	58		"	62.5		93.4	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		100	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 5F09010 - EPA 5030 (soil)

LCS (5F09010-BS1)

Prepared: 06/09/2015 Analyzed: 06/09/2015

Benzene	0.101	0.002	mg/kg	0.100		101	77.1-124			
Toluene	0.090	0.002	"	0.100		89.6	74.5-128			
Ethylbenzene	0.086	0.002	"	0.100		86.3	66.4-127			
m,p-Xylene	0.176	0.004	"	0.200		87.9	76.6-124			
o-Xylene	0.090	0.002	"	0.100		90.3	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	65		ug/kg	62.5		104	70-130			
Surrogate: Toluene-d8	58		"	62.5		93.1	70-130			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.6	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 5F09010 - EPA 5030 (soil)

Matrix Spike (5F09010-MS1)	Source: X506108-01			Prepared: 06/09/2015 Analyzed: 06/09/2015						
Benzene	0.104	0.002	mg/kg	0.100	ND	104	71.8-126			
Toluene	0.093	0.002	"	0.100	ND	93.0	65.1-130			
Ethylbenzene	0.088	0.002	"	0.100	ND	88.2	62.2-130			
m,p-Xylene	0.177	0.004	"	0.200	ND	88.6	46.5-137			
o-Xylene	0.094	0.002	"	0.100	ND	93.6	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	65		ug/kg	62.5		104	70-130			
Surrogate: Toluene-d8	58		"	62.5		93.1	70-130			
Surrogate: 4-Bromofluorobenzene	61		"	62.5		97.1	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 5F09010 - EPA 5030 (soil)

Matrix Spike Dup (5F09010-MSD1)	Source: X506108-01			Prepared: 06/09/2015 Analyzed: 06/09/2015						
Benzene	0.103	0.002	mg/kg	0.100	ND	103	71.8-126	1.32	11.3	
Toluene	0.092	0.002	"	0.100	ND	91.5	65.1-130	1.54	15.4	
Ethylbenzene	0.087	0.002	"	0.100	ND	87.4	62.2-130	0.934	19.6	
m,p-Xylene	0.173	0.004	"	0.200	ND	86.4	46.5-137	2.51	19.2	
o-Xylene	0.092	0.002	"	0.100	ND	92.0	54.2-134	1.72	17.9	
Surrogate: 1,2-Dichloroethane-d4	64		ug/kg	62.5		102	70-130			
Surrogate: Toluene-d8	58		"	62.5		93.4	70-130			
Surrogate: 4-Bromofluorobenzene	61		"	62.5		97.0	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 5F09006 - EPA 3580

Blank (5F09006-BLK1)

Prepared: 06/09/2015 Analyzed: 06/09/2015

Gasoline (C6-C10)	ND	50	mg/kg							
Diesel (C10-C28)	17	50	"							
Residual Range Organics (C28-C36)	ND	200	"							
Surrogate: o-Terphenyl	42.9		"	50.0		85.8	65-146			

LCS (5F09006-BS1)

Prepared: 06/09/2015 Analyzed: 06/09/2015

Gasoline (C6-C10)	900	50	mg/kg	1000		90.3	66.7-119			
Diesel (C10-C28)	920	50	"	1000		91.6	70.1-127			
Residual Range Organics (C28-C36)	1100	200	"	1000		113	54.5-139			
Surrogate: o-Terphenyl	48.7		"	50.0		97.5	65-146			

Matrix Spike (5F09006-MS1)

Source: X506099-01

Prepared: 06/09/2015 Analyzed: 06/09/2015

Gasoline (C6-C10)	890	50	mg/kg	1000	ND	89.3	56.4-132			
Diesel (C10-C28)	890	50	"	1000	10	89.1	57.4-138			
Residual Range Organics (C28-C36)	1100	200	"	1000	ND	110	47.7-129			
Surrogate: o-Terphenyl	48.7		"	50.0		97.3	65-146			

Matrix Spike Dup (5F09006-MSD1)

Source: X506099-01

Prepared: 06/09/2015 Analyzed: 06/09/2015

Gasoline (C6-C10)	890	50	mg/kg	1000	ND	89.1	56.4-132	0.167	22	
Diesel (C10-C28)	900	50	"	1000	10	90.1	57.4-138	1.18	18.3	
Residual Range Organics (C28-C36)	1100	200	"	1000	ND	111	47.7-129	1.11	30.1	
Surrogate: o-Terphenyl	49.9		"	50.0		99.8	65-146			

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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 5F09013 - NO PREP										
Duplicate (5F09013-DUP1)		Source: X506112-02			Prepared: 06/09/2015 Analyzed: 06/09/2015					
pH	7.90		pH Units		8.09			2.38	25	
Batch 5F09014 - NO PREP										
Blank (5F09014-BLK1)		Prepared: 06/09/2015 Analyzed: 06/09/2015								
Specific Conductance (EC)	0.00300		mmhos/cm							
Duplicate (5F09014-DUP1)		Source: X506112-02			Prepared: 06/09/2015 Analyzed: 06/09/2015					
Specific Conductance (EC)	0.111		mmhos/cm		0.0974			12.9	25	

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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.

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