



January 29, 2016

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

**RE: Sump Excavation Report  
HSR-REDMOND-63N67W/21NWSW (HSR-Redmond 12-21)  
Weld County, Colorado  
NWSW SEC 21-T3N-R67W  
API #05-123-17197  
API #05-123-24503  
Location ID #329337**

Dear Mr. Mickelson:

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 soil, collecting a confirmation soil sample from a sump excavation, documenting field activities, and reviewing laboratory analytical results. In addition to the information provided below, Kerr-McGee submitted a Form 19 – Spill/Release Report (Document # 400929495) to the Colorado Oil and Gas Conservation Commission (COGCC) on November 5, 2015.

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 and groundwater sample locations are depicted on the Excavation Site Map provided as Figure 1.

On October 30, 2015, following the removal of the produced water sump, soil samples were collected from the excavation sidewalls at 3.5 feet below ground surface (bgs). Groundwater was encountered in the excavation at a depth of approximately 5 feet bgs. The soil samples were field screened for volatile organic compounds using a photo-ionization detector (PID). LTE personnel did not observe soil staining, odor, or elevated (>1.0 parts per million) PID readings in any of the soil samples. A confirmation soil sample from the northern excavation sidewall (N01@3.5') 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 Methods 8015C and 8260C, pH by USEPA Method 9045D, and specific conductance (EC) by USEPA Method 9050A. Laboratory



analytical results for confirmation soil sample N01@3.5' indicated that BTEX, TPH, pH, and EC levels were less than or within COGCC Table 910-1 allowable levels.

On October 30, 2015, one excavation groundwater sample (GW01) was collected and submitted for laboratory analysis of BTEX by USEPA Method 8260C. Laboratory analytical results for sample GW01 indicated that the benzene concentration of 5.1 micrograms per liter ( $\mu\text{g/L}$ ) exceeded the Colorado Ground Water Quality Standards (CGWQS). On November 2, 2015, following the removal of approximately 24 barrels of impacted groundwater, a second groundwater sample (GW02) was collected from the excavation. Laboratory analytical results for GW02 indicated that the benzene concentration continued to exceed the CGWQS at a concentration of 10.7  $\mu\text{g/L}$ .

The excavation soil and groundwater sample laboratory analytical results are summarized in Tables 1 and 2, respectively. The excavation soil and groundwater laboratory analytical reports are attached.

The sump excavation measured approximately 20 feet west to east by 15 feet north to south to an approximate depth of 5 feet bgs. Approximately 10 cubic yards of impacted soil were excavated and transported to the Ker-McGee Land Treatment Facility in Weld County, Colorado. The impacted groundwater removed from the excavation was transported to a licensed injection facility. The Kerr-McGee facility was deconstructed.

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 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



N01@3.5'  
 10/30/2015  
 B: 0.004  
 T: 0.004  
 E: <0.002  
 X: <0.002

GW01  
 10/30/2015  
 B: **5.1**  
 T: 17.7  
 E: 2.0  
 X: 17.6

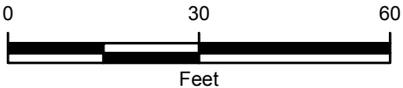
GW02  
 11/2/2015  
 B: **10.7**  
 T: 30.8  
 E: <4.0  
 X: <4.0

SAMPLE ID  
 SAMPLE DATE  
 B: BENZENE  
 T: TOLUENE  
 E: ETHYLBENZENE  
 X: TOTAL XYLENES  
 <: INDICATES RESULT IS LESS THAN THE LABORATORY REPORTING LIMIT  
**BOLD**: INDICATES RESULT EXCEEDS THE APPLICABLE STANDARD  
 GROUNDWATER SAMPLES IN MICROGRAMS PER LITER (µg/L)  
 SOIL SAMPLE IN MILLIGRAMS PER KILOGRAM (mg/kg)

**LEGEND**

- RELEASE LOCATION
- SOIL SAMPLE
- GROUNDWATER SAMPLE
- FORMER METER HOUSE
- FORMER FENCE
- EXCAVATION EXTENT
- FORMER BERM

IMAGE COURTESY OF GOOGLE EARTH 2014



**FIGURE 1**  
 EXCAVATION SITE MAP  
 HSR-REDMOND-63N67W/21NWSW  
 NWSW SEC 21-T3N-R67W  
 WELD COUNTY, COLORADO  
 KERR-MCGEE OIL & GAS ONSHORE LP



**TABLE 1**  
**SOIL SAMPLE ANALYTICAL RESULTS**  
**HSR-REDMOND-63N67W/21NWSW**  
**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 @ 3.5'	3.5'	10/30/2015	0.004	0.004	<0.002	<0.002	<25	<0.200	<100	8.29	0.0551
<b>COGCC Allowable Levels</b>			<b>0.17</b>	<b>85</b>	<b>100</b>	<b>175</b>	<b>500*</b>	<b>500*</b>	<b>500*</b>	<b>6-9</b>	<b>4</b>

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-REDMOND-63N67W/21NWSW**  
**WELD COUNTY, COLORADO**  
**KERR-MCGEE OIL & GAS ONSHORE LP**

<b>Well Name</b>	<b>Date</b>	<b>Benzene (µg/L)</b>	<b>Toluene (µg/L)</b>	<b>Ethylbenzene (µg/L)</b>	<b>Total Xylenes (µg/L)</b>	<b>Depth Water/ (Product Thickness) (ft bgs)</b>
GW01	10/30/2015	<b>5.1</b>	17.7	2.0	17.6	5.00
GW02	11/02/2015	<b>10.7</b>	30.8	<4.0	<4.0	5.00
<b>CGWQS</b>		<b>5</b>	<b>1000</b>	<b>700</b>	<b>1400</b>	

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



November 02, 2015

LT Environmental, Inc.

John Cocroft

4600 West 60th Avenue

Arvada CO 80003

Project Name - KMG - HSR-Redmond 12-21

Project Number - [none]

Attached are your analytical results for KMG - HSR-Redmond 12-21 received by Origins Laboratory, Inc. October 30, 2015. This project is associated with Origins project number X510368-01.

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 - HSR-Redmond 12-21

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
GW01	X510368-01	Water	October 30, 2015 14:00	10/30/2015 16:10
N01 @ 3.5	X510368-02	Soil	October 30, 2015 14:30	10/30/2015 16:10

Origins Laboratory, Inc.



*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.*

Jen Pellegrini For Noelle Doyle Mathis, President



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

John Cocroft  
 Project Number: [none]  
 Project: KMG - HSR-Redmond 12-21

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: XS0368 Client: LTE  
 Client Project ID: HSR-Redmond 12-21  
 Checklist Completed by: Jeff Smith Shipped Via: H/D  
 Date/time completed: 10/30/15 (UPS, FedEx, Hand Delivered, Pick-up, etc.)  
 Airbill #: \_\_\_\_\_  
 Matrix(s) Received: (Check all that apply):  Soil/Solid  Water \_\_\_\_\_ Other: \_\_\_\_\_  
 Cooler Number/Temperature: 1 / 3.4 °C \_\_\_\_\_ / \_\_\_\_\_ °C \_\_\_\_\_ / \_\_\_\_\_ °C (Describe)  
 Thermometer ID: T1053

Requirement Description	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature between 0°C to ≤ 6°C <sup>(1)</sup> ?	✓			
Is there ice present (document if blue ice is used)	✓			
Are custody seals present on cooler? (if so, document in comments if they are signed and dated, broken or intact)		✗		
Are custody seals present on each sample container? (if so, document in comments if they are signed and dated, broken or intact)		✓		
Were all samples received intact <sup>(1)</sup> ?	✓			
Was adequate sample volume provided <sup>(1)</sup> ?	✓			
Are short holding time analytes or samples with HTs due within 48 hours present <sup>(1)</sup> ?	✗			PH
Is a chain-of-custody (COC) present and filled out completely <sup>(1)</sup> ?	✓			
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	✓			
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	✓			
Is the COC properly relinquished by the client with date and time recorded <sup>(1)</sup> ?	✓			
For volatiles in water – is there headspace (> ¼ inch bubble) present? If yes, contact client and note in narrative.		✓		
Are samples preserved that require preservation and was it checked <sup>(1)</sup> ? (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)	✗			17cc
Additional Comments (if any):				

<sup>(1)</sup>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.

Jeff Smith 10/30/15  
 Reviewed by (Project Manager) Date/Time Reviewed

Origins Laboratory, Inc.



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

John Cocroft  
 Project Number: [none]  
 Project: KMG - HSR-Redmond 12-21

**GW01**  
**10/30/2015 2:00:00PM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**X510368-01 (Water)**

**BTEX by EPA 8260C**

Benzene	5.1	1.0	ug/L	1	5J30007	10/30/2015	10/30/2015	
Toluene	17.7	1.0	"	"	"	"	"	
Ethylbenzene	2.0	1.0	"	"	"	"	"	
Xylenes, total	17.6	1.0	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4	103 %	84-121			"	"	"	
Surrogate: Toluene-d8	101 %	85-115			"	"	"	
Surrogate: 4-Bromofluorobenzene	100 %	84-114			"	"	"	

Origins Laboratory, Inc.



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

John Cocroft  
 Project Number: [none]  
 Project: KMG - HSR-Redmond 12-21

**N01 @ 3.5**  
**10/30/2015 2:30:00PM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**X510368-02 (Soil)**

**DRO/RRO by EPA8015C**

Diesel (C10-C28)	ND	25	mg/kg	1	5J30009	10/30/2015	10/30/2015	
Residual Range Organics (C28-C36)	ND	100	"	"	"	"	"	

*Surrogate: o-Terphenyl* 82.7 % 59-131 " " "

**GBTEX by EPA 8260C**

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	5J30010	10/30/2015	10/30/2015	
Benzene	<b>0.004</b>	0.002	"	"	"	"	"	
Toluene	<b>0.004</b>	0.002	"	"	"	"	"	
Ethylbenzene	ND	0.002	"	"	"	"	"	
Xylenes, total	ND	0.002	"	"	"	"	"	

*Surrogate: 1,2-Dichloroethane-d4* 105 % 70-130 " " "

*Surrogate: Toluene-d8* 104 % 70-130 " " "

*Surrogate: 4-Bromofluorobenzene* 98.9 % 70-130 " " "

**pH in Soil by EPA 9045D**

pH	<b>8.29</b>		pH Units	1	5J30015	10/30/2015	10/30/2015	
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**Specific Conductance by Modified 9050A**

Specific Conductance (EC)	<b>0.0551</b>		mmhos/cm	"	5J30016	"	"	
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Origins Laboratory, Inc.



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

John Cocroft  
 Project Number: [none]  
 Project: KMG - HSR-Redmond 12-21

**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 5J30007 - EPA 5030B (Water)**

**Blank (5J30007-BLK1)**

Prepared: 10/30/2015 Analyzed: 10/30/2015

Benzene	ND	1.0	ug/L							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes, total	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	65		"	62.5	104		84-121			
Surrogate: Toluene-d8	62		"	62.5	99.0		85-115			
Surrogate: 4-Bromofluorobenzene	62		"	62.5	98.6		84-114			

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John Cocroft  
 Project Number: [none]  
 Project: KMG - HSR-Redmond 12-21

**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 5J30007 - EPA 5030B (Water)**

**LCS (5J30007-BS1)**

Prepared: 10/30/2015 Analyzed: 10/30/2015

Benzene	50.5	1.0	ug/L	50.0		101	75-126			
Toluene	51.2	1.0	"	50.0		102	78.7-126			
Ethylbenzene	51.8	1.0	"	50.0		104	80-130			
m,p-Xylene	104	2.0	"	100		104	77.2-133			
o-Xylene	54.8	1.0	"	50.0		110	77.9-126			
Surrogate: 1,2-Dichloroethane-d4	63		"	62.5		100	84-121			
Surrogate: Toluene-d8	64		"	62.5		103	85-115			
Surrogate: 4-Bromofluorobenzene	64		"	62.5		102	84-114			

Origins Laboratory, Inc.



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LT Environmental, Inc.  
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 Arvada CO 80003

John Cocroft  
 Project Number: [none]  
 Project: KMG - HSR-Redmond 12-21

**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 5J30007 - EPA 5030B (Water)**

<b>Matrix Spike (5J30007-MS1)</b>	<b>Source: X510328-01</b>			<b>Prepared: 10/30/2015 Analyzed: 10/30/2015</b>						
Benzene	51.3	1.0	ug/L	50.0	ND	103	74-130			
Toluene	50.7	1.0	"	50.0	ND	101	73-131			
Ethylbenzene	53.2	1.0	"	50.0	ND	106	76-132			
m,p-Xylene	107	2.0	"	100	ND	107	69-139			
o-Xylene	55.8	1.0	"	50.0	ND	112	74-131			
Surrogate: 1,2-Dichloroethane-d4	62		"	62.5		99.8	84-121			
Surrogate: Toluene-d8	63		"	62.5		101	85-115			
Surrogate: 4-Bromofluorobenzene	66		"	62.5		105	84-114			

Origins Laboratory, Inc.



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

John Cocroft  
 Project Number: [none]  
 Project: KMG - HSR-Redmond 12-21

**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 5J30007 - EPA 5030B (Water)**

<b>Matrix Spike Dup (5J30007-MSD1)</b>	<b>Source: X510328-01</b>			<b>Prepared: 10/30/2015 Analyzed: 10/30/2015</b>						
Benzene	50.2	1.0	ug/L	50.0	ND	100	74-130	2.13	20	
Toluene	50.2	1.0	"	50.0	ND	100	73-131	1.05	20	
Ethylbenzene	51.6	1.0	"	50.0	ND	103	76-132	3.21	20	
m,p-Xylene	105	2.0	"	100	ND	105	69-139	2.65	20	
o-Xylene	52.4	1.0	"	50.0	ND	105	74-131	6.21	20	
Surrogate: 1,2-Dichloroethane-d4	62		"	62.5		99.4	84-121			
Surrogate: Toluene-d8	62		"	62.5		99.7	85-115			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		100	84-114			

Origins Laboratory, Inc.



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

John Cocroft  
 Project Number: [none]  
 Project: KMG - HSR-Redmond 12-21

**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 5J30010 - EPA 5030 (soil)**

**Blank (5J30010-BLK1)**

Prepared: 10/30/2015 Analyzed: 10/30/2015

Gasoline Range Hydrocarbons	ND	0.200	mg/kg							
Benzene	ND	0.002	"							
Toluene	ND	0.002	"							
Ethylbenzene	ND	0.002	"							
Xylenes, total	ND	0.002	"							
Surrogate: 1,2-Dichloroethane-d4	65.5		ug/kg	62.5		105	70-130			
Surrogate: Toluene-d8	65.1		"	62.5		104	70-130			
Surrogate: 4-Bromofluorobenzene	63.7		"	62.5		102	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 - HSR-Redmond 12-21

**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 5J30010 - EPA 5030 (soil)**

**LCS (5J30010-BS1)**

Prepared: 10/30/2015 Analyzed: 10/30/2015

Benzene	0.102	0.002	mg/kg	0.100		102	77.1-124			
Toluene	0.105	0.002	"	0.100		105	74.5-128			
Ethylbenzene	0.104	0.002	"	0.100		104	66.4-127			
m,p-Xylene	0.215	0.004	"	0.200		107	76.6-124			
o-Xylene	0.109	0.002	"	0.100		109	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	63.6		ug/kg	62.5		102	70-130			
Surrogate: Toluene-d8	64.0		"	62.5		102	70-130			
Surrogate: 4-Bromofluorobenzene	67.2		"	62.5		108	70-130			

Origins Laboratory, Inc.



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 Arvada CO 80003

John Cocroft  
 Project Number: [none]  
 Project: KMG - HSR-Redmond 12-21

**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 5J30010 - EPA 5030 (soil)

Matrix Spike (5J30010-MS1)	Source: X510349-01			Prepared: 10/30/2015 Analyzed: 10/30/2015						
Benzene	0.101	0.002	mg/kg	0.100	ND	101	71.8-126			
Toluene	0.106	0.002	"	0.100	ND	106	65.1-130			
Ethylbenzene	0.105	0.002	"	0.100	ND	105	62.2-130			
m,p-Xylene	0.203	0.004	"	0.200	ND	102	46.5-137			
o-Xylene	0.102	0.002	"	0.100	ND	102	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	62.5		ug/kg	62.5		100	70-130			
Surrogate: Toluene-d8	63.9		"	62.5		102	70-130			
Surrogate: 4-Bromofluorobenzene	63.4		"	62.5		101	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 - HSR-Redmond 12-21

**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 5J30010 - EPA 5030 (soil)

Matrix Spike Dup (5J30010-MSD1)	Source: X510349-01			Prepared: 10/30/2015 Analyzed: 10/30/2015						
Benzene	0.096	0.002	mg/kg	0.100	ND	95.5	71.8-126	5.91	11.3	
Toluene	0.103	0.002	"	0.100	ND	103	65.1-130	2.36	15.4	
Ethylbenzene	0.101	0.002	"	0.100	ND	101	62.2-130	3.49	19.6	
m,p-Xylene	0.203	0.004	"	0.200	ND	101	46.5-137	0.266	19.2	
o-Xylene	0.102	0.002	"	0.100	ND	102	54.2-134	0.902	17.9	
Surrogate: 1,2-Dichloroethane-d4	60.2		ug/kg	62.5		96.3	70-130			
Surrogate: Toluene-d8	62.8		"	62.5		100	70-130			
Surrogate: 4-Bromofluorobenzene	62.0		"	62.5		99.2	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 - HSR-Redmond 12-21

**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 5J30009 - EPA 3580**

**Blank (5J30009-BLK1)**

Prepared: 10/30/2015 Analyzed: 10/30/2015

Diesel (C10-C28)	ND	50	mg/kg							
Residual Range Organics (C28-C36)	ND	200	"							
Surrogate: o-Terphenyl	82		"	100		81.8	59-131			

**LCS (5J30009-BS1)**

Prepared: 10/30/2015 Analyzed: 10/30/2015

Diesel (C10-C28)	930	50	mg/kg	1000		93.0	64-121			
Residual Range Organics (C28-C36)	1000	200	"	1000		103	58-124			
Surrogate: o-Terphenyl	52		"	50.0		104	59-131			

**Matrix Spike (5J30009-MS1)**

Source: X510349-01

Prepared: 10/30/2015 Analyzed: 10/30/2015

Diesel (C10-C28)	930	50	mg/kg	1000	ND	93.3	53-125			
Residual Range Organics (C28-C36)	1000	200	"	1000	15	100	47-133			
Surrogate: o-Terphenyl	51		"	50.0		102	59-131			

**Matrix Spike Dup (5J30009-MSD1)**

Source: X510349-01

Prepared: 10/30/2015 Analyzed: 10/30/2015

Diesel (C10-C28)	800	50	mg/kg	1000	ND	79.9	53-125	15.5	20	
Residual Range Organics (C28-C36)	760	200	"	1000	15	74.9	47-133	28.6	20	QR-02
Surrogate: o-Terphenyl	43		"	50.0		86.8	59-131			

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 Arvada CO 80003

John Cocroft  
 Project Number: [none]  
 Project: KMG - HSR-Redmond 12-21

**Classical Chemistry Parameters - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5J30015 - NO PREP</b>										
<b>Duplicate (5J30015-DUP1)</b>		<b>Source: X510368-02</b>			Prepared: 10/30/2015 Analyzed: 10/30/2015					
pH	7.78		pH Units		8.29			6.35	25	
<b>Batch 5J30016 - NO PREP</b>										
<b>Blank (5J30016-BLK1)</b>		Prepared: 10/30/2015 Analyzed: 10/30/2015								
Specific Conductance (EC)	0.00350		mmhos/cm							
<b>Duplicate (5J30016-DUP1)</b>		<b>Source: X510368-02</b>			Prepared: 10/30/2015 Analyzed: 10/30/2015					
Specific Conductance (EC)	0.0526		mmhos/cm		0.0551			4.64	25	

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Arvada CO 80003

John Cocroft  
Project Number: [none]  
Project: KMG - HSR-Redmond 12-21

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### 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 at a wet weight basis.

Origins Laboratory, Inc.



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---

Jen Pellegrini For Noelle Doyle Mathis, President

November 03, 2015

LT Environmental, Inc.

John Cocroft

4600 West 60th Avenue

Arvada CO 80003

**Project Name - KMG - HSR - Redmond - 63N  
67W/21NESW**

**Project Number - 014215195**

Attached are your analytical results for KMG - HSR - Redmond - 63N 67W/21NESW received by Origins Laboratory, Inc. November 02, 2015. This project is associated with Origins project number X511024-01.

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: 014215195  
Project: KMG - HSR - Redmond - 63N  
67W/21NESW

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
GW02	X511024-01	Water	November 2, 2015 14:30	11/02/2015 17:17

Origins Laboratory, Inc.



*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.*

Jen Pellegrini For Noelle Doyle Mathis, President



LT Environmental, Inc.  
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 Arvada CO 80003

John Cocroft  
 Project Number: 014215195  
 Project: KMG - HSR - Redmond - 63N  
 67W/21NESW

Origins Laboratory

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

**Sample Receipt Checklist**

Origins Work Order: 1511024

Client: LT Environmental

Client Project ID: HSR-REDMOND-630670/21NE

Checklist Completed by: J. Pellegrini

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

Date/time completed: 11/15/12

Airbill #: 121

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

Cooler Number/Temperature: 1 / 129 °C 1 °C 1 °C 1 °C  
(Describe)

Thermometer ID: 7003

Requirement Description	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature between 0°C to ≤ 6°C <sup>(1)</sup> ?	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 <sup>(1)</sup> ?	X			
Was adequate sample volume provided <sup>(1)</sup> ?	X			
Are short holding time analytes or samples with HTs due within 48 hours present <sup>(1)</sup> ?		X		
Is a chain-of-custody (COC) present and filled out completely <sup>(1)</sup> ?	X			
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	X			
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	X			
Is the COC properly relinquished by the client with date and time recorded <sup>(1)</sup> ?	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 <sup>(1)</sup> ? (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 <sub>3</sub> , HCL, H <sub>2</sub> SO <sub>4</sub> ) / (pH >10 for samples preserved with NaAsO <sub>2</sub> +NaOH, ZnAc+NaOH)		X		
Additional Comments (if any):				

<sup>(1)</sup>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.

J. Pellegrini  
 Reviewed by (Project Manager)

11/2/12  
 Date/Time Reviewed

Origins Laboratory, Inc.



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

John Cocroft  
 Project Number: 014215195  
 Project: KMG - HSR - Redmond - 63N  
 67W/21NESW

**GW02**  
**11/2/2015 2:30:00PM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**X511024-01 (Water)**

**BTEX by EPA 8260C**

Benzene	10.7	4.0	ug/L	4	B15K002	11/02/2015	11/02/2015	
Toluene	30.8	4.0	"	"	"	"	"	
Ethylbenzene	ND	4.0	"	"	"	"	"	
Xylenes, total	ND	4.0	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	90.5 %	84-121			"	"	"	
Surrogate: Toluene-d8	102 %	85-115			"	"	"	
Surrogate: 4-Bromofluorobenzene	98.2 %	84-114			"	"	"	

Origins Laboratory, Inc.



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

John Cocroft  
 Project Number: 014215195  
 Project: KMG - HSR - Redmond - 63N  
 67W/21NESW

**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 B15K002 - EPA 5030B (Water)**

**Blank (B15K002-BLK1)**

Prepared: 11/02/2015 Analyzed: 11/02/2015

Benzene	ND	1.0	ug/L							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes, total	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	60		"	62.5	96.1		84-121			
Surrogate: Toluene-d8	62		"	62.5	100		85-115			
Surrogate: 4-Bromofluorobenzene	64		"	62.5	103		84-114			

Origins Laboratory, Inc.



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John Cocroft  
 Project Number: 014215195  
 Project: KMG - HSR - Redmond - 63N  
 67W/21NESW

**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 B15K002 - EPA 5030B (Water)**

**LCS (B15K002-BS1)**

Prepared: 11/02/2015 Analyzed: 11/02/2015

Benzene	48.3	1.0	ug/L	50.0		96.5	75-126			
Toluene	48.5	1.0	"	50.0		97.0	78.7-126			
Ethylbenzene	51.7	1.0	"	50.0		103	80-130			
m,p-Xylene	105	2.0	"	100		105	77.2-133			
o-Xylene	50.7	1.0	"	50.0		101	77.9-126			
Surrogate: 1,2-Dichloroethane-d4	57		"	62.5		91.5	84-121			
Surrogate: Toluene-d8	64		"	62.5		102	85-115			
Surrogate: 4-Bromofluorobenzene	65		"	62.5		104	84-114			

Origins Laboratory, Inc.



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 67W/21NESW

**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 B15K002 - EPA 5030B (Water)**

<b>Matrix Spike (B15K002-MS1)</b>	<b>Source: X511007-03</b>			<b>Prepared: 11/02/2015 Analyzed: 11/02/2015</b>						
Benzene	58.2	1.0	ug/L	50.0	ND	116	74-130			
Toluene	59.0	1.0	"	50.0	ND	118	73-131			
Ethylbenzene	64.3	1.0	"	50.0	ND	129	76-132			
m,p-Xylene	129	2.0	"	100	ND	129	69-139			
o-Xylene	59.3	1.0	"	50.0	ND	119	74-131			
Surrogate: 1,2-Dichloroethane-d4	59		"	62.5		94.5	84-121			
Surrogate: Toluene-d8	64		"	62.5		102	85-115			
Surrogate: 4-Bromofluorobenzene	65		"	62.5		104	84-114			

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch B15K002 - EPA 5030B (Water)**

Matrix Spike Dup (B15K002-MSD1)	Source: X511007-03			Prepared: 11/02/2015 Analyzed: 11/02/2015						
Benzene	47.1	1.0	ug/L	50.0	ND	94.2	74-130	21.2	20	QR-02
Toluene	48.6	1.0	"	50.0	ND	97.3	73-131	19.2	20	
Ethylbenzene	53.0	1.0	"	50.0	ND	106	76-132	19.2	20	
m,p-Xylene	105	2.0	"	100	ND	105	69-139	20.1	20	QR-02
o-Xylene	49.0	1.0	"	50.0	ND	98.0	74-131	19.0	20	
Surrogate: 1,2-Dichloroethane-d4	57		"	62.5		91.9	84-121			
Surrogate: Toluene-d8	63		"	62.5		101	85-115			
Surrogate: 4-Bromofluorobenzene	64		"	62.5		103	84-114			

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John Cocroft  
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67W/21NESW

### 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 at a wet weight basis.

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