

State of Colorado  
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 (303) 894-2100 Fax 894-2109



FOR OGCC USE ONLY

## SITE INVESTIGATION AND REMEDIATION WORKPLAN

This form shall be submitted to the Director for approval prior to the initiation of site investigation and remediation activities. Form 27 is intended to be used whenever possible. Additional documentation will be required when large volumes of soil and groundwater have been impacted or involve large facilities with multiple source areas. See Rule 910. Attach as many pages as needed to fully describe the proposed work.

## CAUSE OF CONDITION BEING INVESTIGATED AND REMEDIATED

☐ Spill or Release ☐ Plug & Abandon ☐ Central Facility Closure ☒ Site/Facility Closure ☐ Other (describe): \_\_\_\_\_

## GENERAL INFORMATION

<b>OGCC Operator Number:</b> 47120		<b>Contact Name and Telephone</b>	
<b>Name of Operator:</b> Kerr-McGee Oil and Gas Onshore LP		<b>Name:</b> Phillip Hamlin	
<b>Address:</b> P.O. Box 173779		<b>No:</b> (970) 336-3500	
<b>City:</b> Denver <b>State:</b> CO <b>Zip:</b> 80217-3779		<b>Fax:</b> (970) 336-3656	
<b>API/Facility No:</b> 329337		<b>County:</b> Weld	
<b>Facility Name:</b> HSR-REDMOND-63N67W/21NWSW		<b>Facility Number:</b> _____	
<b>Well Name:</b> _____		<b>Well Number:</b> _____	
<b>Location (QtrQtr, Sec, Twp, Rng, Meridian):</b> NWSW Sec 21-T3N-R67W		<b>Latitude:</b> 40.20979 <b>Longitude:</b> -104.90383	

## TECHNICAL CONDITIONS

<b>Type of Waste Causing Impact (crude oil, condensate, produced water, etc.):</b> Oil, Produced Water, and Condensate		
<b>Site Conditions:</b> Is location within a sensitive area (according to Rule 901e)? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N If yes, attach evaluation. <i>Groundwater &lt; 20 ft.</i>		
<b>Adjacent land use (cultivated, irrigated, dry land farming, industrial, residential, etc.):</b> Rangeland		
<b>Soil type, if not previously identified on Form 2A or Federal Surface Use Plan:</b> Fine to medium grained sand		
<b>Potential receptors (water wells within 1/4 mi, surface waters, etc.):</b> Surface water and wetlands approximately 250' southwest, water well approximately 1,720' east, building approximately 1,700' southeast, and excavation groundwater approximately 5' below ground surface (bgs).		
<b>Description of Impact (if previously provided, refer to that form or document):</b>		
<b>Impacted Media (check):</b>	<b>Extent of Impact:</b>	<b>How Determined:</b>
<input checked="" type="checkbox"/> Soils	15' N-S x 20' E-W x 5' bgs	Collected soil samples for laboratory analysis
<input type="checkbox"/> Vegetation	_____	_____
<input checked="" type="checkbox"/> Groundwater	See attached data	Collected groundwater samples for laboratory analysis
<input type="checkbox"/> Surface water	_____	_____

## REMEDIALATION WORKPLAN

<b>Describe initial action taken (if previously provided, refer to that form or document):</b> <p>During deconstruction activities at the HSR-Redmond-63N67W/21NWSW tank battery, petroleum hydrocarbon impacted groundwater was encountered beneath the produced water sump. The volume of the release is unknown. The petroleum hydrocarbon impacted soil was excavated. Impacted groundwater was encountered in the excavation at approximately 5 feet bgs. A topographic Site Location Map depicting the general location of the release is provided as Figure 1.</p>
<b>Describe how source is to be removed:</b> <p>Soil and groundwater samples were collected from the excavation and submitted for laboratory analysis. Soil samples were collected from the excavation sidewalls at 3.5 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 (&gt;1.0 parts per million) PID readings in any of the soil samples. A confirmation soil sample collected from the northern excavation sidewall (N01@3.5") was submitted for laboratory analysis of total petroleum hydrocarbons (TPH), benzene, toluene, ethylbenzene, and total xylenes (BTEX), pH, and specific conductivity (EC). Laboratory analytical results for the confirmation soil sample indicated that TPH, BTEX, pH, and EC levels were in compliance with the Colorado Oil and Gas Conservation Commission (COGCC) Table 910-1 allowable levels. Soil was excavated into the phreatic zone to address potential hydrocarbon impacts that may have been present below the current water table due to past seasonal fluctuations. Approximately 10 cubic yards of impacted soil were excavated and transported to the Kerr-McGee Land Treatment Facility in Weld County, Colorado.</p> <p>The excavation groundwater was sampled for BTEX. Laboratory analytical results for the initial excavation groundwater sample (GW01) indicated the benzene concentration exceeded the Colorado Groundwater Quality Standards (CGWQS) at a concentration of 5.1 micrograms per liter (µg/L). Following the removal of approximately 24 barrels of impacted groundwater, a second groundwater sample (GW02) was collected from the excavation for laboratory analysis. Laboratory analytical results for sample GW02 indicated the benzene concentration continued to exceed the CGWQS at a concentration of 10.7 µg/L. The general site layout, excavation dimensions, and soil and groundwater sample locations are depicted on the Excavation Site Map provided as Figure 2. The excavation soil and groundwater sample analytical results are summarized in Tables 1 and 2, respectively. The laboratory analytical reports are attached.</p>
<b>Describe how remediation of existing impacts is to be accomplished, including removal and disposal at an injection well or licensed facility, land treatment on site, removal of impacted groundwater, insitu bioremediation, burning of oily vegetation, etc.:</b> <p>The impacted soil was transported to the Kerr-McGee Land Treatment Facility in Weld County, Colorado. The impacted groundwater was transported to a licensed injection facility for disposal.</p>

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REMEDIATION WORKPLAN (CONT.)

OGCC Employee:

Tracking Number: \_\_\_\_\_  
Name of Operator: \_\_\_\_\_  
OGCC Operator No: \_\_\_\_\_  
Received Date: \_\_\_\_\_  
Well Name & No: \_\_\_\_\_  
Facility Name & No.: \_\_\_\_\_

If groundwater has been impacted, describe proposed monitoring plan (# of wells or sample points, sampling schedule, analytical methods, etc.):

Groundwater monitoring wells will be installed at the site to fully define the extent and magnitude of the release. The monitoring wells will be surveyed to determine the groundwater flow direction. Groundwater monitoring activities will be conducted on a quarterly basis and all groundwater samples will be submitted for laboratory analysis of BTEX.

Describe reclamation plan. Discuss existing and new grade recontouring; method and testing of compaction alleviation; and reseeding program, including location of new seed, seed mix and noxious weed prevention. Attach diagram or drawing. Use additional sheet for description if required.

The site was restored to its pre-release grade. The Kerr-McGee facility was deconstructed.

Attach samples and analytical results taken to verify remediation of impacts. Show locations of samples on an onsite schematic or drawing.

Is further site investigation required? ☒ Y ☐ N If yes, describe:

After installing the monitoring wells and establishing points of compliance, groundwater monitoring will continue on a quarterly basis.

Final disposition of E&P waste (landtreated and disposed onsite, name of licensed disposal facility, recycling, reuse, etc.):

The impacted soil was transported to the Kerr-McGee Land Treatment Facility in Weld County, Colorado. The impacted groundwater was transported to a licensed injection facility for disposal.

IMPLEMENTATION SCHEDULE

Date Site Investigation Began:	10/30/2015	Date Site Investigation Completed:	Active	Remediation Plan Submitted:	
Remediation Start Date:	11/2/2015	Anticipated Completion Date:	TBD	Actual Completion Date:	

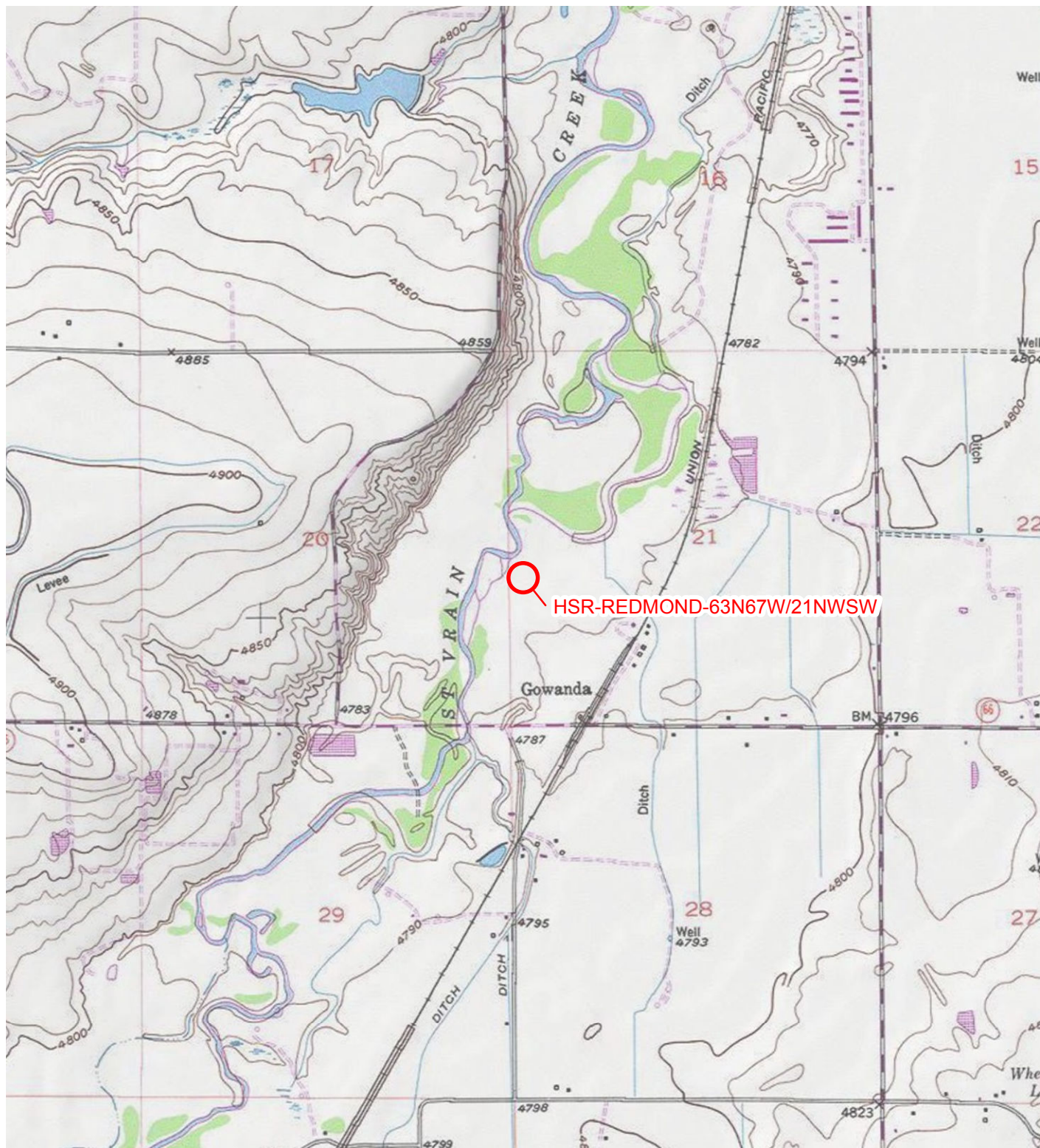
I hereby certify that the statements made in this form are, to the best of my knowledge, true, correct, and complete.

Print Name: Phillip Hamlin

Signed:  Title: Senior HSE Representative Date: 1/27/16

OGCC Approved: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_





# LEGEND

○ SITE LOCATION

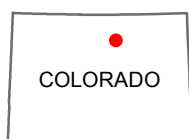
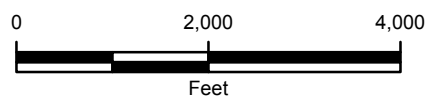


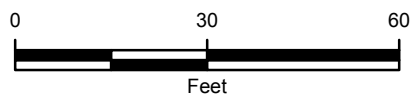
FIGURE 1  
SITE LOCATION MAP  
HSR-REDMOND-63N67W/21NWSW  
NWSW SEC 21-T3N-R67W  
WELD COUNTY, COLORADO  
KERR-MCGEE OIL & GAS ONSHORE LP







IMAGE COURTESY OF GOOGLE EARTH 2014



**FIGURE 2**  
**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



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: [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.*



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

**ORIGINS**  
LABORATORY, INC

1725 Elk Place  
Denver, CO 80211

Phone: 303.433.1322

Fax: 303.265.9645

www.originslaboratory.com

page 1 of 1

Client: LTÉ

Address: 4600 W 60th Ave  
Arvada CO 80003

Telephone Number: 303 433 9788

Email Address: JCocroft@Cltenv.com/see list

Project Manager: John Cocroft

Project Name: HSR-Remed 12-21

Project Number: \_\_\_\_\_

Samples Collected By: Chaf Tillit  
APC Contact Sam LaRue  
APC WO# AFE 2111857.PAB

Project Manager: John Cocroft

Project Name: HSR-Remed 12-21

Project Number: \_\_\_\_\_

Samples Collected By: Chaf Tillit  
APC Contact Sam LaRue  
APC WO# AFE 2111857.PAB

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix			Analysis				Sample Instructions	
				Unpreserved	HCl	HNO <sub>3</sub>	Other	Groundwater	Soil	Air Summa #	Other	TPH (ppm)	PH	EC		SAR
G-W01	10/30/15	1400	3	X				X							X BTEX	1
N01Q3.5	↓	1430	2	X				X							X SAR	2
E01Q3.5	↓	1435	2	X				X							X Hold, Hold SAR	3
S01Q3.5	↓	1440	2	X				X							X Hold, Hold SAR	4
W01Q3.5	↓	1445	2	X				X							X Hold, Hold SAR	5
BG01	↓	1450	2	X				X							X Hold, Hold SAR	6
																7
																8
																9
																10

Relinquished By: [Signature] Date: 10/30/15 Time: 1610

Relinquished By: [Signature] Date: 10/30/15 Time: 1610

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

Date Results Needed

Temp Received 3.4

Origins Laboratory, Inc.

Jeff Pellipini

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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

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

Date/time completed: 10/30/15

Airbill #: \_\_\_\_\_

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

Cooler Number/Temperature: 1 / 3.4 °C \_\_\_\_\_ / \_\_\_\_\_ °C \_\_\_\_\_ / \_\_\_\_\_ °C (Describe)

Thermometer ID: TL053

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 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)	✓			146
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  
Reviewed by (Project Manager)

10/30/15  
Date/Time Reviewed

Origins Laboratory, Inc.

*Jen Pellegrini*

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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	0.004	0.002	"	"	"	"	"
Toluene	0.004	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	8.29		pH Units	1	5J30015	10/30/2015	10/30/2015
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**Specific Conductance by Modified 9050A**

Specific Conductance (EC)	0.0551		mmhos/cm	"	5J30016	"	"
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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			

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)**

**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.  
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)**

Matrix Spike (5J30007-MS1)		Source: X510328-01			Prepared: 10/30/2015 Analyzed: 10/30/2015					
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			

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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)**

Matrix Spike Dup (5J30007-MSD1)		Source: X510328-01			Prepared: 10/30/2015 Analyzed: 10/30/2015					
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.



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 - 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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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 (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
<b>Batch 5J30010 - EPA 5030 (soil)</b>										
<b>Matrix Spike Dup (5J30010-MSD1)</b>		<b>Source: X510349-01</b>			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			

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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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## 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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4600 West 60th Avenue  
Arvada CO 80003

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

### 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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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



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: 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.*



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

**ORIGINS**

LABORATORY, INC

www.originslaboratory.com

X511024

page 1 of 1

LTE

Client:

4600 W 60<sup>th</sup> Ave

Address:

ARLINDA CO 80003

Telephone Number:

303-433-9788

Email Address:

TCooper@GTEA.V.COM

Project Manager:

John Cooper

Project Name:

HSE-PROJECT-1010-63N67W-21-NESW

Project Number:

014215195 HSR-REYMOND-63N67W-21NE SW

Samples Collected By:

PZ

ATTN: 211857.PAB ATT: SAM LARUE

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix			Analysis				Sample Instructions
				Unpreserved	HCl	HNO <sub>3</sub>	Other	Groundwater	Soil	Air Summa #	Other				
G1002	11/2/15	1431	3	X				X					BTX		1
															2
															3
															4
															5
															6
															7
															8
															9
															10
Relinquished By: [Signature]	Date: 11/2/15	Time: 1640											Date: 11-2-15	Time: 1640	Turnaround Time: Same Day <input checked="" type="checkbox"/> 24 Hr <input type="checkbox"/>
Relinquished By: [Signature]	Date: 11-2-15	Time: 1717											Date: 11/2/15	Time: 1717	48 Hr <input type="checkbox"/> 72 Hr <input type="checkbox"/> Standard <input type="checkbox"/>

Temp Received: 29°

Date Results Needed: 11/3

8 AM

Origins Laboratory, Inc.

Jeff Pellgrini

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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

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-63N67W/21NE

Checklist Completed by: J. Pellegrini

Shipped Via: H/D

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

Date/time completed: 11/15/12

Airbill #: 123

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

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

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> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is there ice present (document if blue ice is used)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are custody seals present on cooler? (if so, document in comments if they are signed and dated, broken or intact)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Are custody seals present on each sample container? (if so, document in comments if they are signed and dated, broken or intact)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Were all samples received intact <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was adequate sample volume provided <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are short holding time analytes or samples with HTs due within 48 hours present <sup>(1)</sup> ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Is a chain-of-custody (COC) present and filled out completely <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is the COC properly relinquished by the client with date and time recorded <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
For volatiles in water — is there headspace (> ¼ inch bubble) present? If yes, contact client and note in narrative.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
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)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
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)

11/15/12  
Date/Time Reviewed

Origins Laboratory, Inc.

Jefe Pellegrini

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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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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)**

**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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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)**

Matrix Spike (B15K002-MS1)		Source: X511007-03			Prepared: 11/02/2015 Analyzed: 11/02/2015					
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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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)**

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			

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.

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Arvada CO 80003

John Cocroft  
Project Number: 014215195  
Project: KMG - HSR - Redmond - 63N  
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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Jen Pellegrini For Noelle Doyle Mathis, President