

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.

OGCC Employee: _____

Spill Complaint

Inspection NOAV

Tracking No: _____

CAUSE OF CONDITION BEING INVESTIGATED AND REMEDIATED

Spill or Release Plug & Abandon Central Facility Closure Site/Facility Closure Other (describe): _____

GENERAL INFORMATION

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

TECHNICAL CONDITIONS

Type of Waste Causing Impact (crude oil, condensate, produced water, etc.): Oil, Produced Water, and Condensate

Site Conditions: Is location within a sensitive area (according to Rule 901e)? Y N If yes, attach evaluation. Groundwater < 20 ft.

Adjacent land use (cultivated, irrigated, dry land farming, industrial, residential, etc.): Rangeland

Soil type, if not previously identified on Form 2A or Federal Surface Use Plan: Fine to medium grained sand

Potential receptors (water wells within 1/4 mi, surface waters, etc.): 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).

Description of Impact (if previously provided, refer to that form or document):

Impacted Media (check):	Extent of Impact:	How Determined:
<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	_____	_____

REMEDIATION WORKPLAN

Describe initial action taken (if previously provided, refer to that form or document):

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.

Describe how source is to be removed:

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 (>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.

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.

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.:

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.



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

REMEDIATION WORKPLAN (CONT.)

OGCC Employee: _____

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.

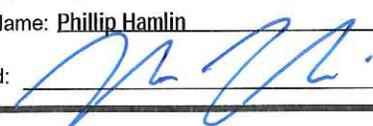
Describe reclamation plan. Discuss existing and new grade recontouring; method and testing of compaction alleviation; and reseeding program, including location of new seed, seed mix and noxious weed prevention. Attach diagram or drawing. Use additional sheet for description if required.
The site was restored to its pre-release grade. The Kerr-McGee facility was deconstructed.

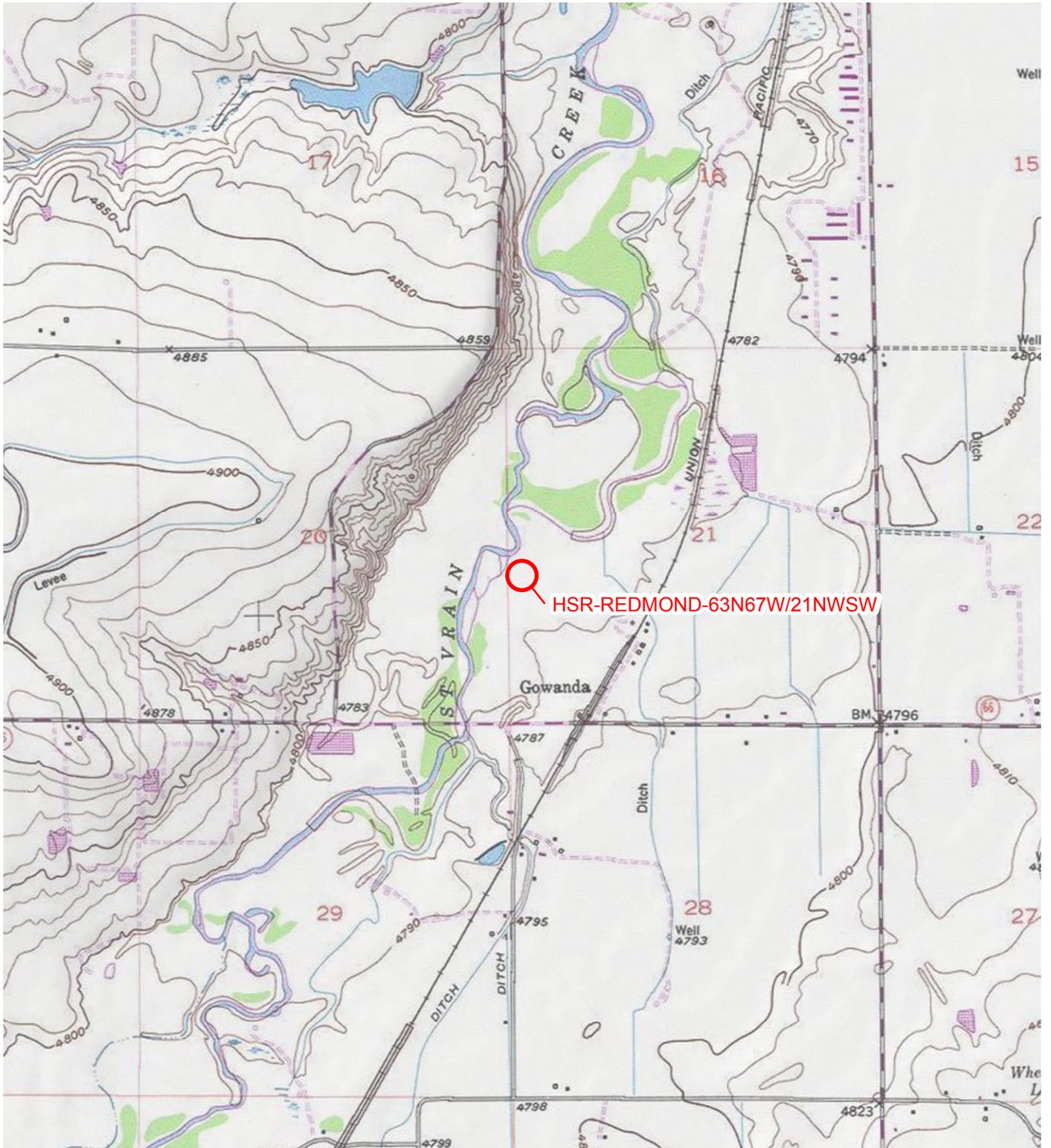
Attach samples and analytical results taken to verify remediation of impacts. Show locations of samples on an onsite schematic or drawing.
Is further site investigation required? Y N If yes, describe:
After installing the monitoring wells and establishing points of compliance, groundwater monitoring 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: _____



HSR-REDMOND-63N67W/21NWSW

LEGEND

 SITE LOCATION

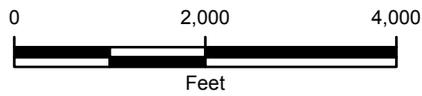
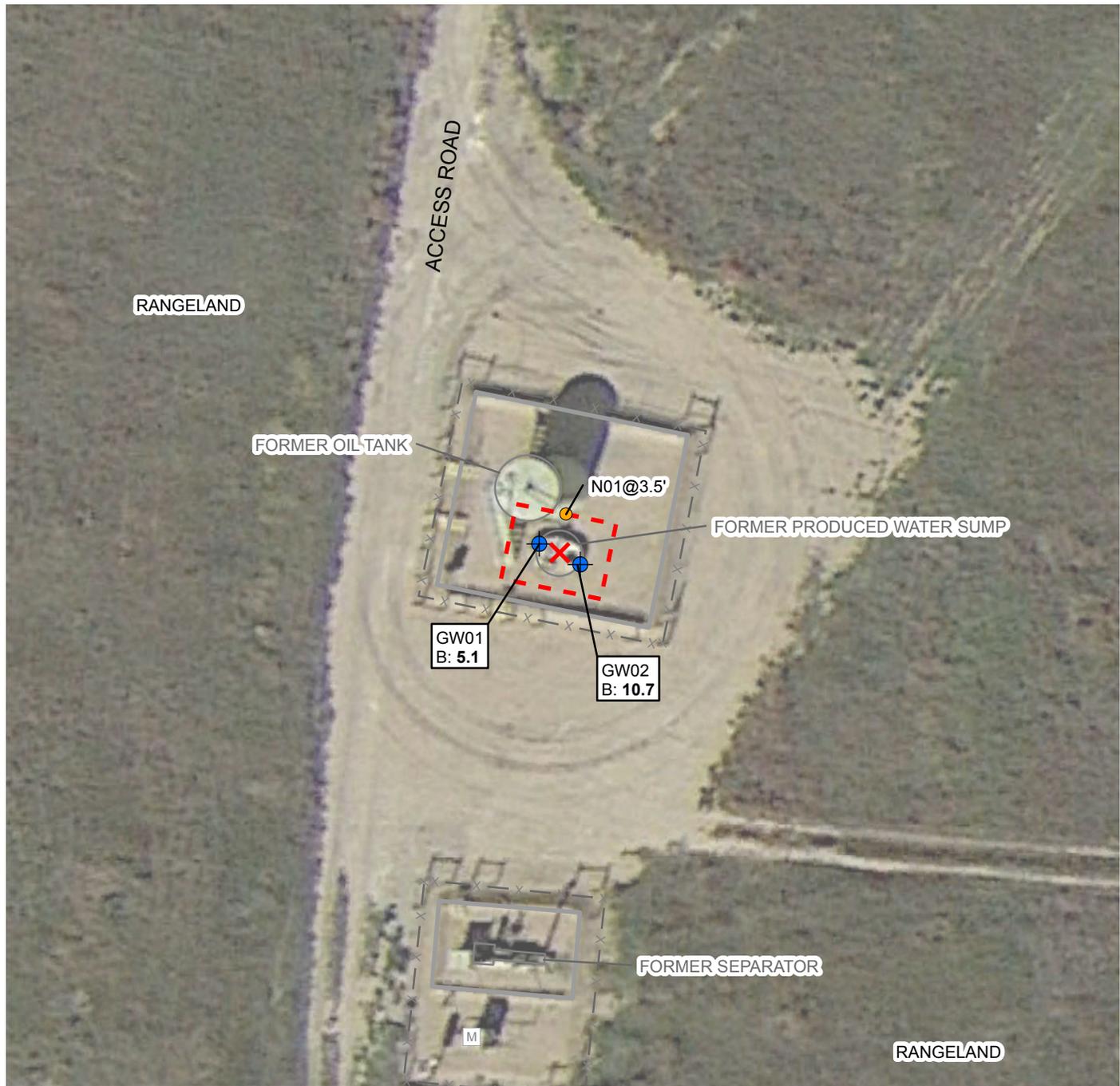


FIGURE 1
SITE LOCATION MAP
 HSR-REDMOND-63N67W/21NWSW
 NWSW SEC 21-T3N-R67W
 WELD COUNTY, COLORADO
 KERR-MCGEE OIL & GAS ONSHORE LP



IMAGE COURTESY OF ESRI/USGS



LEGEND

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

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

IMAGE COURTESY OF GOOGLE EARTH 2014

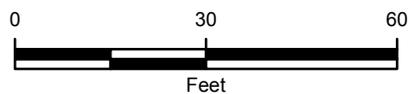


FIGURE 2
 EXCAVATION SITE MAP
 HSR-REDMOND-63N67W/21NWSW
 NWSW SEC 21-T3N-R67W
 WELD COUNTY, COLORADO
 KERR-MCGEE OIL & GAS ONSHORE LP



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
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-REDMOND-63N67W/21NWSW
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	10/30/2015	5.1	17.7	2.0	17.6	5.00
GW02	11/02/2015	10.7	30.8	<4.0	<4.0	5.00
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



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: T055

Requirement Description	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature between 0°C to ≤ 6°C ⁽¹⁾ ?	✓			
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 ⁽¹⁾ ?	✓			
Was adequate sample volume provided ⁽¹⁾ ?	✓			
Are short holding time analytes or samples with HTs due within 48 hours present ⁽¹⁾ ?	✗			PH
Is a chain-of-custody (COC) present and filled out completely ⁽¹⁾ ?	✓			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	✓			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	✓			
Is the COC properly relinquished by the client with date and time recorded ⁽¹⁾ ?	✓			
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 ⁽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)	✗			17cc
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.

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.



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

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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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			

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			

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 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.



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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.



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)

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.



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)

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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LT Environmental, Inc.
 4600 West 60th Avenue
 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
Batch 5J30015 - NO PREP										
Duplicate (5J30015-DUP1)		Source: X510368-02			Prepared: 10/30/2015 Analyzed: 10/30/2015					
pH	7.78		pH Units		8.29			6.35	25	
Batch 5J30016 - NO PREP										
Blank (5J30016-BLK1)		Prepared: 10/30/2015 Analyzed: 10/30/2015								
Specific Conductance (EC)	0.00350		mmhos/cm							
Duplicate (5J30016-DUP1)		Source: X510368-02			Prepared: 10/30/2015 Analyzed: 10/30/2015					
Specific Conductance (EC)	0.0526		mmhos/cm		0.0551			4.64	25	

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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

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.



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

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.
 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-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 ⁽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		
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 HNO ₃ , HCL, H ₂ SO ₄) / (pH >10 for samples preserved with NaAsO ₂ +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.

J. Pellegrini
 Reviewed by (Project Manager)

11/2/12
 Date/Time Reviewed

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: 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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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)

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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Jen Pellegrini For Noelle Doyle Mathis, President

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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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 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.



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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

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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