



May 1, 2017

Mr. Phil Hamlin, REM, CSEM
Senior HSE Representative
Kerr-McGee Oil & Gas Onshore LP
1099 18th Street, Suite 1800
Denver, Colorado 80202

**RE: Sump Closure Report
Wardell 3C-20HZ
API #05-123-35137
Location ID #336494
Remediation # 10777
SESW SEC 29-T3N-R65W
Weld County, Colorado**

Dear Mr. Hamlin:

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 soil samples, documenting field activities, and reviewing laboratory analytical results.

The objective of the soil sampling was to determine if petroleum hydrocarbon impact 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, soil sample locations, and sump excavation dimensions are depicted on the Excavation Site Map provided as Figure 1.

On March 3, 2017, following removal of the produced water sump, three soil samples were collected from the northern, eastern, and western sidewalls of the sump excavation. A liner was present beneath the sump at this site; therefore, no excavation base or south sidewall soil samples were collected. The soil samples were field-screened for volatile organic compounds using a photoionization detector (PID). PID headspace readings ranging from 4.1 to 3,621 parts per million were recorded for the soil samples. Odors were detected for all three soil samples. No staining was observed in the soil samples. Based on the field-screening results, the excavation sidewall samples (N01@3.5', E01@3.5', and W01@3.5') were submitted for laboratory analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) and total petroleum hydrocarbons (TPH)-gasoline range organics (GRO) by United States Environmental Protection Agency (USEPA) Method 8260C, TPH-diesel range organics (DRO) and oil range organics (ORO) by USEPA Method 8015C, pH by USEPA Method 9045D, and specific conductance (EC) by USEPA modified Method 9050A. Laboratory analytical results indicated that soil sample W01@3.5' exceeded the Colorado Oil and Gas Conservation Commission (COGCC) Table 910-1 allowable level for TPH at a concentration of 905 milligrams per kilogram. On March 8, 2017, following the



removal of impacted soil, an additional soil sample (W02@3.5') was collected from the western sidewall and submitted for laboratory analysis. The sidewall soil samples from the final excavation extent were compliant with COGCC Table 910-1 allowable levels for BTEX, TPH, pH, and EC. The soil sample analytical results are summarized in Table 1, and the laboratory analytical reports are attached.

Approximately 20 cubic yards of impacted soil were excavated and transported to the Kerr-McGee Aggregate Recycle Facility in Weld County, Colorado. The final sump excavation measured approximately 32 feet north to south by 26 feet east to west to an approximate depth of 5 feet below ground surface. Groundwater was not encountered in the excavation; however, water had accumulated due to retention by the liner and was not sampled. The produced water sump at this facility will be replaced.

LTE appreciates the opportunity to provide environmental services to Kerr-McGee. Please contact us at (303) 433-9788 if you have any questions regarding this Sump Closure Report or if you require additional information.

Sincerely,

LT ENVIRONMENTAL, INC.

A handwritten signature in blue ink that reads "Katharine Howe".

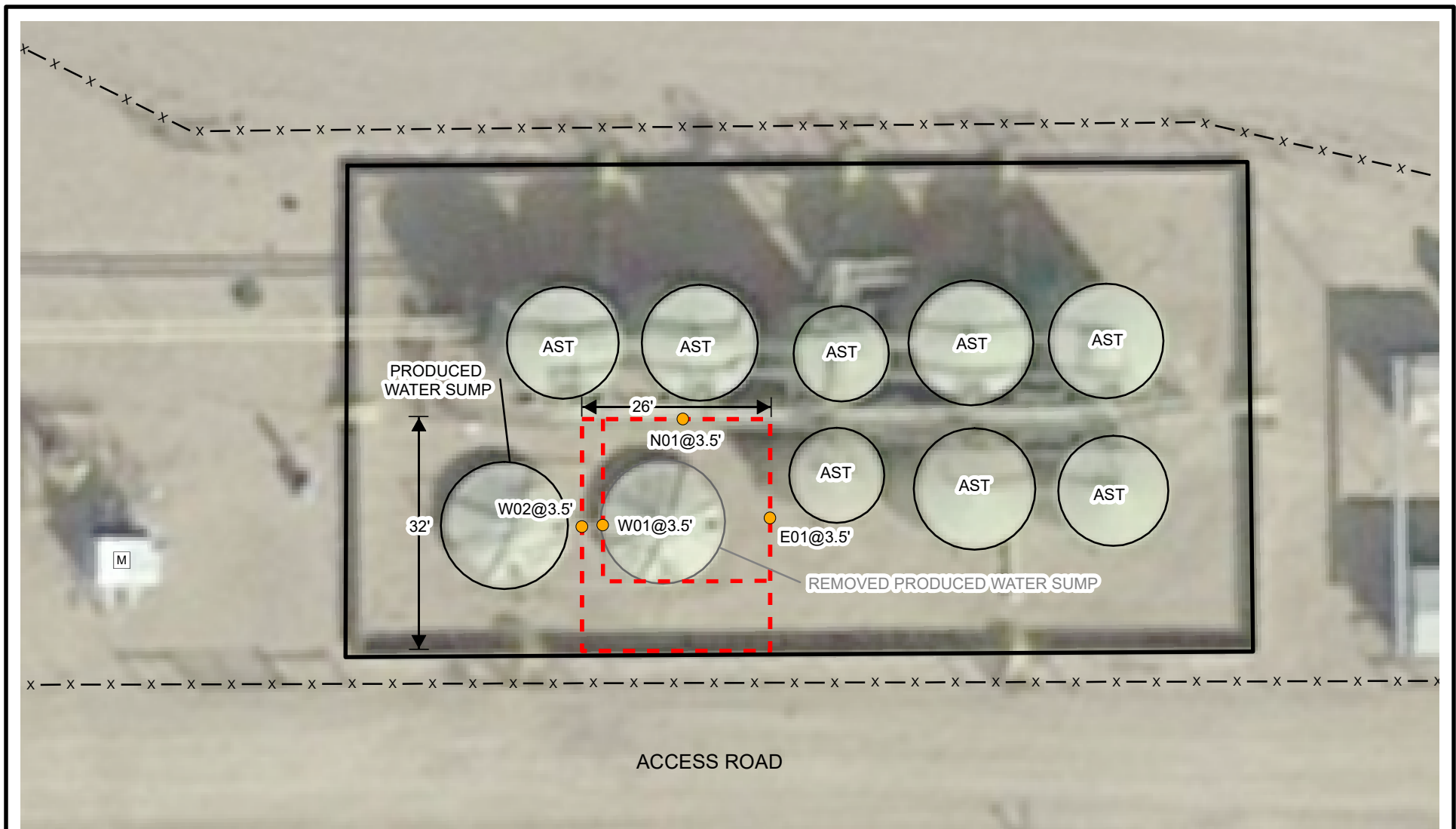
Katharine Howe, E.I.
Staff Engineer

A handwritten signature in blue ink that reads "Brian Sulzberger".

Brian Sulzberger, P.E., P.G.
Project Engineer

Attachments

ATTACHMENTS



LEGEND

- SOIL SAMPLE
- METER HOUSE
- FENCE
- EXCAVATION EXTENT
- BERM
- AST: ABOVEGROUND STORAGE TANK

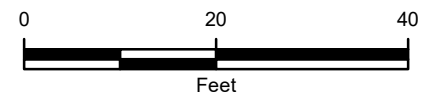


FIGURE 1
EXCAVATION SITE MAP
WARDELL 3C-20HZ
SESW SEC 29-T3N-R65W
WELD COUNTY, COLORADO
KERR-MCGEE OIL & GAS ONSHORE LP



TABLE 1
SOIL SAMPLE ANALYTICAL RESULTS
WARDELL 3C-20HZ
WELD COUNTY, COLORADO
KERR-MCGEE OIL & GAS ONSHORE LP

Soil Sample ID	Depth (bgs)	Date	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	DRO (mg/kg)	GRO (mg/kg)	ORO (mg/kg)	pH (su)	Specific Conductance (mmhos/cm)
E01@3.5'	3.5'	03/03/2017	0.008	0.005	0.012	0.218	<25.0	1.71	<100	8.51	0.105
N01@3.5'	3.5'	03/03/2017	0.017	0.018	0.013	0.197	<25.0	0.920	<100	8.55	0.0809
W01@3.5'	3.5'	03/03/2017	0.155	0.940	4.84	54.9	157	748	<100	8.48	0.0970
W02@3.5'	3.5'	03/08/2017	<0.002	<0.002	<0.002	<0.002	39.1	1.01	<100	8.02	0.127
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

TPH - total petroleum hydrocarbons

* - TPH standard applies to combined DRO-GRO-ORO

< - less than laboratory reporting limit

Bold indicates result exceeds allowable level.





March 06, 2017

LT Environmental, Inc.

Brian Sulzberger

4600 West 60th Avenue

Arvada

CO 80003

Project Name - KMG - Wardell 3L20-Hz

Project Number - 014217036

Attached are your analytical results for KMG - Wardell 3L20-Hz received by Origins Laboratory, Inc. March 03, 2017. This project is associated with Origins project number Y703065-01.

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

Brian Sulzberger
Project Number: 014217036
Project: KMG - Wardell 3L20-Hz

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
E01@3.5'	Y703065-01	Soil	March 3, 2017 15:25	03/03/2017 17:00
W01@3.5'	Y703065-02	Soil	March 3, 2017 15:30	03/03/2017 17:00
N01@3.5'	Y703065-04	Soil	March 3, 2017 15:40	03/03/2017 17:00

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.

Brian Sulzberger
Project Number: 014217036
Project: KMG - Wardell 3L20-Hz

ORIGINS
LABORATORY, INC

www.originslaboratory.com

X7 Y703065

page 1 of 1

Client: LTE
Address: 4600 W 60th Ave
Denver CO 80003
Telephone Number: 303-433-9788
Email Address: BSuleBee@lteu.com

Project Manager: Brian Sulzberger
Project Name: WARRIEN 3-2012
Project Number: 014217036
Samples Collected By: RL
ART PAUL SCHWARTZ NO# TBD

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix			Analysis			Sample Instructions		
				Unpreserved	HCl	HNO ₃	Other	Groundwater	Soil	As Summed Contaminant #	Other	GP E+ H2O2 D ₁₅	D ₁₅			D ₁₅
F01 @ 8.5'	3/3/17	1525	2	X				X				X	X	X	1	Hand Saw
W01 @ 3.5'		1530	2	X					X			X	X	X	2	Hand Saw
S01 @ 3.5'		1535	2	X					X						3	Hand All
N01 @ 3.5'		1540	2	X					X			X	X	X	4	Hand Saw
B401		1545	2	X					X						5	Hand All
															6	
															7	
															8	
															9	
															10	
Requisitioned By: <u>[Signature]</u>	Date: <u>3/3/2017</u>	Time: <u>1611</u>		Received By: <u>[Signature]</u>	Date: <u>3/3/17</u>	Time: <u>1611</u>										Turnaround Time: Same Day <input checked="" type="checkbox"/> 24 Hr <input type="checkbox"/>
Requisitioned By: <u>[Signature]</u>	Date: <u>3/3/2017</u>	Time: <u>1658</u>		Received By: <u>[Signature]</u>	Date: <u>3/3/17</u>	Time: <u>1700</u>										48 Hr <input type="checkbox"/> 72 Hr <input type="checkbox"/> Standard <input type="checkbox"/>

Temp Received: 16.8°C

Date Results Needed

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

Brian Sulzberger
Project Number: 014217036
Project: KMG - Wardell 3L20-Hz

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: Y703065

Client: LT Environmental

Client Project ID: Wardell 3L-20 Hz

Checklist Completed by: Joe Henderson

Shipped Via: UPS

Date/time completed: 3/5/17 16:17

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

Airbill #: NP

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

Cooler Number/Temperature: 1 / 16.8 °C 1 / _____ °C 1 / _____ °C (Describe)

Thermometer ID: 1063

Requirement Description	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature between 0°C to ≤ 6°C ⁽¹⁾ ?		<input checked="" type="checkbox"/>		Sampled Sunday
Is there ice present (document if blue ice is used)	<input checked="" type="checkbox"/>			
Are custody seals present on cooler? (if so, document in comments if they are signed and dated, broken or intact)		<input checked="" type="checkbox"/>		
Are custody seals present on each sample container? (if so, document in comments if they are signed and dated, broken or intact)		<input checked="" type="checkbox"/>		
Were all samples received intact ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Are short holding time analytes or samples with HTs due within 48 hours present ⁽¹⁾ ?	<input checked="" type="checkbox"/>			P#
Is a chain-of-custody (COC) present and filled out completely ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client with date and time recorded ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
For volatiles in water — is there headspace (> ¼ inch bubble) present? If yes, contact client and note in narrative.			<input checked="" type="checkbox"/>	
Are samples preserved that require preservation and was it checked ⁽¹⁾ ? (note ID of confirmation instrument used in comments) / (preservation is not confirmed for subcontracted analyses in order to insure sample integrity)/(pH <2 for samples preserved with HNO ₃ , HCL, H ₂ SO ₄) / (pH >10 for samples preserved with NaAsO ₂ +NaOH, ZnAc+NaOH)			<input checked="" type="checkbox"/>	
Additional Comments (if any):				

⁽¹⁾ If NO, then contact the client before proceeding with analysis and note date/time and person contacted as well as the corrective action to in the additional comments (above) and the case narrative.

Reviewed by (Project Manager)

Date/Time Reviewed 3/5/17

Origins Laboratory, Inc.



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

Brian Sulzberger
Project Number: 014217036
Project: KMG - Wardell 3L20-Hz

E01@3.5'

3/3/2017 3:25:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y703065-01 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	ND	25.0	mg/kg	1	B7C0502	03/05/2017	03/06/2017	U
Residual Range Organics (C28-C40)	ND	100	"	"	"	"	"	U

Surrogate: o-Terphenyl	84.3 %	59-131			"	"	"	
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GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	1.71	0.200	mg/kg	1	B7C0501	03/05/2017	03/06/2017	
Benzene	0.008	0.002	"	"	"	"	"	
Toluene	0.005	0.002	"	"	"	"	"	
Ethylbenzene	0.012	0.002	"	"	"	"	"	
Xylenes, total	0.218	0.002	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	107 %	70-130			"	"	"	
Surrogate: Toluene-d8	94.4 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	107 %	70-130			"	"	"	

pH in Soil by EPA 9045D

pH	8.51		pH Units	1	B7C0503	03/05/2017	03/05/2017	
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.105		mmhos/cm	"	B7C0504	03/05/2017	03/05/2017	
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Origins Laboratory, Inc.



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

Brian Sulzberger
Project Number: 014217036
Project: KMG - Wardell 3L20-Hz

W01@3.5'

3/3/2017 3:30:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y703065-02 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	157	25.0	mg/kg	1	B7C0502	03/05/2017	03/06/2017	
Residual Range Organics (C28-C40)	ND	100	"	"	"	"	"	U

Surrogate: o-Terphenyl	81.2 %	59-131			"	"	"	
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GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	748	50.0	mg/kg	250	B7C0501	03/05/2017	03/06/2017	
Benzene	0.155	0.050	"	25	"	"	03/06/2017	
Toluene	0.940	0.498	"	250	"	"	"	
Ethylbenzene	4.84	0.050	"	25	"	"	"	
Xylenes, total	54.9	0.498	"	250	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	101 %	70-130			"	"	"	
Surrogate: Toluene-d8	110 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	99.6 %	70-130			"	"	"	

pH in Soil by EPA 9045D

pH	8.48		pH Units	1	B7C0503	03/05/2017	03/05/2017	
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.0970		mmhos/cm	"	B7C0504	03/05/2017	03/05/2017	
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Origins Laboratory, Inc.



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

Brian Sulzberger
Project Number: 014217036
Project: KMG - Wardell 3L20-Hz

N01@3.5'

3/3/2017 3:40:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y703065-04 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	ND	25.0	mg/kg	1	B7C0502	03/05/2017	03/06/2017	U
Residual Range Organics (C28-C40)	ND	100	"	"	"	"	"	U

Surrogate: o-Terphenyl	85.8 %	59-131			"	"	"	
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GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	0.920	0.200	mg/kg	1	B7C0501	03/05/2017	03/06/2017	
Benzene	0.017	0.002	"	"	"	"	"	
Toluene	0.018	0.002	"	"	"	"	"	
Ethylbenzene	0.013	0.002	"	"	"	"	"	
Xylenes, total	0.197	0.002	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	112 %	70-130			"	"	"	
Surrogate: Toluene-d8	99.6 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	100 %	70-130			"	"	"	

pH in Soil by EPA 9045D

pH	8.55		pH Units	1	B7C0503	03/05/2017	03/05/2017	
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.0809		mmhos/cm	"	B7C0504	03/05/2017	03/05/2017	
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Origins Laboratory, Inc.



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

Brian Sulzberger
Project Number: 014217036
Project: KMG - Wardell 3L20-Hz

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 B7C0501 - EPA 5030 (soil)										
Blank (B7C0501-BLK1)					Prepared: 03/05/2017 Analyzed: 03/05/2017					
Gasoline Range Hydrocarbons	ND	0.200	mg/kg							U
Benzene	ND	0.002	"							U
Toluene	ND	0.002	"							U
Ethylbenzene	ND	0.002	"							U
Xylenes, total	ND	0.002	"							U
Surrogate: 1,2-Dichloroethane-d4	67		ug/kg	62.5		107	70-130			
Surrogate: Toluene-d8	65		"	62.5		103	70-130			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.2	70-130			

Origins Laboratory, Inc.



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

Brian Sulzberger
Project Number: 014217036
Project: KMG - Wardell 3L20-Hz

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 B7C0501 - EPA 5030 (soil)										
LCS (B7C0501-BS1)					Prepared: 03/05/2017 Analyzed: 03/05/2017					
Benzene	0.117	0.002	mg/kg	0.100		117	77.1-124			
Toluene	0.119	0.002	"	0.100		119	74.5-128			
Ethylbenzene	0.112	0.002	"	0.100		112	66.4-127			
m,p-Xylene	0.230	0.004	"	0.200		115	76.6-124			
o-Xylene	0.111	0.002	"	0.100		111	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	72		ug/kg	62.5		116	70-130			
Surrogate: Toluene-d8	65		"	62.5		103	70-130			
Surrogate: 4-Bromofluorobenzene	61		"	62.5		97.5	70-130			

Origins Laboratory, Inc.



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

Brian Sulzberger
Project Number: 014217036
Project: KMG - Wardell 3L20-Hz

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 B7C0501 - EPA 5030 (soil)

Matrix Spike (B7C0501-MS1)		Source: Y703059-01			Prepared: 03/05/2017 Analyzed: 03/05/2017					
Benzene	0.110	0.002	mg/kg	0.100	ND	110	71.8-126			
Toluene	0.113	0.002	"	0.100	ND	113	65.1-130			
Ethylbenzene	0.109	0.002	"	0.100	ND	109	62.2-130			
m,p-Xylene	0.223	0.004	"	0.200	ND	111	46.5-137			
o-Xylene	0.109	0.002	"	0.100	ND	109	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	57		ug/kg	62.5		90.8	70-130			
Surrogate: Toluene-d8	64		"	62.5		102	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		100	70-130			

Origins Laboratory, Inc.



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

Brian Sulzberger
Project Number: 014217036
Project: KMG - Wardell 3L20-Hz

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 B7C0501 - EPA 5030 (soil)										
Matrix Spike Dup (B7C0501-MSD1)		Source: Y703059-01			Prepared: 03/05/2017 Analyzed: 03/05/2017					
Benzene	0.104	0.002	mg/kg	0.100	ND	104	71.8-126	5.08	11.3	
Toluene	0.108	0.002	"	0.100	ND	108	65.1-130	4.17	15.4	
Ethylbenzene	0.103	0.002	"	0.100	ND	103	62.2-130	6.05	19.6	
m,p-Xylene	0.210	0.004	"	0.200	ND	105	46.5-137	6.03	19.2	
o-Xylene	0.103	0.002	"	0.100	ND	103	54.2-134	5.04	17.9	
Surrogate: 1,2-Dichloroethane-d4	58		ug/kg	62.5		93.1	70-130			
Surrogate: Toluene-d8	64		"	62.5		102	70-130			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.0	70-130			

Origins Laboratory, Inc.



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

Brian Sulzberger
Project Number: 014217036
Project: KMG - Wardell 3L20-Hz

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 B7C0502 - EPA 3580

Blank (B7C0502-BLK1)

Prepared: 03/05/2017 Analyzed: 03/05/2017

Diesel (C10-C28)	ND	50.0	mg/kg							U
Residual Range Organics (C28-C40)	ND	200	"							U
Surrogate: o-Terphenyl	47		"	50.0		93.1	59-131			

LCS (B7C0502-BS1)

Prepared: 03/05/2017 Analyzed: 03/05/2017

Diesel (C10-C28)	964	50.0	mg/kg	1000		96.4	64-121			
Residual Range Organics (C28-C40)	967	200	"	1000		96.7	58-124			
Surrogate: o-Terphenyl	46		"	50.0		91.8	59-131			

Matrix Spike (B7C0502-MS1)

Source: Y703059-01

Prepared: 03/05/2017 Analyzed: 03/05/2017

Diesel (C10-C28)	975	50.0	mg/kg	1000	13.2	96.2	53-125			
Residual Range Organics (C28-C40)	983	200	"	1000	ND	98.3	47-133			
Surrogate: o-Terphenyl	45		"	50.0		89.2	59-131			

Matrix Spike Dup (B7C0502-MSD1)

Source: Y703059-01

Prepared: 03/05/2017 Analyzed: 03/05/2017

Diesel (C10-C28)	990	50.0	mg/kg	1000	13.2	97.7	53-125	1.58	20	
Residual Range Organics (C28-C40)	998	200	"	1000	ND	99.8	47-133	1.49	20	
Surrogate: o-Terphenyl	45		"	50.0		89.6	59-131			

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

Brian Sulzberger
Project Number: 014217036
Project: KMG - Wardell 3L20-Hz

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 B7C0503 - NO PREP										
Duplicate (B7C0503-DUP1)		Source: Y703059-01			Prepared: 03/05/2017 Analyzed: 03/05/2017					
pH	9.38		pH Units		9.50			1.27	25	
Batch B7C0504 - NO PREP										
Blank (B7C0504-BLK1)		Prepared: 03/05/2017 Analyzed: 03/05/2017								
Specific Conductance (EC)	0.00320		mmhos/cm							
Duplicate (B7C0504-DUP1)		Source: Y703059-01			Prepared: 03/05/2017 Analyzed: 03/05/2017					
Specific Conductance (EC)	0.0648		mmhos/cm		0.0689			6.13	25	

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LT Environmental, Inc.

4600 West 60th Avenue

Arvada CO 80003

Brian Sulzberger

Project Number: 014217036

Project: KMG - Wardell 3L20-Hz

Notes and Definitions

U Sample is Non-Detect.

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.



March 09, 2017

LT Environmental, Inc.

Brian Sulzberger

4600 West 60th Avenue

Arvada

CO 80003

Project Name - KMG - Wardell 3L20-Hz

Project Number - 014217036

Attached are your analytical results for KMG - Wardell 3L20-Hz received by Origins Laboratory, Inc. March 08, 2017. This project is associated with Origins project number Y703124-01.

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

Brian Sulzberger

Project Number: 014217036

Project: KMG - Wardell 3L20-Hz

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
W02@3.5'	Y703124-01	Soil	March 8, 2017 15:30	03/08/2017 16:44

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.

Brian Sulzberger
Project Number: 014217036
Project: KMG - Wardell 3L20-Hz

ORIGINS

LABORATORY, INC

www.originslaboratory.com

Y703124

page 1 of 1

Client: LTE

Address: 4600 W 60th Ave

Arvode, CO 80003

Telephone Number: 303-433-9788

Email Address: bsulzberger@ltsu.com

Project Manager: Brian Sulzberger

Project Name: Wards 11 3C-20HZ

Project Number: 014217036

Samples Collected By: Michael Furthw

Attn: Paul Schwarz WO# 89249112

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative					Matrix			Analysis					Sample Instructions
				Unpreserved	HCl	HNO ₃	Other	Groundwater	Soil	Air Summa Canister #	Other	GC/MS	ICP/OES	FI	NC	SAR	
W02 @ 3.5'	3/8/17	1530	2	X					X			X	X	X	X	Hold SAR	1
																	2
																	3
																	4
																	5
																	6
																	7
																	8
																	9
																	10
Relinquished By: <u>Mar [Signature]</u>	Date: <u>3-8-2017</u>	Time: <u>1614</u>	Received By: <u>Paul [Signature]</u>	Date: <u>3-8-17</u>	Time: <u>1444</u>	Turnaround Time: Same Day <input checked="" type="checkbox"/> 24 Hr <input type="checkbox"/> 48 Hr <input type="checkbox"/> Standard <input type="checkbox"/>											
Relinquished By: _____	Date: _____	Time: _____	Received By: _____	Date: _____	Time: _____												

Temp Received: 11.6°C

Date Results Needed

Origins Laboratory, Inc.

Jeff Pellipini

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

Brian Sulzberger
Project Number: 014217036
Project: KMG - Wardell 3L20-Hz

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: Y203124

Client: KMG

Client Project ID: KMG - Wardell 3L20-Hz

Checklist Completed by: Don L

Shipped Via: HD

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

Date/time completed: 3-8-12 1651

Airbill #: ND

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

Cooler Number/Temperature: / / 11.6 °C / / °C / / °C (Describe) / °C

Thermometer ID: 1003

Requirement Description	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature between 0°C to ≤ 6°C ⁽¹⁾ ?		<input checked="" type="checkbox"/>		Sampled Same Day
Is there ice present (document if blue ice is used)	<input checked="" type="checkbox"/>			
Are custody seals present on cooler? (if so, document in comments if they are signed and dated, broken or intact)		<input checked="" type="checkbox"/>		
Are custody seals present on each sample container? (if so, document in comments if they are signed and dated, broken or intact)		<input checked="" type="checkbox"/>		
Were all samples received intact ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Are short holding time analytes or samples with HTs due within 48 hours present ⁽¹⁾ ?	<input checked="" type="checkbox"/>			pH
Is a chain-of-custody (COC) present and filled out completely ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client with date and time recorded ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
For volatiles in water – is there headspace (> ¼ inch bubble) present? If yes, contact client and note in narrative.			<input checked="" type="checkbox"/>	
Are samples preserved that require preservation and was it checked ⁽¹⁾ ? (note ID of confirmation instrument used in comments) / (preservation is not confirmed for subcontracted analyses in order to insure sample integrity)/(pH <2 for samples preserved with HNO ₃ , HCL, H ₂ SO ₄) / (pH >10 for samples preserved with NaAsO ₂ +NaOH, ZnAc+NaOH)		<input checked="" type="checkbox"/>		
Additional Comments (if any):				

⁽¹⁾If NO, then contact the client before proceeding with analysis and note date/time and person contacted as well as the corrective action to in the additional comments (above) and the case narrative.

Reviewed by (Project Manager)

3-8-12 1652
Date/Time Reviewed

Origins Laboratory, Inc.

Jefe Pellegrini

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

Brian Sulzberger
Project Number: 014217036
Project: KMG - Wardell 3L20-Hz

W02@3.5'
3/8/2017 3:30:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y703124-01 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	39.1	25.0	mg/kg	1	B7C0807	03/08/2017	03/09/2017	
Residual Range Organics (C28-C40)	ND	100	"	"	"	"	"	U

Surrogate: o-Terphenyl	87.9 %	59-131			"	"	"	
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GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	1.01	0.200	mg/kg	1	B7C0802	03/08/2017	03/09/2017	
Benzene	ND	0.002	"	"	"	"	"	U
Toluene	ND	0.002	"	"	"	"	"	U
Ethylbenzene	ND	0.002	"	"	"	"	"	U
Xylenes, total	ND	0.002	"	"	"	"	"	U

Surrogate: 1,2-Dichloroethane-d4	112 %	70-130			"	"	"	
Surrogate: Toluene-d8	96.8 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	101 %	70-130			"	"	"	

pH in Soil by EPA 9045D

pH	8.02		pH Units	1	B7C0808	03/08/2017	03/08/2017	
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.127		mmhos/cm	"	B7C0809	03/08/2017	03/08/2017	
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Origins Laboratory, Inc.



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

Brian Sulzberger
Project Number: 014217036
Project: KMG - Wardell 3L20-Hz

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 B7C0802 - EPA 5030 (soil)										
Blank (B7C0802-BLK1)					Prepared: 03/08/2017 Analyzed: 03/08/2017					
Gasoline Range Hydrocarbons	ND	0.200	mg/kg							U
Benzene	ND	0.002	"							U
Toluene	ND	0.002	"							U
Ethylbenzene	ND	0.002	"							U
Xylenes, total	ND	0.002	"							U
Surrogate: 1,2-Dichloroethane-d4	64		ug/kg	62.5		103	70-130			
Surrogate: Toluene-d8	64		"	62.5		102	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		100	70-130			

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

Brian Sulzberger
Project Number: 014217036
Project: KMG - Wardell 3L20-Hz

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 B7C0802 - EPA 5030 (soil)										
Blank (B7C0802-BLK2)					Prepared: 03/08/2017 Analyzed: 03/08/2017					
Gasoline Range Hydrocarbons	ND	0.200	mg/kg							U
Benzene	ND	0.002	"							U
Toluene	ND	0.002	"							U
Ethylbenzene	ND	0.002	"							U
Xylenes, total	ND	0.002	"							U
Surrogate: 1,2-Dichloroethane-d4	68		ug/kg	62.5		108	70-130			
Surrogate: Toluene-d8	64		"	62.5		102	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	70-130			

Origins Laboratory, Inc.



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Arvada CO 80003

Brian Sulzberger
Project Number: 014217036
Project: KMG - Wardell 3L20-Hz

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 B7C0802 - EPA 5030 (soil)										
Blank (B7C0802-BLK3)					Prepared: 03/08/2017 Analyzed: 03/08/2017					
Gasoline Range Hydrocarbons	ND	0.200	mg/kg							U
Benzene	ND	0.002	"							U
Toluene	ND	0.002	"							U
Ethylbenzene	ND	0.002	"							U
Xylenes, total	ND	0.002	"							U
Surrogate: 1,2-Dichloroethane-d4	66		ug/kg	62.5		106	70-130			
Surrogate: Toluene-d8	63		"	62.5		101	70-130			
Surrogate: 4-Bromofluorobenzene	61		"	62.5		97.8	70-130			

Origins Laboratory, Inc.



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

Brian Sulzberger
Project Number: 014217036
Project: KMG - Wardell 3L20-Hz

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 B7C0802 - EPA 5030 (soil)										
Blank (B7C0802-BLK4)					Prepared: 03/08/2017 Analyzed: 03/08/2017					
Gasoline Range Hydrocarbons	ND	0.200	mg/kg							U
Benzene	ND	0.002	"							U
Toluene	ND	0.002	"							U
Ethylbenzene	ND	0.002	"							U
Xylenes, total	ND	0.002	"							U
Surrogate: 1,2-Dichloroethane-d4	68		ug/kg	62.5		109	70-130			
Surrogate: Toluene-d8	63		"	62.5		101	70-130			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		98.8	70-130			

Origins Laboratory, Inc.



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

Brian Sulzberger
Project Number: 014217036
Project: KMG - Wardell 3L20-Hz

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 B7C0802 - EPA 5030 (soil)										
LCS (B7C0802-BS1)					Prepared: 03/08/2017 Analyzed: 03/08/2017					
Benzene	0.115	0.002	mg/kg	0.100		115	77.1-124			
Toluene	0.114	0.002	"	0.100		114	74.5-128			
Ethylbenzene	0.110	0.002	"	0.100		110	66.4-127			
m,p-Xylene	0.229	0.004	"	0.200		114	76.6-124			
o-Xylene	0.108	0.002	"	0.100		108	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	62		ug/kg	62.5		99.2	70-130			
Surrogate: Toluene-d8	64		"	62.5		102	70-130			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.7	70-130			

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

Brian Sulzberger
Project Number: 014217036
Project: KMG - Wardell 3L20-Hz

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 B7C0802 - EPA 5030 (soil)										
LCS (B7C0802-BS2)					Prepared: 03/08/2017 Analyzed: 03/08/2017					
Benzene	0.111	0.002	mg/kg	0.100		111	77.1-124			
Toluene	0.111	0.002	"	0.100		111	74.5-128			
Ethylbenzene	0.109	0.002	"	0.100		109	66.4-127			
m,p-Xylene	0.229	0.004	"	0.200		114	76.6-124			
o-Xylene	0.112	0.002	"	0.100		112	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	65		ug/kg	62.5		104	70-130			
Surrogate: Toluene-d8	64		"	62.5		103	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	70-130			

Origins Laboratory, Inc.



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

Brian Sulzberger
Project Number: 014217036
Project: KMG - Wardell 3L20-Hz

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 B7C0802 - EPA 5030 (soil)										
LCS (B7C0802-BS3)					Prepared: 03/08/2017 Analyzed: 03/08/2017					
Benzene	0.107	0.002	mg/kg	0.100		107	77.1-124			
Toluene	0.105	0.002	"	0.100		105	74.5-128			
Ethylbenzene	0.102	0.002	"	0.100		102	66.4-127			
m,p-Xylene	0.210	0.004	"	0.200		105	76.6-124			
o-Xylene	0.105	0.002	"	0.100		105	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	68		ug/kg	62.5		108	70-130			
Surrogate: Toluene-d8	64		"	62.5		102	70-130			
Surrogate: 4-Bromofluorobenzene	61		"	62.5		97.2	70-130			

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

Brian Sulzberger
Project Number: 014217036
Project: KMG - Wardell 3L20-Hz

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 B7C0802 - EPA 5030 (soil)										
LCS (B7C0802-BS4)					Prepared: 03/08/2017 Analyzed: 03/08/2017					
Benzene	0.106	0.002	mg/kg	0.100		106	77.1-124			
Toluene	0.103	0.002	"	0.100		103	74.5-128			
Ethylbenzene	0.101	0.002	"	0.100		101	66.4-127			
m,p-Xylene	0.210	0.004	"	0.200		105	76.6-124			
o-Xylene	0.104	0.002	"	0.100		104	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	67		ug/kg	62.5		107	70-130			
Surrogate: Toluene-d8	63		"	62.5		101	70-130			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.6	70-130			

Origins Laboratory, Inc.



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

Brian Sulzberger
Project Number: 014217036
Project: KMG - Wardell 3L20-Hz

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 B7C0802 - EPA 5030 (soil)

Matrix Spike (B7C0802-MS1)		Source: Y703051-01			Prepared: 03/08/2017 Analyzed: 03/08/2017					
Benzene	0.107	0.002	mg/kg	0.100	ND	107	71.8-126			
Toluene	0.107	0.002	"	0.100	ND	107	65.1-130			
Ethylbenzene	0.102	0.002	"	0.100	ND	102	62.2-130			
m,p-Xylene	0.214	0.004	"	0.200	ND	107	46.5-137			
o-Xylene	0.106	0.002	"	0.100	ND	106	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	63		ug/kg	62.5		101	70-130			
Surrogate: Toluene-d8	65		"	62.5		103	70-130			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.3	70-130			

Origins Laboratory, Inc.



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

Brian Sulzberger
Project Number: 014217036
Project: KMG - Wardell 3L20-Hz

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 B7C0802 - EPA 5030 (soil)

Matrix Spike (B7C0802-MS2)		Source: Y703051-02			Prepared: 03/08/2017 Analyzed: 03/08/2017					
Benzene	0.114	0.002	mg/kg	0.100	ND	114	71.8-126			
Toluene	0.113	0.002	"	0.100	ND	113	65.1-130			
Ethylbenzene	0.110	0.002	"	0.100	ND	110	62.2-130			
m,p-Xylene	0.229	0.004	"	0.200	ND	115	46.5-137			
o-Xylene	0.112	0.002	"	0.100	ND	112	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	62		ug/kg	62.5		99.3	70-130			
Surrogate: Toluene-d8	64		"	62.5		103	70-130			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.6	70-130			

Origins Laboratory, Inc.



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

Brian Sulzberger
Project Number: 014217036
Project: KMG - Wardell 3L20-Hz

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 B7C0802 - EPA 5030 (soil)

Matrix Spike (B7C0802-MS3)		Source: Y703051-03			Prepared: 03/08/2017 Analyzed: 03/09/2017					
Benzene	0.104	0.002	mg/kg	0.100	ND	104	71.8-126			
Toluene	0.104	0.002	"	0.100	ND	104	65.1-130			
Ethylbenzene	0.100	0.002	"	0.100	ND	100	62.2-130			
m,p-Xylene	0.206	0.004	"	0.200	ND	103	46.5-137			
o-Xylene	0.104	0.002	"	0.100	ND	104	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	63		ug/kg	62.5		101	70-130			
Surrogate: Toluene-d8	65		"	62.5		103	70-130			
Surrogate: 4-Bromofluorobenzene	61		"	62.5		97.6	70-130			

Origins Laboratory, Inc.



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

Brian Sulzberger
Project Number: 014217036
Project: KMG - Wardell 3L20-Hz

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 B7C0802 - EPA 5030 (soil)

Matrix Spike (B7C0802-MS4)		Source: Y703130-01			Prepared: 03/08/2017 Analyzed: 03/09/2017					
Benzene	0.105	0.002	mg/kg	0.100	ND	105	71.8-126			
Toluene	0.102	0.002	"	0.100	ND	102	65.1-130			
Ethylbenzene	0.097	0.002	"	0.100	ND	96.5	62.2-130			
m,p-Xylene	0.199	0.004	"	0.200	ND	99.7	46.5-137			
o-Xylene	0.101	0.002	"	0.100	ND	101	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	68		ug/kg	62.5		109	70-130			
Surrogate: Toluene-d8	63		"	62.5		100	70-130			
Surrogate: 4-Bromofluorobenzene	61		"	62.5		97.7	70-130			

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Project: KMG - Wardell 3L20-Hz

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 B7C0802 - EPA 5030 (soil)

Matrix Spike Dup (B7C0802-MSD1)		Source: Y703051-01			Prepared: 03/08/2017 Analyzed: 03/08/2017					
Benzene	0.114	0.002	mg/kg	0.100	ND	114	71.8-126	6.92	11.3	
Toluene	0.114	0.002	"	0.100	ND	114	65.1-130	7.02	15.4	
Ethylbenzene	0.111	0.002	"	0.100	ND	111	62.2-130	7.64	19.6	
m,p-Xylene	0.231	0.004	"	0.200	ND	116	46.5-137	7.67	19.2	
o-Xylene	0.115	0.002	"	0.100	ND	115	54.2-134	7.74	17.9	
Surrogate: 1,2-Dichloroethane-d4	64		ug/kg	62.5		102	70-130			
Surrogate: Toluene-d8	64		"	62.5		103	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		100	70-130			

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Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B7C0802 - EPA 5030 (soil)										
Matrix Spike Dup (B7C0802-MSD2)					Source: Y703051-02					Prepared: 03/08/2017 Analyzed: 03/08/2017
Benzene	0.104	0.002	mg/kg	0.100	ND	104	71.8-126	9.69	11.3	
Toluene	0.105	0.002	"	0.100	ND	105	65.1-130	7.31	15.4	
Ethylbenzene	0.100	0.002	"	0.100	ND	100	62.2-130	9.38	19.6	
m,p-Xylene	0.205	0.004	"	0.200	ND	103	46.5-137	11.0	19.2	
o-Xylene	0.101	0.002	"	0.100	ND	101	54.2-134	10.1	17.9	
Surrogate: 1,2-Dichloroethane-d4	64		ug/kg	62.5		103	70-130			
Surrogate: Toluene-d8	65		"	62.5		103	70-130			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		98.9	70-130			

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Project: KMG - Wardell 3L20-Hz

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 B7C0802 - EPA 5030 (soil)										
Matrix Spike Dup (B7C0802-MSD3)					Source: Y703051-03					Prepared: 03/08/2017 Analyzed: 03/09/2017
Benzene	0.112	0.002	mg/kg	0.100	ND	112	71.8-126	7.32	11.3	
Toluene	0.111	0.002	"	0.100	ND	111	65.1-130	6.88	15.4	
Ethylbenzene	0.107	0.002	"	0.100	ND	107	62.2-130	6.70	19.6	
m,p-Xylene	0.225	0.004	"	0.200	ND	112	46.5-137	8.83	19.2	
o-Xylene	0.111	0.002	"	0.100	ND	111	54.2-134	7.13	17.9	
Surrogate: 1,2-Dichloroethane-d4	59		ug/kg	62.5		95.0	70-130			
Surrogate: Toluene-d8	64		"	62.5		103	70-130			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		100	70-130			

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Project: KMG - Wardell 3L20-Hz

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 B7C0802 - EPA 5030 (soil)										
Matrix Spike Dup (B7C0802-MSD4)		Source: Y703130-01			Prepared: 03/08/2017 Analyzed: 03/09/2017					
Benzene	0.103	0.002	mg/kg	0.100	ND	103	71.8-126	2.04	11.3	
Toluene	0.103	0.002	"	0.100	ND	103	65.1-130	0.960	15.4	
Ethylbenzene	0.095	0.002	"	0.100	ND	95.3	62.2-130	1.29	19.6	
m,p-Xylene	0.196	0.004	"	0.200	ND	98.2	46.5-137	1.46	19.2	
o-Xylene	0.099	0.002	"	0.100	ND	98.8	54.2-134	2.60	17.9	
Surrogate: 1,2-Dichloroethane-d4	68		ug/kg	62.5		108	70-130			
Surrogate: Toluene-d8	63		"	62.5		101	70-130			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.2	70-130			

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Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Extractable Petroleum Hydrocarbons by 8015C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B7C0807 - EPA 3550B

Blank (B7C0807-BLK1)

Prepared: 03/08/2017 Analyzed: 03/08/2017

Diesel (C10-C28)	ND	50.0	mg/kg							U
Residual Range Organics (C28-C40)	ND	200	"							U
Surrogate: o-Terphenyl	53		"	50.0		106	59-131			

Blank (B7C0807-BLK2)

Prepared: 03/08/2017 Analyzed: 03/08/2017

Diesel (C10-C28)	ND	50.0	mg/kg							U
Residual Range Organics (C28-C40)	ND	200	"							U
Surrogate: o-Terphenyl	49		"	50.0		98.9	59-131			

Blank (B7C0807-BLK3)

Prepared: 03/08/2017 Analyzed: 03/08/2017

Diesel (C10-C28)	ND	50.0	mg/kg							U
Residual Range Organics (C28-C40)	ND	200	"							U
Surrogate: o-Terphenyl	44		"	50.0		87.0	59-131			

LCS (B7C0807-BS1)

Prepared: 03/08/2017 Analyzed: 03/08/2017

Diesel (C10-C28)	983	50.0	mg/kg	1000		98.3	64-121			
Residual Range Organics (C28-C40)	1000	200	"	1000		100	58-124			
Surrogate: o-Terphenyl	49		"	50.0		97.4	59-131			

LCS (B7C0807-BS2)

Prepared: 03/08/2017 Analyzed: 03/08/2017

Diesel (C10-C28)	961	50.0	mg/kg	1000		96.1	64-121			
Residual Range Organics (C28-C40)	968	200	"	1000		96.8	58-124			

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Project Number: 014217036
Project: KMG - Wardell 3L20-Hz

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
Batch B7C0807 - EPA 3550B										
LCS (B7C0807-BS2)					Prepared: 03/08/2017 Analyzed: 03/08/2017					
Surrogate: o-Terphenyl	49		mg/kg	50.0		97.9	59-131			
LCS (B7C0807-BS3)					Prepared: 03/08/2017 Analyzed: 03/08/2017					
Diesel (C10-C28)	959	50.0	mg/kg	1000		95.9	64-121			
Residual Range Organics (C28-C40)	964	200	"	1000		96.4	58-124			
Surrogate: o-Terphenyl	49		"	50.0		98.7	59-131			
Matrix Spike (B7C0807-MS1)					Source: Y703121-01		Prepared: 03/08/2017 Analyzed: 03/08/2017			
Diesel (C10-C28)	925	50.0	mg/kg	1000	19.7	90.6	53-125			
Residual Range Organics (C28-C40)	991	200	"	1000	ND	99.1	47-133			
Surrogate: o-Terphenyl	46		"	50.0		92.7	59-131			
Matrix Spike (B7C0807-MS2)					Source: Y703121-02		Prepared: 03/08/2017 Analyzed: 03/08/2017			
Diesel (C10-C28)	943	50.0	mg/kg	1000	25.8	91.8	53-125			
Residual Range Organics (C28-C40)	988	200	"	1000	ND	98.8	47-133			
Surrogate: o-Terphenyl	48		"	50.0		95.2	59-131			
Matrix Spike (B7C0807-MS3)					Source: Y703121-03		Prepared: 03/08/2017 Analyzed: 03/08/2017			
Diesel (C10-C28)	920	50.0	mg/kg	1000	21.4	89.9	53-125			
Residual Range Organics (C28-C40)	1160	200	"	1000	ND	116	47-133			
Surrogate: o-Terphenyl	110		"	100		107	59-131			
Matrix Spike Dup (B7C0807-MSD1)					Source: Y703121-01		Prepared: 03/08/2017 Analyzed: 03/08/2017			
Diesel (C10-C28)	893	50.0	mg/kg	1000	19.7	87.4	53-125	3.59	20	
Residual Range Organics (C28-C40)	946	200	"	1000	ND	94.6	47-133	4.64	20	
Surrogate: o-Terphenyl	48		"	50.0		96.3	59-131			
Matrix Spike Dup (B7C0807-MSD2)					Source: Y703121-02		Prepared: 03/08/2017 Analyzed: 03/08/2017			

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Brian Sulzberger
Project Number: 014217036
Project: KMG - Wardell 3L20-Hz

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
Batch B7C0807 - EPA 3550B										
Matrix Spike Dup (B7C0807-MSD2)			Source: Y703121-02		Prepared: 03/08/2017 Analyzed: 03/08/2017					
Diesel (C10-C28)	941	50.0	mg/kg	1000	25.8	91.6	53-125	0.224	20	
Residual Range Organics (C28-C40)	1010	200	"	1000	ND	101	47-133	2.04	20	
Surrogate: o-Terphenyl	47		"	50.0		93.7	59-131			
Matrix Spike Dup (B7C0807-MSD3)			Source: Y703121-03		Prepared: 03/08/2017 Analyzed: 03/08/2017					
Diesel (C10-C28)	879	50.0	mg/kg	1000	21.4	85.8	53-125	4.71	20	
Residual Range Organics (C28-C40)	1080	200	"	1000	ND	108	47-133	6.98	20	
Surrogate: o-Terphenyl	54		"	50.0		108	59-131			

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Classical Chemistry Parameters - Quality Control Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B7C0808 - NO PREP										
Duplicate (B7C0808-DUP1)	Source: Y703121-01				Prepared: 03/08/2017 Analyzed: 03/08/2017					
pH	8.23		pH Units		8.16			0.854	25	
Duplicate (B7C0808-DUP2)	Source: Y703128-01				Prepared: 03/08/2017 Analyzed: 03/08/2017					
pH	8.85		pH Units		8.98			1.46	25	
Batch B7C0809 - NO PREP										
Blank (B7C0809-BLK1)					Prepared: 03/08/2017 Analyzed: 03/08/2017					
Specific Conductance (EC)	0.00330		mmhos/cm							
Blank (B7C0809-BLK2)					Prepared: 03/08/2017 Analyzed: 03/08/2017					
Specific Conductance (EC)	0.00330		mmhos/cm							
Duplicate (B7C0809-DUP1)	Source: Y703121-01				Prepared: 03/08/2017 Analyzed: 03/08/2017					
Specific Conductance (EC)	0.224		mmhos/cm		0.213			5.03	25	
Duplicate (B7C0809-DUP2)	Source: Y703128-01				Prepared: 03/08/2017 Analyzed: 03/08/2017					
Specific Conductance (EC)	0.166		mmhos/cm		0.148			11.4	25	

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Notes and Definitions

U Sample is Non-Detect.

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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