

TABLE 1
SOIL SAMPLE ANALYTICAL RESULTS
SHAHER 21-25, BADDING USX W25-06
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)
B01@2'	2'	04/17/2017	0.002	0.008	0.008	0.017	27.7	0.782	<100	7.48	0.0140
B02@2'	2'	04/17/2017	0.004	0.004	<0.002	<0.002	<25.0	<0.200	<100	7.45	0.0149
B03@6'	6'	04/17/2017	<0.002	<0.002	<0.002	<0.002	<25.0	<0.200	<100	9.00	0.121
E01@5'	5'	04/17/2017	<0.002	<0.002	<0.002	<0.002	30.4	<0.200	<100	8.80	0.0785
N01@5'	5'	04/17/2017	<0.002	<0.002	<0.002	<0.002	<25.0	<0.200	<100	8.81	0.0880
S01@5'	5'	04/17/2017	<0.002	<0.002	<0.002	<0.002	151	0.326	<100	8.48	0.0703
W01@5'	5'	04/17/2017	<0.002	<0.002	<0.002	<0.002	611	2.25	241	9.33 †	0.0916
W02@5'	5'	04/18/2017	<0.002	<0.002	<0.002	<0.002	<25.0	<0.200	<100	9.27 †	0.100
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
† - Sample was collected below the designated root zone (>3' bgs)
* - TPH standard applies to combined DRO-GRO-ORO
< - less than laboratory reporting limit
Bold indicates result exceeds allowable level.





April 18, 2017

LT Environmental, Inc.

Brian Sulzberger

4600 West 60th Avenue

Arvada

CO 80003

Project Name - KMG - Shafer 21-25 Badding USX W 25-06 **Project Number - 014217073**

Attached are your analytical results for KMG - Shafer 21-25 Badding USX W 25-06 received by Origins Laboratory, Inc. April 17, 2017. This project is associated with Origins project number Y704197-01.

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: 014217073
Project: KMG - Shafer 21-25 Badding USX W
25-06

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B01@2'	Y704197-01	Soil	April 17, 2017 14:00	04/17/2017 15:38
B02@2'	Y704197-02	Soil	April 17, 2017 14:05	04/17/2017 15:38
B03@6'	Y704197-03	Soil	April 17, 2017 14:10	04/17/2017 15:38
N01@5'	Y704197-04	Soil	April 17, 2017 14:15	04/17/2017 15:38
E01@5'	Y704197-05	Soil	April 17, 2017 14:20	04/17/2017 15:38
S01@5'	Y704197-06	Soil	April 17, 2017 14:25	04/17/2017 15:38
W01@5'	Y704197-07	Soil	April 17, 2017 14:30	04/17/2017 15:38

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: 014217073
Project: KMG - Shafer 21-25 Badding USX W
25-06

[illegible]

Origins Laboratory, Inc.

Jeff Pellipini

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

Brian Sulzberger
Project Number: 014217073
Project: KMG - Shafer 21-25 Badding USX W 25-06

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: 4-104197

Client: LT

Client Project ID: KMG-Shafer 21-25 Badding USX W 25-06

Checklist Completed by: DM Lu

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

Date/time completed: 4-17-12 1547

Airbill #: NR

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

Cooler Number/Temperature: 1 / 41.3 °C _____ / _____ °C _____ / _____ °C (Describe)

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"/>	<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 ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was adequate sample volume provided ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are short holding time analytes or samples with HTs due within 48 hours present ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	pH
Is a chain-of-custody (COC) present and filled out completely ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is the COC properly relinquished by the client with date and time recorded ⁽¹⁾ ?	<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 type="checkbox"/>	<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 type="checkbox"/>	<input checked="" type="checkbox"/>	<input 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) DM Lu

4-17-12 1548
Date/Time Reviewed

Origins Laboratory, Inc.

Jen 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: 014217073
Project: KMG - Shafer 21-25 Badding USX W
25-06

B01@2'
4/17/2017 2:00:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y704197-01 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	27.7	25.0	mg/kg	1	B7D1703	04/17/2017	04/17/2017	
Residual Range Organics (C28-C40)	ND	100	"	"	"	"	"	U

Surrogate: o-Terphenyl	75.2 %	59-131			"	"	"	
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GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	0.782	0.200	mg/kg	1	B7D1702	04/17/2017	04/17/2017	
Benzene	0.002	0.002	"	"	"	"	"	
Toluene	0.008	0.002	"	"	"	"	"	
Ethylbenzene	0.008	0.002	"	"	"	"	"	
Xylenes, total	0.017	0.002	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	88.4 %	70-130			"	"	"	
Surrogate: Toluene-d8	95.1 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	86.8 %	70-130			"	"	"	

pH in Soil by EPA 9045D

pH	7.48		pH Units	1	B7D1705	04/17/2017	04/17/2017	
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.0140		mmhos/cm	"	B7D1706	"	04/17/2017	
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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: 014217073
Project: KMG - Shafer 21-25 Badding USX W
25-06

B02@2'
4/17/2017 2:05:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y704197-02 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	ND	25.0	mg/kg	1	B7D1703	04/17/2017	04/17/2017	U
Residual Range Organics (C28-C40)	ND	100	"	"	"	"	"	U

Surrogate: o-Terphenyl 78.0 % 59-131 " " "

GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	B7D1702	04/17/2017	04/17/2017	U
Benzene	0.004	0.002	"	"	"	"	"	
Toluene	0.004	0.002	"	"	"	"	"	
Ethylbenzene	ND	0.002	"	"	"	"	"	U
Xylenes, total	ND	0.002	"	"	"	"	"	U

Surrogate: 1,2-Dichloroethane-d4 87.0 % 70-130 " " "
Surrogate: Toluene-d8 94.3 % 70-130 " " "
Surrogate: 4-Bromofluorobenzene 83.9 % 70-130 " " "

pH in Soil by EPA 9045D

pH	7.45		pH Units	1	B7D1705	04/17/2017	04/17/2017	
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.0149		mmhos/cm	"	B7D1706	"	04/17/2017	
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LT Environmental, Inc.
4600 West 60th Avenue
Arvada CO 80003

Brian Sulzberger
Project Number: 014217073
Project: KMG - Shafer 21-25 Badding USX W
25-06

B03@6'

4/17/2017 2:10:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y704197-03 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	ND	25.0	mg/kg	1	B7D1703	04/17/2017	04/17/2017	U
Residual Range Organics (C28-C40)	ND	100	"	"	"	"	"	U

Surrogate: o-Terphenyl 59.8 % 59-131 " " "

GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	B7D1702	04/17/2017	04/17/2017	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 90.2 % 70-130 " " "
Surrogate: Toluene-d8 94.2 % 70-130 " " "
Surrogate: 4-Bromofluorobenzene 84.6 % 70-130 " " "

pH in Soil by EPA 9045D

pH	9.00		pH Units	1	B7D1705	04/17/2017	04/17/2017	
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.121		mmhos/cm	"	B7D1706	"	04/17/2017	
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LT Environmental, Inc.
4600 West 60th Avenue
Arvada CO 80003

Brian Sulzberger
Project Number: 014217073
Project: KMG - Shafer 21-25 Badding USX W 25-06

N01@5'
4/17/2017 2:15:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y704197-04 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	ND	25.0	mg/kg	1	B7D1703	04/17/2017	04/17/2017	U
Residual Range Organics (C28-C40)	ND	100	"	"	"	"	"	U

Surrogate: o-Terphenyl 78.8 % 59-131 " " "

GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	B7D1702	04/17/2017	04/17/2017	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 87.2 % 70-130 " " "
Surrogate: Toluene-d8 93.7 % 70-130 " " "
Surrogate: 4-Bromofluorobenzene 84.1 % 70-130 " " "

pH in Soil by EPA 9045D

pH	8.81		pH Units	1	B7D1705	04/17/2017	04/17/2017	
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.0880		mmhos/cm	"	B7D1706	"	04/17/2017	
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LT Environmental, Inc.
4600 West 60th Avenue
Arvada CO 80003

Brian Sulzberger
Project Number: 014217073
Project: KMG - Shafer 21-25 Badding USX W
25-06

E01@5'
4/17/2017 2:20:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y704197-05 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	30.4	25.0	mg/kg	1	B7D1703	04/17/2017	04/17/2017	
Residual Range Organics (C28-C40)	ND	100	"	"	"	"	"	U

Surrogate: o-Terphenyl	80.4 %	59-131			"	"	"	
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GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	B7D1702	04/17/2017	04/17/2017	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	87.5 %	70-130			"	"	"	
Surrogate: Toluene-d8	95.0 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	83.8 %	70-130			"	"	"	

pH in Soil by EPA 9045D

pH	8.80		pH Units	1	B7D1705	04/17/2017	04/17/2017	
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.0785		mmhos/cm	"	B7D1706	"	04/17/2017	
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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: 014217073
Project: KMG - Shafer 21-25 Badding USX W
25-06

S01@5'
4/17/2017 2:25:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y704197-06 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	151	25.0	mg/kg	1	B7D1703	04/17/2017	04/17/2017	
Residual Range Organics (C28-C40)	ND	100	"	"	"	"	"	U

Surrogate: o-Terphenyl	85.1 %	59-131			"	"	"	
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GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	0.326	0.200	mg/kg	1	B7D1702	04/17/2017	04/17/2017	
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	88.0 %	70-130			"	"	"	
Surrogate: Toluene-d8	93.0 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	85.3 %	70-130			"	"	"	

pH in Soil by EPA 9045D

pH	8.48		pH Units	1	B7D1705	04/17/2017	04/17/2017	
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.0703		mmhos/cm	"	B7D1706	"	04/17/2017	
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LT Environmental, Inc.
4600 West 60th Avenue
Arvada CO 80003

Brian Sulzberger
Project Number: 014217073
Project: KMG - Shafer 21-25 Badding USX W
25-06

W01@5'

4/17/2017 2:30:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y704197-07 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	611	25.0	mg/kg	1	B7D1703	04/17/2017	04/17/2017	
Residual Range Organics (C28-C40)	241	100	"	"	"	"	"	

Surrogate: o-Terphenyl	94.0 %	59-131			"	"	"	
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GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	2.25	0.200	mg/kg	1	B7D1702	04/17/2017	04/17/2017	
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	89.3 %	70-130			"	"	"	
Surrogate: Toluene-d8	95.1 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	90.9 %	70-130			"	"	"	

pH in Soil by EPA 9045D

pH	9.33		pH Units	1	B7D1705	04/17/2017	04/17/2017	
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.0916		mmhos/cm	"	B7D1706	"	04/17/2017	
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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: 014217073
Project: KMG - Shafer 21-25 Badding USX W
25-06

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 B7D1702 - EPA 5030 (soil)										
Blank (B7D1702-BLK1)					Prepared: 04/17/2017 Analyzed: 04/17/2017					
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	54		ug/kg	62.5		85.7	70-130			
Surrogate: Toluene-d8	60		"	62.5		95.3	70-130			
Surrogate: 4-Bromofluorobenzene	53		"	62.5		85.6	70-130			

Origins Laboratory, Inc.



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

Brian Sulzberger
Project Number: 014217073
Project: KMG - Shafer 21-25 Badding USX W
25-06

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 B7D1702 - EPA 5030 (soil)										
LCS (B7D1702-BS1)					Prepared: 04/17/2017 Analyzed: 04/17/2017					
Benzene	0.100	0.002	mg/kg	0.100		100	77.1-124			
Toluene	0.100	0.002	"	0.100		99.9	74.5-128			
Ethylbenzene	0.101	0.002	"	0.100		101	66.4-127			
m,p-Xylene	0.199	0.004	"	0.200		99.7	76.6-124			
o-Xylene	0.098	0.002	"	0.100		98.2	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	51		ug/kg	62.5		80.9	70-130			
Surrogate: Toluene-d8	59		"	62.5		94.6	70-130			
Surrogate: 4-Bromofluorobenzene	56		"	62.5		89.2	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

Brian Sulzberger
Project Number: 014217073
Project: KMG - Shafer 21-25 Badding USX W
25-06

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 B7D1702 - EPA 5030 (soil)

Matrix Spike (B7D1702-MS1)		Source: Y704180-01			Prepared: 04/17/2017 Analyzed: 04/17/2017					
Benzene	0.092	0.002	mg/kg	0.100	ND	91.8	71.8-126			
Toluene	0.091	0.002	"	0.100	ND	91.5	65.1-130			
Ethylbenzene	0.091	0.002	"	0.100	ND	90.7	62.2-130			
m,p-Xylene	0.177	0.004	"	0.200	ND	88.4	46.5-137			
o-Xylene	0.090	0.002	"	0.100	ND	90.0	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	55		ug/kg	62.5		88.0	70-130			
Surrogate: Toluene-d8	59		"	62.5		94.4	70-130			
Surrogate: 4-Bromofluorobenzene	57		"	62.5		92.0	70-130			

Origins Laboratory, Inc.



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

Brian Sulzberger
Project Number: 014217073
Project: KMG - Shafer 21-25 Badding USX W
25-06

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 B7D1702 - EPA 5030 (soil)

Matrix Spike Dup (B7D1702-MSD1)		Source: Y704180-01			Prepared: 04/17/2017 Analyzed: 04/17/2017					
Benzene	0.099	0.002	mg/kg	0.100	ND	99.4	71.8-126	8.01	11.3	
Toluene	0.100	0.002	"	0.100	ND	99.9	65.1-130	8.82	15.4	
Ethylbenzene	0.100	0.002	"	0.100	ND	99.9	62.2-130	9.74	19.6	
m,p-Xylene	0.197	0.004	"	0.200	ND	98.4	46.5-137	10.7	19.2	
o-Xylene	0.099	0.002	"	0.100	ND	98.7	54.2-134	9.31	17.9	
Surrogate: 1,2-Dichloroethane-d4	53		ug/kg	62.5		85.3	70-130			
Surrogate: Toluene-d8	59		"	62.5		93.8	70-130			
Surrogate: 4-Bromofluorobenzene	56		"	62.5		89.2	70-130			

Origins Laboratory, Inc.



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

Brian Sulzberger
Project Number: 014217073
Project: KMG - Shafer 21-25 Badding USX W
25-06

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 B7D1703 - EPA 3550B

Blank (B7D1703-BLK1)

Prepared: 04/17/2017 Analyzed: 04/17/2017

Diesel (C10-C28)	ND	50.0	mg/kg							U
Residual Range Organics (C28-C40)	ND	200	"							U
Surrogate: o-Terphenyl	38		"	50.0		75.9	59-131			

LCS (B7D1703-BS1)

Prepared: 04/17/2017 Analyzed: 04/17/2017

Diesel (C10-C28)	935	50.0	mg/kg	1000		93.5	64-121			
Residual Range Organics (C28-C40)	1020	200	"	1000		102	58-124			
Surrogate: o-Terphenyl	45		"	50.0		90.9	59-131			

Matrix Spike (B7D1703-MS1)

Source: Y704180-01

Prepared: 04/17/2017 Analyzed: 04/17/2017

Diesel (C10-C28)	883	50.0	mg/kg	1000	17.3	86.6	53-125			
Residual Range Organics (C28-C40)	990	200	"	1000	21.8	96.8	47-133			
Surrogate: o-Terphenyl	42		"	50.0		84.6	59-131			

Matrix Spike Dup (B7D1703-MSD1)

Source: Y704180-01

Prepared: 04/17/2017 Analyzed: 04/17/2017

Diesel (C10-C28)	887	50.0	mg/kg	1000	17.3	87.0	53-125	0.395	20	
Residual Range Organics (C28-C40)	958	200	"	1000	21.8	93.6	47-133	3.28	20	
Surrogate: o-Terphenyl	44		"	50.0		88.4	59-131			

Origins Laboratory, Inc.



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

Brian Sulzberger
Project Number: 014217073
Project: KMG - Shafer 21-25 Badding USX W
25-06

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 B7D1705 - NO PREP										
Duplicate (B7D1705-DUP1)		Source: Y704197-01			Prepared: 04/17/2017 Analyzed: 04/17/2017					
pH	7.52		pH Units		7.48			0.533	25	
Batch B7D1706 - NO PREP										
Blank (B7D1706-BLK1)		Prepared: 04/17/2017 Analyzed: 04/17/2017								
Specific Conductance (EC)	0.00370		mmhos/cm							
Duplicate (B7D1706-DUP1)		Source: Y704197-01			Prepared: 04/17/2017 Analyzed: 04/17/2017					
Specific Conductance (EC)	0.0168		mmhos/cm		0.0140			18.2	25	

Origins Laboratory, Inc.



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

Brian Sulzberger
Project Number: 014217073
Project: KMG - Shafer 21-25 Badding USX W
25-06

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.



April 19, 2017

LT Environmental, Inc.

Brian Sulzberger

4600 West 60th Avenue

Arvada

CO 80003

Project Name - KMG - Shafer 21-25 Badding USX W 25-06 **Project Number - 014217073**

Attached are your analytical results for KMG - Shafer 21-25 Badding USX W 25-06 received by Origins Laboratory, Inc. April 18, 2017. This project is associated with Origins project number Y704218-01.

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: 014217073

Project: KMG - Shafer 21-25 Badding USX W
25-06

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
W02@5'	Y704218-01	Soil	April 18, 2017 15:45	04/18/2017 16:52

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: 014217073
Project: KMG - Shafer 21-25 Badding USX W
25-06

[illegible]

Origins Laboratory, Inc.

Jeff Pellgrini

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: 014217073
Project: KMG - Shafer 21-25 Badding USX W 25-06

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: 1704218

Client: LTE

Client Project ID: KMG - Shafer 21-25 Badding USX W 25

Checklist Completed by: DW

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

Date/time completed: 4/18/12 1711

Airbill #: 2K

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

Cooler Number/Temperature: 1 / 10.7 °C 1 / 10.7 °C 1 / 10.7 °C (Describe)

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: (Signature) Project Manager

4/18/12 1712
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: 014217073
Project: KMG - Shafer 21-25 Badding USX W
25-06

W02@5'
4/18/2017 3:45:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y704218-01 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	ND	25.0	mg/kg	1	B7D1805	04/18/2017	04/19/2017	U
Residual Range Organics (C28-C40)	ND	100	"	"	"	"	"	U

Surrogate: o-Terphenyl 88.0 % 59-131 " " "

GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	B7D1804	04/18/2017	04/18/2017	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 117 % 70-130 " " "
Surrogate: Toluene-d8 102 % 70-130 " " "
Surrogate: 4-Bromofluorobenzene 103 % 70-130 " " "

pH in Soil by EPA 9045D

pH	9.27		pH Units	1	B7D1807	04/18/2017	04/18/2017	
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.100		mmhos/cm	"	B7D1808	04/18/2017	04/18/2017	
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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: 014217073
Project: KMG - Shafer 21-25 Badding USX W
25-06

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 B7D1804 - EPA 5030 (soil)										
Blank (B7D1804-BLK1)					Prepared: 04/18/2017 Analyzed: 04/18/2017					
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	69		ug/kg	62.5		110	70-130			
Surrogate: Toluene-d8	65		"	62.5		104	70-130			
Surrogate: 4-Bromofluorobenzene	65		"	62.5		104	70-130			

Origins Laboratory, Inc.



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Arvada CO 80003

Brian Sulzberger
Project Number: 014217073
Project: KMG - Shafer 21-25 Badding USX W
25-06

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 B7D1804 - EPA 5030 (soil)										
LCS (B7D1804-BS1)					Prepared: 04/18/2017 Analyzed: 04/18/2017					
Benzene	0.085	0.002	mg/kg	0.100		84.6	77.1-124			
Toluene	0.091	0.002	"	0.100		91.4	74.5-128			
Ethylbenzene	0.101	0.002	"	0.100		101	66.4-127			
m,p-Xylene	0.206	0.004	"	0.200		103	76.6-124			
o-Xylene	0.102	0.002	"	0.100		102	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	66		ug/kg	62.5		106	70-130			
Surrogate: Toluene-d8	65		"	62.5		104	70-130			
Surrogate: 4-Bromofluorobenzene	65		"	62.5		104	70-130			

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Arvada CO 80003

Brian Sulzberger
Project Number: 014217073
Project: KMG - Shafer 21-25 Badding USX W
25-06

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 B7D1804 - EPA 5030 (soil)

Matrix Spike (B7D1804-MS1)		Source: Y704195-01			Prepared: 04/18/2017 Analyzed: 04/18/2017					
Benzene	0.080	0.002	mg/kg	0.100	ND	80.3	71.8-126			
Toluene	0.085	0.002	"	0.100	ND	84.6	65.1-130			
Ethylbenzene	0.092	0.002	"	0.100	ND	92.4	62.2-130			
m,p-Xylene	0.188	0.004	"	0.200	ND	93.9	46.5-137			
o-Xylene	0.096	0.002	"	0.100	ND	96.5	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	57		ug/kg	62.5		91.3	70-130			
Surrogate: Toluene-d8	64		"	62.5		103	70-130			
Surrogate: 4-Bromofluorobenzene	67		"	62.5		107	70-130			

Origins Laboratory, Inc.



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4600 West 60th Avenue
Arvada CO 80003

Brian Sulzberger
Project Number: 014217073
Project: KMG - Shafer 21-25 Badding USX W
25-06

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 B7D1804 - EPA 5030 (soil)

Matrix Spike Dup (B7D1804-MSD1)		Source: Y704195-01			Prepared: 04/18/2017 Analyzed: 04/18/2017					
Benzene	0.079	0.002	mg/kg	0.100	ND	79.4	71.8-126	1.13	11.3	
Toluene	0.085	0.002	"	0.100	ND	84.7	65.1-130	0.118	15.4	
Ethylbenzene	0.096	0.002	"	0.100	ND	95.6	62.2-130	3.47	19.6	
m,p-Xylene	0.195	0.004	"	0.200	ND	97.5	46.5-137	3.73	19.2	
o-Xylene	0.099	0.002	"	0.100	ND	99.1	54.2-134	2.72	17.9	
Surrogate: 1,2-Dichloroethane-d4	77		ug/kg	62.5		123	70-130			
Surrogate: Toluene-d8	65		"	62.5		103	70-130			
Surrogate: 4-Bromofluorobenzene	68		"	62.5		109	70-130			

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

Brian Sulzberger
Project Number: 014217073
Project: KMG - Shafer 21-25 Badding USX W 25-06

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 B7D1805 - EPA 3550B

Blank (B7D1805-BLK1)

Prepared: 04/18/2017 Analyzed: 04/18/2017

Diesel (C10-C28)	ND	50.0	mg/kg							U
Residual Range Organics (C28-C40)	ND	200	"							U
Surrogate: o-Terphenyl	47		"	50.0		94.5	59-131			

LCS (B7D1805-BS1)

Prepared: 04/18/2017 Analyzed: 04/18/2017

Diesel (C10-C28)	792	50.0	mg/kg	1000		79.2	64-121			
Residual Range Organics (C28-C40)	831	200	"	1000		83.1	58-124			
Surrogate: o-Terphenyl	39		"	50.0		77.4	59-131			

Matrix Spike (B7D1805-MS1)

Source: Y704195-01

Prepared: 04/18/2017 Analyzed: 04/18/2017

Diesel (C10-C28)	941	50.0	mg/kg	1000	14.6	92.6	53-125			
Residual Range Organics (C28-C40)	1040	200	"	1000	20.2	102	47-133			
Surrogate: o-Terphenyl	46		"	50.0		91.7	59-131			

Matrix Spike Dup (B7D1805-MSD1)

Source: Y704195-01

Prepared: 04/18/2017 Analyzed: 04/18/2017

Diesel (C10-C28)	753	50.0	mg/kg	1000	14.6	73.8	53-125	22.6	20	QR-02
Residual Range Organics (C28-C40)	807	200	"	1000	20.2	78.7	47-133	26.2	20	QR-02
Surrogate: o-Terphenyl	38		"	50.0		75.4	59-131			

Origins Laboratory, Inc.



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

Brian Sulzberger
Project Number: 014217073
Project: KMG - Shafer 21-25 Badding USX W
25-06

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 B7D1807 - NO PREP										
Duplicate (B7D1807-DUP1)		Source: Y704216-01			Prepared: 04/18/2017 Analyzed: 04/18/2017					
pH	9.64		pH Units		9.16			5.11	25	
Batch B7D1808 - NO PREP										
Blank (B7D1808-BLK1)		Prepared: 04/18/2017 Analyzed: 04/18/2017								
Specific Conductance (EC)	0.00360		mmhos/cm							
Duplicate (B7D1808-DUP1)		Source: Y704216-01			Prepared: 04/18/2017 Analyzed: 04/18/2017					
Specific Conductance (EC)	1.58		mmhos/cm		1.51			4.34	25	

Origins Laboratory, Inc.



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

Brian Sulzberger
Project Number: 014217073
Project: KMG - Shafer 21-25 Badding USX W
25-06

Notes and Definitions

U Sample is Non-Detect.

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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