



# **LEGEND**

- BACKGROUND ARSENIC SAMPLE (mg/kg)
- SANDRIDGE REMEDIATION SITE LOCATION



IMAGE COURTESY OF ESRI



**FIGURE 1**  
**ARSENIC SITE MAP**  
**JACKSON COUNTY, COLORADO**

**SANDRIDGE EXPLORATION AND PRODUCTION, LLC**



**TABLE 1**  
**BACKGROUND SOIL ANALYTICAL RESULTS**

**JACKSON COUNTY, COLORADO**  
**SANDRIDGE EXPLORATION AND PRODUCTION, LLC**

Location	Sample ID	Arsenic (mg/kg)	Latitude	Longitude
Gregory 5-09H	BG01	4.04	40.585331	-106.387264
	BG02	6.09		
	BG03	1.91		
	BG04	1.87		
Hebron 1-18H	BG01@0-6"	2.99	40.584117	-106.414345
	BG02@0-6"	3.51		
	BG03@0-6"	3.32		
	BG04@0-6"	2.13		
Mutual 7 Pad	BG01	4.01	40.583408	-106.406314
	BG02	4.47		
	BG03	4.99		
	BG04	3.76		
Evans 2-21H & Ray Ranch 7-21H	BG01	2.44	40.569775	-106.374985
	BG02	2.97		
	BG03	2.97		
	BG04	2.61		
Marr Pad	BG01	1.61	40.598325	-106.415653
	BG02	0.00201		
	BG03	1.43		
	BG04	2.82		
Open Range	OR BG01 N	2.76	40.571183	-106.424278
	OR BG02 E	2.46		
	OR BG03 S	3.16		
	OR BG04 W	2.68		
Ray Ranch West	RR BG01 N	0.235	40.573847	-106.382212
	RR BG02 E	0.354		
	RR BG03 S	0.534		
	RR BG04 W	0.677		

Notes:

All samples are reported in miligrams per kilogram (mg/kg)

All samples were collected from 0-6 inches below ground surface (bgs)

# Summit Scientific

---

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

August 29, 2016

Brett Forkner  
LT Environmental, Inc.  
4600 West 60th Avenue  
Arvada, CO 80003  
RE: Marr Background

Enclosed are the results of analyses for samples received by Summit Scientific on 08/24/16 16:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'P. Shrewsbury', with a stylized, cursive script.

Paul Shrewsbury  
President



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

Project: Marr Background  
Project Number: 065815003.003  
Project Manager: Brett Forkner

**Reported:**  
08/29/16 13:41

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BG01	1608198-01	Soil	08/23/16 15:25	08/24/16 16:00
BG02	1608198-02	Soil	08/23/16 15:11	08/24/16 16:00
BG03	1608198-03	Soil	08/23/16 16:00	08/24/16 16:00
BG04	1608198-04	Soil	08/23/16 15:45	08/24/16 16:00

Summit Scientific

*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.*

Page 2 of 12





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

Project: Marr Background  
Project Number: 065815003.003  
Project Manager: Brett Forkner

Reported:  
08/29/16 13:41

#### Sample Receipt Checklist

S2 Work Order: 1608198

Client: LIE

Client Project ID: Marr background

Shipped Via: P/U

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

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

Matrix (check all that apply): ☐ Air ☒ Soil/Solid ☐ Water ☐ Other: \_\_\_\_\_  
(Describe)

Cooler ID					
Temp (°C)	<u>5.4</u>				

Thermometer ID: 61857155-K

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature just above 0°C to ≤ 6°C <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
NOTE: If samples are delivered the same day of sampling, this requirement is waived provided that there is evidence that cooling has begun.				
Were all samples received intact <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
If custody seals are present, are they intact <sup>(1)</sup> ?			<input checked="" type="checkbox"/>	
Are short holding time analytes or samples with HTs due within 48 hours present?			<input checked="" type="checkbox"/>	
Is a chain-of-custody (COC) form present and filled out completely <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client w/ date and time recorded <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.			<input checked="" type="checkbox"/>	
Are samples preserved that require preservation (excluding cooling) <sup>(1)</sup> ?			<input checked="" type="checkbox"/>	
Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect			<input checked="" type="checkbox"/>	
If samples are acid preserved for metals, is the pH ≤ 2 <sup>(1)</sup> ?			<input checked="" type="checkbox"/>	
Record the pH in Comments.			<input checked="" type="checkbox"/>	
If dissolved metals are requested, were samples field filtered?			<input checked="" type="checkbox"/>	
Additional Comments (if any):				

<sup>(1)</sup> If NO, then contact the client before proceeding with analysis and note in case narrative.

Nakita  
Custodian Printed Name

MA  
Signature or Initials of Custodian

8/24/16 1700  
Date/Time



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

Project: Marr Background  
Project Number: 065815003.003  
Project Manager: Brett Forkner

Reported:  
08/29/16 13:41

**BG01**  
**1608198-01 (Soil)**

**Summit Scientific**

**Total Metals by EPA Method 6020 - Dry Weight Basis**

Date Sampled: **08/23/16 15:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	1.61	0.202	mg/kg dry	1	1608231	08/25/16	08/25/16	EPA 6020A	

**Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis**

Date Sampled: **08/23/16 15:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Calcium	364	11.4	mg/kg dry	1	1608264	08/29/16	08/29/16	EPA 6020/Mod. USDA60 6(2, 3A)	
Magnesium	142	5.72	"	"	"	"	"	"	
Sodium	15.1	5.72	"	"	"	"	"	"	

Date Sampled: **08/23/16 15:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sodium Adsorption Ratio	0.170		units	"	1608283	08/29/16	08/29/16	"	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **08/23/16 15:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	0.0822	0.0100	mmhos/cm	1	1608281	08/29/16	08/29/16	SM 2510B	

Date Sampled: **08/23/16 15:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	6.84	0.100	pH Units	"	1608280	08/29/16	08/29/16	EPA 9045	

Summit Scientific

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

Project: Marr Background  
Project Number: 065815003.003  
Project Manager: Brett Forkner

**Reported:**  
08/29/16 13:41

**BG01**  
**1608198-01 (Soil)**

**Summit Scientific**

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **08/23/16 15:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	87.4		%	1	1608260	08/25/16	08/28/16	% calculation	

Summit Scientific

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

Project: Marr Background  
Project Number: 065815003.003  
Project Manager: Brett Forkner

**Reported:**  
08/29/16 13:41

**BG02**  
**1608198-02 (Soil)**

**Summit Scientific**

**Total Metals by EPA Method 6020 - Dry Weight Basis**

Date Sampled: **08/23/16 15:11**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	<b>0.00201</b>	0.000603	mg/kg dry	1	1608231	08/25/16	08/25/16	EPA 6020A	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **08/23/16 15:11**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	<b>88.2</b>		%	1	1608260	08/25/16	08/28/16	% calculation	

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

Project: Marr Background  
Project Number: 065815003.003  
Project Manager: Brett Forkner

**Reported:**  
08/29/16 13:41

**BG03**  
**1608198-03 (Soil)**

**Summit Scientific**

**Total Metals by EPA Method 6020 - Dry Weight Basis**

Date Sampled: **08/23/16 16:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	1.43	0.227	mg/kg dry	1	1608231	08/25/16	08/25/16	EPA 6020A	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **08/23/16 16:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	79.1		%	1	1608260	08/25/16	08/28/16	% calculation	

Summit Scientific

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

Project: Marr Background  
Project Number: 065815003.003  
Project Manager: Brett Forkner

**Reported:**  
08/29/16 13:41

**BG04**  
**1608198-04 (Soil)**

**Summit Scientific**

**Total Metals by EPA Method 6020 - Dry Weight Basis**

Date Sampled: **08/23/16 15:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	2.82	0.242	mg/kg dry	1	1608231	08/25/16	08/25/16	EPA 6020A	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **08/23/16 15:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	70.7		%	1	1608260	08/25/16	08/28/16	% calculation	

Summit Scientific

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

Project: Marr Background  
Project Number: 065815003.003  
Project Manager: Brett Forkner

**Reported:**  
08/29/16 13:41

**Total Metals by EPA Method 6020 - Dry Weight Basis - Quality Control**

**Summit Scientific**

Analyte	Reporting			Spike	Source		%REC		RPD	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

**Batch 1608231 - EPA 3050B**

**Blank (1608231-BLK1)**

Prepared: 08/23/16 Analyzed: 08/25/16

Arsenic ND 0.200 mg/kg wet

**LCS (1608231-BS1)**

Prepared: 08/23/16 Analyzed: 08/25/16

Arsenic 53.0 0.200 mg/kg wet 52.8 100 82.6-117

**Duplicate (1608231-DUP1)**

**Source: 1608175-01**

Prepared: 08/23/16 Analyzed: 08/25/16

Arsenic 2.15 0.234 mg/kg dry 2.05 4.55 20

**Matrix Spike (1608231-MS1)**

**Source: 1608175-01**

Prepared: 08/23/16 Analyzed: 08/25/16

Arsenic 53.0 0.234 mg/kg dry 46.7 2.05 109 75-125

**Matrix Spike Dup (1608231-MSD1)**

**Source: 1608175-01**

Prepared: 08/23/16 Analyzed: 08/25/16

Arsenic 56.3 0.234 mg/kg dry 46.7 2.05 116 75-125 5.94 25

Summit Scientific

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

Project: Marr Background  
Project Number: 065815003.003  
Project Manager: Brett Forkner

Reported:  
08/29/16 13:41

**Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis - Quality Control**  
**Summit Scientific**

Analyte	Reporting			Spike	Source		%REC		RPD	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

**Batch 1608264 - General Preparation**

**Blank (1608264-BLK1)**

Prepared & Analyzed: 08/29/16

Calcium	ND	10.0	mg/kg wet
Magnesium	ND	5.00	"
Sodium	ND	5.00	"

**LCS (1608264-BS1)**

Prepared & Analyzed: 08/29/16

Calcium	538	10.0	mg/kg wet	500	108	82.9-118
Magnesium	508	5.00	"	500	102	77.1-123
Sodium	514	5.00	"	500	103	71-129

**Duplicate (1608264-DUP1)**

Source: 1608198-01

Prepared & Analyzed: 08/29/16

Calcium	291	11.4	mg/kg dry	364	22.3	200
Magnesium	109	5.72	"	142	26.0	200
Sodium	10.2	5.72	"	15.1	38.6	200

**Matrix Spike (1608264-MS1)**

Source: 1608198-01

Prepared & Analyzed: 08/29/16

Calcium	977	11.4	mg/kg dry	572	364	107	75-125
Magnesium	755	5.72	"	572	142	107	75-125
Sodium	639	5.72	"	572	15.1	109	75-125

**Matrix Spike Dup (1608264-MSD1)**

Source: 1608198-01

Prepared & Analyzed: 08/29/16

Calcium	993	11.4	mg/kg dry	572	364	110	75-125	1.63	25
Magnesium	737	5.72	"	572	142	104	75-125	2.36	25
Sodium	616	5.72	"	572	15.1	105	75-125	3.67	25

Summit Scientific

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

Project: Marr Background  
Project Number: 065815003.003  
Project Manager: Brett Forkner

Reported:  
08/29/16 13:41

Physical Parameters by APHA/ASTM/EPA Methods - Quality Control  
Summit Scientific

Analyte	Reporting			Spike	Source	%REC		RPD		
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

Batch 1608260 - General Preparation

Duplicate (1608260-DUP1) Source: 1608197-01 Prepared: 08/25/16 Analyzed: 08/28/16

% Solids	92.4		%		92.1			0.358	20	
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Batch 1608280 - General Preparation

LCS (1608280-BS1) Prepared & Analyzed: 08/29/16

pH	8.01	0.100	pH Units	8.00	100	95-105				
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Duplicate (1608280-DUP1) Source: 1608198-01 Prepared & Analyzed: 08/29/16

pH	6.94	0.100	pH Units		6.84			1.45	20	
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Batch 1608281 - General Preparation

Blank (1608281-BLK1) Prepared & Analyzed: 08/29/16

Specific Conductance (EC)	ND	0.0100	mmhos/cm							
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LCS (1608281-BS1) Prepared & Analyzed: 08/29/16

Specific Conductance (EC)	0.503	0.0100	mmhos/cm	0.500	101	90-110				
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Duplicate (1608281-DUP1) Source: 1608198-01 Prepared & Analyzed: 08/29/16

Specific Conductance (EC)	0.0918	0.0100	mmhos/cm		0.0822			11.1	20	
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Summit Scientific

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

Project: Marr Background  
Project Number: 065815003.003  
Project Manager: Brett Forkner

**Reported:**  
08/29/16 13:41

### Notes and Definitions

DET Analyte DETECTED  
ND Analyte NOT DETECTED at or above the reporting limit  
NR Not Reported  
dry Sample results reported on a dry weight basis  
RPD Relative Percent Difference

---

Summit Scientific

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A handwritten signature in black ink, appearing to be 'MSF'.

**TABLE 1**  
**BACKGROUND SOIL SAMPLING ANALYTICAL RESULTS**  
**HEBRON 1-18H OIL AND GAS LOCATION**

**SANDRIDGE ENERGY, INC.**

Parameter	COGCC Table 910-1 Concentration Levels	Units	BG01@0-6"	BG02@0-6"	BG03@0-6"	BG04@0-6"
Sample Date			2/24/2016	2/24/2016	2/24/2016	2/24/2016
Sample Type			Background	Background	Background	Background
Depth (feet bgs)			0-0.50	0-0.50	0-0.50	0-0.50
Benzene	0.17	mg/kg	--	--	--	--
Toluene	85	mg/kg	--	--	--	--
Ethylbenzene	100	mg/kg	--	--	--	--
Total Xylenes	175	mg/kg	--	--	--	--
TEPH-DRO	--	mg/kg	--	--	--	--
TVPH-GRO	--	mg/kg	--	--	--	--
TPH Total	500	mg/kg	--	--	--	--
Arsenic	0.39	mg/kg	<b>2.99</b>	<b>3.51</b>	<b>3.32</b>	<b>2.13</b>
Barium	15,000	mg/kg	--	--	--	--
Cadmium	70	mg/kg	--	--	--	--
Chromium (III)	120,000	mg/kg	--	--	--	--
Chromium (VI)	23	mg/kg	--	--	--	--
Copper	3,100	mg/kg	--	--	--	--
Lead	400	mg/kg	--	--	--	--
Mercury	23	mg/kg	--	--	--	--
Nickel	1,600	mg/kg	--	--	--	--
Selenium	390	mg/kg	--	--	--	--
Silver	390	mg/kg	--	--	--	--
Zinc	23,000	mg/kg	--	--	--	--
Acenaphthene	1,000	mg/kg	--	--	--	--
Anthracene	1,000	mg/kg	--	--	--	--
Benzo (A) anthracene	0.22	mg/kg	--	--	--	--
Benzo (B) fluoranthene	0.22	mg/kg	--	--	--	--
Benzo (K) fluoranthene	2.2	mg/kg	--	--	--	--
Benzo (A) pyrene	0.022	mg/kg	--	--	--	--
Chrysene	22	mg/kg	--	--	--	--
Dibenzo (A,H) anthracene	0.022	mg/kg	--	--	--	--
Fluoranthene	1,000	mg/kg	--	--	--	--
Fluorene	1,000	mg/kg	--	--	--	--
Indeno (1,2,3,C,D) pyrene	0.22	mg/kg	--	--	--	--
Napthalene	23	mg/kg	--	--	--	--
Pyrene	1,000	mg/kg	--	--	--	--
EC	4	mmhos/cm	0.303	0.395	0.290	0.447
pH	6 - 9	SU	6.36	6.83	6.40	7.63
SAR	12	unitless	0.192	0.176	0.290	0.218

**NOTES:**

**BOLD** - indicates result exceeds the COGCC Table 910-1 Concentration Level

bgs - below ground surface

COGCC - colorado oil and gas conservation commission

EC - electrical conductivity

mg/kg - milligrams per kilogram

mmhos/cm - millimhos per centimeter in saturated paste extract

SAR - sodium adsorption ratio

SU - standard unit on saturated paste

TEPH-DRO - total extractable petroleum hydrocarbon-diesel range organics

TVPH-GRO - total volume petroleum hydrocarbon-gasoline range organics

TPH - total petroleum hydrocarbons

-- - not analyzed/no standard

< - less than the stated analytical reporting limit



# Summit Scientific

---

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

March 02, 2016

Brett Forkner  
LT Environmental, Inc.  
4600 West 60th Avenue  
Arvada, CO 80003  
RE: Hebron 1-18H

Enclosed are the results of analyses for samples received by Summit Scientific on 02/25/16 10:05. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'P. Shrewsbury', with a stylized, cursive script.

Paul Shrewsbury  
President



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

Project: Hebron 1-18H  
Project Number: 065815003-003  
Project Manager: Brett Forkner

**Reported:**  
03/02/16 09:15

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BG01@0-6"	1602198-01	Soil	02/24/16 12:00	02/25/16 10:05
BG02@0-6"	1602198-02	Soil	02/24/16 12:15	02/25/16 10:05
BG03@0-6"	1602198-03	Soil	02/24/16 12:30	02/25/16 10:05
BG04@0-6"	1602198-04	Soil	02/24/16 12:45	02/25/16 10:05

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

Project: Hebron 1-18H  
Project Number: 065815003-003  
Project Manager: Brett Forkner

Reported:  
03/02/16 09:15

# Summit Scientific

S<sub>2</sub>

741 Corporate Circle, Suite J&K ♦ Golden, Colorado 80401  
303-277-9310 ♦ 303-374-5933

1602198

Page 1 of 1

Client: LTE Project Manager: Brett Forkner  
Address: 4600 W 60th Ave E-Mail: bforkner@ltenu.com  
City/State/Zip: Arvada CO 80003  
Phone: 303 433 9788 Fax: Project Name: Hebron 1-18H  
Sampler Name: G Maniz Project Number: 065815003-003

ID	Sample Description	Date Sampled	Time Sampled	# of containers	Preservative				Matrix				Analysis Requested				Special Instructions
					HCl	HNO <sub>3</sub>	None	Other (Specify)	Groundwater	Soil	Air-Canister #	Other (Specify)	SAR	EC	pH	Arsenic	
1	BG01 @ 0-6"	2/24/16	1200	1			/						/	/	/		
2	BG02 @ 0-6"		1215	1			/						/	/	/		
3	BG03 @ 0-6"		1230	1			/						/	/	/		
4	BG04 @ 0-6"		1245	1			/						/	/	/		
5																	
6																	
7																	
8																	
9																	
10																	

Relinquished by: <u>[Signature]</u>	Date/Time: <u>2/25/16 10:05</u>	Received by: <u>[Signature]</u>	Date/Time: <u>2/25/16 10:05</u>	Turn Around Time (Check)	Notes: <u>on ice</u>
Relinquished by: <u>[Signature]</u>	Date/Time: <u>2/25/16 10:30</u>	Received by: <u>[Signature]</u>	Date/Time: <u>2/25/16 10:30</u>	Same Day <input type="checkbox"/> 72 hours <input type="checkbox"/>	
Relinquished by: <u>[Signature]</u>	Date/Time: <u>2/25/16 10:30</u>	Received by: <u>[Signature]</u>	Date/Time: <u>2/25/16 10:30</u>	24 hours <input type="checkbox"/> Standard <input checked="" type="checkbox"/>	
				Sample Integrity:	
				Temperature Upon Receipt: <u>3.6°C</u>	
				Intact: <input checked="" type="radio"/> Yes <input type="radio"/> No	

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Summit Scientific

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.

[Signature]



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

Project: Hebron 1-18H  
Project Number: 065815003-003  
Project Manager: Brett Forkner

Reported:  
03/02/16 09:15

**BG01@0-6"**  
**1602198-01 (Soil)**

**Summit Scientific**

**Total Metals by EPA Method 6020 - Dry Weight Basis**

Date Sampled: 02/24/16 12:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	2.99	0.160	mg/kg dry	1	1602271	02/29/16	02/29/16	EPA 6020A	

**Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis**

Date Sampled: 02/24/16 12:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Calcium	285	14.4	mg/kg dry	1	1602272	02/29/16	02/29/16	EPA 6020/Mod. USDA60 6(2, 3A)	
Magnesium	126	7.21	"	"	"	"	"	"	
Sodium	15.5	7.21	"	"	"	"	"	"	

Date Sampled: 02/24/16 12:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sodium Adsorption Ratio	0.192		units	"	1603001	03/01/16	03/02/16	"	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: 02/24/16 12:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	0.303	0.0100	mmhos/cm	1	1602250	02/25/16	02/25/16	SM 2510B	

Date Sampled: 02/24/16 12:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	6.36	0.100	pH Units	"	1602249	02/25/16	02/25/16	EPA 9045	

Summit Scientific

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

Project: Hebron 1-18H  
Project Number: 065815003-003  
Project Manager: Brett Forkner

**Reported:**  
03/02/16 09:15

**BG01@0-6"**  
**1602198-01 (Soil)**

**Summit Scientific**

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **02/24/16 12:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	62.5		%	1	1602273	02/29/16	03/02/16	% calculation	

Summit Scientific

*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

Project: Hebron 1-18H  
Project Number: 065815003-003  
Project Manager: Brett Forkner

Reported:  
03/02/16 09:15

**BG02@0-6"**  
**1602198-02 (Soil)**

**Summit Scientific**

**Total Metals by EPA Method 6020 - Dry Weight Basis**

Date Sampled: **02/24/16 12:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	3.51	0.153	mg/kg dry	1	1602271	02/29/16	02/29/16	EPA 6020A	

**Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis**

Date Sampled: **02/24/16 12:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Calcium	651	15.6	mg/kg dry	1	1602272	02/29/16	02/29/16	EPA 6020/Mod. USDA60 6(2, 3A)	
Magnesium	156	7.80	"	"	"	"	"	"	
Sodium	19.3	7.80	"	"	"	"	"	"	

Date Sampled: **02/24/16 12:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sodium Adsorption Ratio	0.176		units	"	1603001	03/01/16	03/02/16	"	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **02/24/16 12:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	0.395	0.0100	mmhos/cm	1	1602250	02/25/16	02/25/16	SM 2510B	

Date Sampled: **02/24/16 12:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	6.83	0.100	pH Units	"	1602249	02/25/16	02/25/16	EPA 9045	

Summit Scientific

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

Project: Hebron 1-18H  
Project Number: 065815003-003  
Project Manager: Brett Forkner

**Reported:**  
03/02/16 09:15

**BG02@0-6"**  
**1602198-02 (Soil)**

**Summit Scientific**

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **02/24/16 12:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	57.5		%	1	1602273	02/29/16	03/02/16	% calculation	

Summit Scientific

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

Project: Hebron 1-18H  
Project Number: 065815003-003  
Project Manager: Brett Forkner

Reported:  
03/02/16 09:15

**BG03@0-6"**  
**1602198-03 (Soil)**

**Summit Scientific**

**Total Metals by EPA Method 6020 - Dry Weight Basis**

Date Sampled: **02/24/16 12:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	3.32	0.197	mg/kg dry	1	1602271	02/29/16	02/29/16	EPA 6020A	

**Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis**

Date Sampled: **02/24/16 12:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Calcium	295	22.0	mg/kg dry	1	1602272	02/29/16	02/29/16	EPA 6020/Mod. USDA60 6(2, 3A)	
Magnesium	160	11.0	"	"	"	"	"	"	
Sodium	34.8	11.0	"	"	"	"	"	"	

Date Sampled: **02/24/16 12:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sodium Adsorption Ratio	0.405		units	"	1603001	03/01/16	03/02/16	"	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **02/24/16 12:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	0.290	0.0100	mmhos/cm	1	1602250	02/25/16	02/25/16	SM 2510B	

Date Sampled: **02/24/16 12:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	6.40	0.100	pH Units	"	1602249	02/25/16	02/25/16	EPA 9045	

Summit Scientific

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

Project: Hebron 1-18H  
Project Number: 065815003-003  
Project Manager: Brett Forkner

**Reported:**  
03/02/16 09:15

**BG03@0-6"**  
**1602198-03 (Soil)**

**Summit Scientific**

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **02/24/16 12:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	45.4		%	1	1602273	02/29/16	03/02/16	% calculation	

Summit Scientific

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

Project: Hebron 1-18H  
Project Number: 065815003-003  
Project Manager: Brett Forkner

Reported:  
03/02/16 09:15

**BG04@0-6"**  
**1602198-04 (Soil)**

**Summit Scientific**

**Total Metals by EPA Method 6020 - Dry Weight Basis**

Date Sampled: **02/24/16 12:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	2.13	0.107	mg/kg dry	1	1602271	02/29/16	02/29/16	EPA 6020A	

**Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis**

Date Sampled: **02/24/16 12:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Calcium	308	12.0	mg/kg dry	1	1602272	02/29/16	02/29/16	EPA 6020/Mod. USDA60 6(2, 3A)	
Magnesium	114	5.99	"	"	"	"	"	"	
Sodium	17.6	5.99	"	"	"	"	"	"	

Date Sampled: **02/24/16 12:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sodium Adsorption Ratio	0.218		units	"	1603001	03/01/16	03/02/16	"	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **02/24/16 12:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	0.447	0.0100	mmhos/cm	1	1602250	02/25/16	02/25/16	SM 2510B	

Date Sampled: **02/24/16 12:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	7.63	0.100	pH Units	"	1602249	02/25/16	02/25/16	EPA 9045	

Summit Scientific

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

Project: Hebron 1-18H  
Project Number: 065815003-003  
Project Manager: Brett Forkner

**Reported:**  
03/02/16 09:15

**BG04@0-6"**  
**1602198-04 (Soil)**

**Summit Scientific**

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **02/24/16 12:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	83.5		%	1	1602273	02/29/16	03/02/16	% calculation	

Summit Scientific

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

Project: Hebron 1-18H  
Project Number: 065815003-003  
Project Manager: Brett Forkner

**Reported:**  
03/02/16 09:15

**Total Metals by EPA Method 6020 - Dry Weight Basis - Quality Control**

**Summit Scientific**

Analyte	Reporting			Spike	Source		%REC		RPD	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

**Batch 1602271 - EPA 3050B**

**Blank (1602271-BLK1)**

Prepared & Analyzed: 02/29/16

Arsenic 0.325 0.100 mg/kg wet

**LCS (1602271-BS1)**

Prepared & Analyzed: 02/29/16

Arsenic 113 0.100 mg/kg wet 127 88.7 59-110

**Duplicate (1602271-DUP1)**

**Source: 1602197-01**

Prepared & Analyzed: 02/29/16

Arsenic 7.49 0.119 mg/kg dry 7.66 2.29 20

**Matrix Spike (1602271-MS1)**

**Source: 1602197-01**

Prepared & Analyzed: 02/29/16

Arsenic 57.1 0.119 mg/kg dry 46.5 7.66 106 75-125

**Matrix Spike Dup (1602271-MSD1)**

**Source: 1602197-01**

Prepared & Analyzed: 02/29/16

Arsenic 56.5 0.119 mg/kg dry 47.1 7.66 104 75-125 1.07 25

Summit Scientific

*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

Project: Hebron 1-18H  
Project Number: 065815003-003  
Project Manager: Brett Forkner

Reported:  
03/02/16 09:15

**Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis - Quality Control**  
**Summit Scientific**

Analyte	Reporting			Spike	Source		%REC		RPD	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

**Batch 1602272 - General Preparation**

**Blank (1602272-BLK1)**

Prepared & Analyzed: 02/29/16

Calcium	ND	10.0	mg/kg wet
Magnesium	ND	5.00	"
Sodium	ND	5.00	"

**LCS (1602272-BS1)**

Prepared & Analyzed: 02/29/16

Calcium	530	10.0	mg/kg wet	500	106	82.9-118
Magnesium	554	5.00	"	500	111	77.1-123
Sodium	563	5.00	"	500	113	71-129

**Duplicate (1602272-DUP1)**

Source: 1602197-01

Prepared & Analyzed: 02/29/16

Calcium	11400	9.28	mg/kg dry	11700	2.46	200
Magnesium	639	4.64	"	653	2.16	200
Sodium	1870	4.64	"	1860	0.676	200

**Matrix Spike (1602272-MS1)**

Source: 1602197-01

Prepared & Analyzed: 02/29/16

Calcium	12500	9.28	mg/kg dry	464	11700	169	75-125	QM-07
Magnesium	1200	4.64	"	464	653	117	75-125	
Sodium	2400	4.64	"	464	1860	118	75-125	

**Matrix Spike Dup (1602272-MSD1)**

Source: 1602197-01

Prepared & Analyzed: 02/29/16

Calcium	15000	9.28	mg/kg dry	464	11700	712	75-125	18.3	25	QM-07
Magnesium	1420	4.64	"	464	653	164	75-125	16.8	25	QM-07
Sodium	2320	4.64	"	464	1860	99.6	75-125	3.53	25	

Summit Scientific

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

Project: Hebron 1-18H  
Project Number: 065815003-003  
Project Manager: Brett Forkner

Reported:  
03/02/16 09:15

Physical Parameters by APHA/ASTM/EPA Methods - Quality Control  
Summit Scientific

Analyte	Reporting			Spike	Source	%REC		RPD		
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

Batch 1602249 - General Preparation

LCS (1602249-BS1)

Prepared & Analyzed: 02/25/16

pH	8.02	0.100	pH Units	8.00	100	95-105
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Duplicate (1602249-DUP1)

Source: 1602191-01

Prepared & Analyzed: 02/25/16

pH	8.30	0.100	pH Units	8.25	0.604	20
----	------	-------	----------	------	-------	----

Batch 1602250 - General Preparation

Blank (1602250-BLK1)

Prepared & Analyzed: 02/25/16

Specific Conductance (EC)	ND	0.0100	mmhos/cm
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LCS (1602250-BS1)

Prepared & Analyzed: 02/25/16

Specific Conductance (EC)	0.512	0.0100	mmhos/cm	0.500	102	90-110
---------------------------	-------	--------	----------	-------	-----	--------

Duplicate (1602250-DUP1)

Source: 1602191-01

Prepared & Analyzed: 02/25/16

Specific Conductance (EC)	1.08	0.0100	mmhos/cm	1.15	6.37	20
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Batch 1602273 - General Preparation

Duplicate (1602273-DUP1)

Source: 1602197-01

Prepared: 02/29/16 Analyzed: 03/02/16

% Solids	84.6	%	84.3	0.425	20
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Summit Scientific

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

Project: Hebron 1-18H  
Project Number: 065815003-003  
Project Manager: Brett Forkner

**Reported:**  
03/02/16 09:15

### Notes and Definitions

QM-07    The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS/LCSD recovery.

DET      Analyte DETECTED

ND      Analyte NOT DETECTED at or above the reporting limit

NR      Not Reported

dry      Sample results reported on a dry weight basis

RPD      Relative Percent Difference

---

Summit Scientific

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A handwritten signature in black ink, appearing to be 'MSF'.

**TABLE 1**  
**BACKGROUND SOIL SAMPLING ANALYTICAL RESULTS**  
**MUTUAL 7 OIL AND GAS LOCATION**

**SANDRIDGE ENERGY, INC.**

Parameter	COGCC Table 910-1 Concentration Levels	Units	BG01	BG02	BG03	BG04
Sample Date			3/22/2016	3/22/2016	3/22/2016	3/22/2016
Sample Type			Background	Background	Background	Background
Depth (feet bgs)			0-0.5	0-0.5	0-0.5	0-0.5
Benzene	0.17	mg/kg	--	--	--	--
Toluene	85	mg/kg	--	--	--	--
Ethylbenzene	100	mg/kg	--	--	--	--
Total Xylenes	175	mg/kg	--	--	--	--
TEPH-DRO	--	mg/kg	--	--	--	--
TVPH-GRO	--	mg/kg	--	--	--	--
TPH Total	500	mg/kg	--	--	--	--
Arsenic	0.39	mg/kg	<b>4.01</b>	<b>4.47</b>	<b>4.99</b>	<b>3.76</b>
Barium	15,000	mg/kg	--	--	--	--
Cadmium	70	mg/kg	--	--	--	--
Chromium (III)	120,000	mg/kg	--	--	--	--
Chromium (VI)	23	mg/kg	--	--	--	--
Copper	3,100	mg/kg	--	--	--	--
Lead	400	mg/kg	--	--	--	--
Mercury	23	mg/kg	--	--	--	--
Nickel	1,600	mg/kg	--	--	--	--
Selenium	390	mg/kg	--	--	--	--
Silver	390	mg/kg	--	--	--	--
Zinc	23,000	mg/kg	--	--	--	--
Acenaphthene	1,000	mg/kg	--	--	--	--
Anthracene	1,000	mg/kg	--	--	--	--
Benzo (A) anthracene	0.22	mg/kg	--	--	--	--
Benzo (B) fluoranthene	0.22	mg/kg	--	--	--	--
Benzo (K) fluoranthene	2.2	mg/kg	--	--	--	--
Benzo (A) pyrene	0.022	mg/kg	--	--	--	--
Chrysene	22	mg/kg	--	--	--	--
Dibenzo (A,H) anthracene	0.022	mg/kg	--	--	--	--
Fluoranthene	1,000	mg/kg	--	--	--	--
Fluorene	1,000	mg/kg	--	--	--	--
Indeno (1,2,3,C,D) pyrene	0.22	mg/kg	--	--	--	--
Napthalene	23	mg/kg	--	--	--	--
Pyrene	1,000	mg/kg	--	--	--	--
EC	4	mmhos/cm	2.96	3.99	0.431	0.615
pH	6 - 9	SU	8.05	7.29	6.33	6.88
SAR	12	unitless	3.09	2.67	0.389	1.33

**NOTES:**

**BOLD** - indicates result exceeds the COGCC Table 910-1 Concentration Level

bgs - below ground surface

COGCC - colorado oil and gas conservation commission

EC - electrical conductivity

mg/kg - milligrams per kilogram

mmhos/cm - millimhos per centimeter in saturated paste extract

SAR - sodium adsorption ratio

SU - standard unit on saturated paste

TEPH-DRO - total extractable petroleum hydrocarbon-diesel range organics

TVPH-GRO - total volume petroleum hydrocarbon-gasolene range organics

TPH - total petroleum hydrocarbons

-- - not analyzed/no standard

< - less than the stated analytical reporting limit



# Summit Scientific

---

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

March 29, 2016

Brett Forkner  
LT Environmental, Inc.  
4600 West 60th Avenue  
Arvada, CO 80003  
RE: Mutual 7 Pad

Enclosed are the results of analyses for samples received by Summit Scientific on 03/22/16 16:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in dark ink, appearing to read "M Clements", with a stylized flourish at the end.

Michelle Clements For Paul Shrewsbury  
President



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

Project: Mutual 7 Pad  
Project Number: 065815003.003  
Project Manager: Brett Forkner

**Reported:**  
03/29/16 14:37

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BG01	1603158-01	Soil	03/22/16 11:45	03/22/16 16:30
BG02	1603158-02	Soil	03/22/16 11:52	03/22/16 16:30
BG03	1603158-03	Soil	03/22/16 11:59	03/22/16 16:30
BG04	1603158-04	Soil	03/22/16 12:05	03/22/16 16:30

Summit Scientific

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

Project: Mutual 7 Pad  
Project Number: 065815003.003  
Project Manager: Brett Forkner

Reported:  
03/29/16 14:37

**BG01**  
**1603158-01 (Soil)**

**Summit Scientific**

**Total Metals by EPA Method 6020 - Dry Weight Basis**

Date Sampled: 03/22/16 11:45

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Arsenic	4.01	0.123	mg/kg dry	1	1603266	03/25/16	03/28/16	EPA 6020A	

**Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis**

Date Sampled: 03/22/16 11:45

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Calcium	385	11.0	mg/kg dry	1	1603267	03/25/16	03/28/16	EPA 6020/Mod. USDA60 6(2, 3A)	
Magnesium	110	5.48	"	"	"	"	"	"	
Sodium	267	5.48	"	"	"	"	"	"	

Date Sampled: 03/22/16 11:45

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Sodium Adsorption Ratio	3.09		units	"	1603286	03/29/16	03/29/16	"	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: 03/22/16 11:45

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Specific Conductance (EC)	2.96	0.0100	mmhos/cm	1	1603279	03/28/16	03/28/16	SM 2510B	

Date Sampled: 03/22/16 11:45

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
pH	8.05	0.100	pH Units	"	1603278	03/28/16	03/28/16	EPA 9045	

Summit Scientific

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

Project: Mutual 7 Pad  
Project Number: 065815003.003  
Project Manager: Brett Forkner

**Reported:**  
03/29/16 14:37

**BG01**  
**1603158-01 (Soil)**

**Summit Scientific**

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **03/22/16 11:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	81.4		%	1	1603240	03/23/16	03/24/16	% calculation	

Summit Scientific

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

Project: Mutual 7 Pad  
Project Number: 065815003.003  
Project Manager: Brett Forkner

Reported:  
03/29/16 14:37

**BG02**  
**1603158-02 (Soil)**

**Summit Scientific**

**Total Metals by EPA Method 6020 - Dry Weight Basis**

Date Sampled: **03/22/16 11:52**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	4.47	0.121	mg/kg dry	1	1603266	03/25/16	03/28/16	EPA 6020A	

**Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis**

Date Sampled: **03/22/16 11:52**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Calcium	392	12.1	mg/kg dry	1	1603267	03/25/16	03/28/16	EPA 6020/Mod. USDA60 6(2, 3A)	
Magnesium	142	6.05	"	"	"	"	"	"	
Sodium	243	6.05	"	"	"	"	"	"	

Date Sampled: **03/22/16 11:52**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sodium Adsorption Ratio	2.67		units	"	1603286	03/29/16	03/29/16	"	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **03/22/16 11:52**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	3.99	0.0100	mmhos/cm	1	1603279	03/28/16	03/28/16	SM 2510B	

Date Sampled: **03/22/16 11:52**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	7.29	0.100	pH Units	"	1603278	03/28/16	03/28/16	EPA 9045	

Summit Scientific

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

Project: Mutual 7 Pad  
Project Number: 065815003.003  
Project Manager: Brett Forkner

**Reported:**  
03/29/16 14:37

**BG02**  
**1603158-02 (Soil)**

**Summit Scientific**

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **03/22/16 11:52**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	82.6		%	1	1603240	03/23/16	03/24/16	% calculation	

Summit Scientific

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

Project: Mutual 7 Pad  
Project Number: 065815003.003  
Project Manager: Brett Forkner

Reported:  
03/29/16 14:37

**BG03**  
**1603158-03 (Soil)**

**Summit Scientific**

**Total Metals by EPA Method 6020 - Dry Weight Basis**

Date Sampled: **03/22/16 11:59**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	<b>4.99</b>	0.129	mg/kg dry	1	1603266	03/25/16	03/28/16	EPA 6020A	

**Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis**

Date Sampled: **03/22/16 11:59**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Calcium	<b>327</b>	12.9	mg/kg dry	1	1603267	03/25/16	03/28/16	EPA 6020/Mod. USDA60 6(2, 3A)	
Magnesium	<b>95.9</b>	6.46	"	"	"	"	"	"	
Sodium	<b>31.1</b>	6.46	"	"	"	"	"	"	

Date Sampled: **03/22/16 11:59**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sodium Adsorption Ratio	<b>0.389</b>		units	"	1603286	03/29/16	03/29/16	"	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **03/22/16 11:59**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	<b>0.431</b>	0.0100	mmhos/cm	1	1603279	03/28/16	03/28/16	SM 2510B	

Date Sampled: **03/22/16 11:59**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	<b>6.33</b>	0.100	pH Units	"	1603278	03/28/16	03/28/16	EPA 9045	

Summit Scientific

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

Project: Mutual 7 Pad  
Project Number: 065815003.003  
Project Manager: Brett Forkner

**Reported:**  
03/29/16 14:37

**BG03**  
**1603158-03 (Soil)**

**Summit Scientific**

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **03/22/16 11:59**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	77.4		%	1	1603240	03/23/16	03/24/16	% calculation	

Summit Scientific

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

Project: Mutual 7 Pad  
Project Number: 065815003.003  
Project Manager: Brett Forkner

Reported:  
03/29/16 14:37

**BG04**  
**1603158-04 (Soil)**

**Summit Scientific**

**Total Metals by EPA Method 6020 - Dry Weight Basis**

Date Sampled: **03/22/16 12:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	3.76	0.108	mg/kg dry	1	1603266	03/25/16	03/28/16	EPA 6020A	

**Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis**

Date Sampled: **03/22/16 12:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Calcium	373	11.0	mg/kg dry	1	1603267	03/25/16	03/28/16	EPA 6020/Mod. USDA60 6(2, 3A)	
Magnesium	131	5.48	"	"	"	"	"	"	
Sodium	117	5.48	"	"	"	"	"	"	

Date Sampled: **03/22/16 12:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sodium Adsorption Ratio	1.33		units	"	1603286	03/29/16	03/29/16	"	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **03/22/16 12:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	0.615	0.0100	mmhos/cm	1	1603279	03/28/16	03/28/16	SM 2510B	

Date Sampled: **03/22/16 12:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	6.88	0.100	pH Units	"	1603278	03/28/16	03/28/16	EPA 9045	

Summit Scientific

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

Project: Mutual 7 Pad  
Project Number: 065815003.003  
Project Manager: Brett Forkner

**Reported:**  
03/29/16 14:37

**BG04**  
**1603158-04 (Soil)**

**Summit Scientific**

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **03/22/16 12:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	82.9		%	1	1603240	03/23/16	03/24/16	% calculation	

Summit Scientific

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

Project: Mutual 7 Pad  
Project Number: 065815003.003  
Project Manager: Brett Forkner

Reported:  
03/29/16 14:37

**Total Metals by EPA Method 6020 - Dry Weight Basis - Quality Control**  
**Summit Scientific**

Analyte	Reporting			Spike	Source		%REC		RPD	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

**Batch 1603266 - EPA 3050B**

**Blank (1603266-BLK1)**

Prepared: 03/25/16 Analyzed: 03/28/16

Arsenic ND 0.100 mg/kg wet

**LCS (1603266-BS1)**

Prepared: 03/25/16 Analyzed: 03/28/16

Arsenic 43.4 0.100 mg/kg wet 47.6 91.1 59.7-113

**Duplicate (1603266-DUP1)**

Source: 1603123-03

Prepared: 03/25/16 Analyzed: 03/28/16

Arsenic 8.19 0.131 mg/kg dry 7.66 6.70 20

**Matrix Spike (1603266-MS1)**

Source: 1603123-03

Prepared: 03/25/16 Analyzed: 03/28/16

Arsenic 59.8 0.131 mg/kg dry 49.6 7.66 105 75-125

**Matrix Spike Dup (1603266-MSD1)**

Source: 1603123-03

Prepared: 03/25/16 Analyzed: 03/28/16

Arsenic 59.1 0.131 mg/kg dry 49.6 7.66 104 75-125 1.14 25

Summit Scientific

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

Project: Mutual 7 Pad  
Project Number: 065815003.003  
Project Manager: Brett Forkner

Reported:  
03/29/16 14:37

**Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis - Quality Control**  
**Summit Scientific**

Analyte	Reporting			Spike	Source		%REC		RPD	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

**Batch 1603267 - General Preparation**

**Blank (1603267-BLK1)**

Prepared: 03/25/16 Analyzed: 03/28/16

Calcium	ND	10.0	mg/kg wet							
Magnesium	ND	5.00	"							
Sodium	ND	5.00	"							

**LCS (1603267-BS1)**

Prepared: 03/25/16 Analyzed: 03/28/16

Calcium	525	10.0	mg/kg wet	500	105	82.9-118				
Magnesium	531	5.00	"	500	106	77.1-123				
Sodium	557	5.00	"	500	111	71-129				

**Duplicate (1603267-DUP1)**

Source: 1603123-03

Prepared: 03/25/16 Analyzed: 03/28/16

Calcium	1100	13.1	mg/kg dry	1020		7.98	200			
Magnesium	114	6.54	"	124		8.56	200			
Sodium	2310	6.54	"	2020		13.3	200			

**Matrix Spike (1603267-MS1)**

Source: 1603123-03

Prepared: 03/25/16 Analyzed: 03/28/16

Calcium	1930	13.1	mg/kg dry	654	1020	140	75-125			QM-07
Magnesium	833	6.54	"	654	124	108	75-125			
Sodium	2950	6.54	"	654	2020	141	75-125			QM-07

**Matrix Spike Dup (1603267-MSD1)**

Source: 1603123-03

Prepared: 03/25/16 Analyzed: 03/28/16

Calcium	1880	13.1	mg/kg dry	654	1020	132	75-125	2.77	25	QM-07
Magnesium	856	6.54	"	654	124	112	75-125	2.64	25	
Sodium	2960	6.54	"	654	2020	143	75-125	0.490	25	QM-07

Summit Scientific

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

Project: Mutual 7 Pad  
Project Number: 065815003.003  
Project Manager: Brett Forkner

Reported:  
03/29/16 14:37

**Physical Parameters by APHA/ASTM/EPA Methods - Quality Control**  
**Summit Scientific**

Analyte	Reporting			Spike	Source	%REC		RPD		
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

**Batch 1603240 - General Preparation**

**Duplicate (1603240-DUP1)**      **Source: 1603147-01**      Prepared: 03/23/16      Analyzed: 03/24/16

% Solids	69.6		%		72.2			3.67	20	
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**Batch 1603278 - General Preparation**

**LCS (1603278-BS1)**      Prepared & Analyzed: 03/28/16

pH	8.01	0.100	pH Units	8.00	100	95-105				
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**Duplicate (1603278-DUP1)**      **Source: 1603123-03**      Prepared & Analyzed: 03/28/16

pH	9.03	0.100	pH Units	9.02			0.111	20		
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**Batch 1603279 - General Preparation**

**Blank (1603279-BLK1)**      Prepared & Analyzed: 03/28/16

Specific Conductance (EC)	ND	0.0100	mmhos/cm							
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**LCS (1603279-BS1)**      Prepared & Analyzed: 03/28/16

Specific Conductance (EC)	0.489	0.0100	mmhos/cm	0.500	97.8	90-110				
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**Duplicate (1603279-DUP1)**      **Source: 1603123-03**      Prepared & Analyzed: 03/28/16

Specific Conductance (EC)	2.71	0.0100	mmhos/cm	2.18			21.6	20		QR-03
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Summit Scientific

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

Project: Mutual 7 Pad  
Project Number: 065815003.003  
Project Manager: Brett Forkner

**Reported:**  
03/29/16 14:37

### Notes and Definitions

QR-03 The RPD value for the sample duplicate or MS/MSD was outside of QC acceptance limits due to matrix interference. QC batch accepted based on LCS and/or LCSD recovery and/or RPD values.

QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS/LCSD recovery.

DET Analyte DETECTED

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis

RPD Relative Percent Difference

Summit Scientific

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**TABLE 1**  
**BACKGROUND SOIL SAMPLING ANALYTICAL RESULTS**  
**GREGORY 5-09H OIL AND GAS LOCATION**

**SANDRIDGE ENERGY, INC.**

Parameter	COGCC Table 910-1 Concentration Levels	Units	BG01	BG02	BG03	BG04
Sample Date			1/18/2016	1/18/2016	1/18/2016	1/18/2016
Sample Type			Background	Background	Background	Background
Depth (feet bgs)			0-0.75	0-0.75	0-0.75	0-0.75
Benzene	0.17	mg/kg	--	--	--	--
Toluene	85	mg/kg	--	--	--	--
Ethylbenzene	100	mg/kg	--	--	--	--
Total Xylenes	175	mg/kg	--	--	--	--
TEPH-DRO	--	mg/kg	--	--	--	--
TVPH-GRO	--	mg/kg	--	--	--	--
TPH Total	500	mg/kg	--	--	--	--
Arsenic	0.39	mg/kg	<b>4.04</b>	<b>6.09</b>	<b>1.91</b>	<b>1.87</b>
Barium	15,000	mg/kg	--	--	--	--
Cadmium	70	mg/kg	--	--	--	--
Chromium (III)	120,000	mg/kg	--	--	--	--
Chromium (VI)	23	mg/kg	--	--	--	--
Copper	3,100	mg/kg	--	--	--	--
Lead	400	mg/kg	--	--	--	--
Mercury	23	mg/kg	--	--	--	--
Nickel	1,600	mg/kg	--	--	--	--
Selenium	390	mg/kg	--	--	--	--
Silver	390	mg/kg	--	--	--	--
Zinc	23,000	mg/kg	--	--	--	--
Acenaphthene	1,000	mg/kg	--	--	--	--
Anthracene	1,000	mg/kg	--	--	--	--
Benzo (A) anthracene	0.22	mg/kg	--	--	--	--
Benzo (B) fluoranthene	0.22	mg/kg	--	--	--	--
Benzo (K) fluoranthene	2.2	mg/kg	--	--	--	--
Benzo (A) pyrene	0.022	mg/kg	--	--	--	--
Chrysene	22	mg/kg	--	--	--	--
Dibenzo (A,H) anthracene	0.022	mg/kg	--	--	--	--
Fluoranthene	1,000	mg/kg	--	--	--	--
Fluorene	1,000	mg/kg	--	--	--	--
Indeno (1,2,3,C,D) pyrene	0.22	mg/kg	--	--	--	--
Napthalene	23	mg/kg	--	--	--	--
Pyrene	1,000	mg/kg	--	--	--	--
EC	4	mmhos/cm	0.259	1.55	0.639	0.278
pH	6 - 9	SU	6.05	7.01	7.06	6.81
SAR	12	unitless	0.215	0.308	1.89	1.52

**NOTES:**

**BOLD** - indicates result exceeds the COGCC Table 910-1 Concentration Level

bgs - below ground surface

COGCC - colorado oil and gas conservation commission

EC - electrical conductivity

mg/kg - milligrams per kilogram

mmhos/cm - millimhos per centimeter in saturated paste extract

SAR - sodium adsorption ratio

SU - standard unit on saturated paste

TEPH-DRO - total extractable petroleum hydrocarbon-diesel range organics

TVPH-GRO - total volume petroleum hydrocarbon-gasoline range organics

TPH - total petroleum hydrocarbons

-- - not analyzed/no standard

< - less than the stated analytical reporting limit



# Summit Scientific

---

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

January 24, 2016

Brett Forkner  
LT Environmental, Inc.  
4600 West 60th Avenue  
Arvada, CO 80003  
RE: Gregory 5-09H

Enclosed are the results of analyses for samples received by Summit Scientific on 01/19/16 09:23. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'P. Shrewsbury', with a stylized, cursive script.

Paul Shrewsbury  
President



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

Project: Gregory 5-09H  
Project Number: 065815003  
Project Manager: Brett Forkner

**Reported:**  
01/24/16 15:16

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BG01	1601145-01	Soil	01/18/16 12:10	01/19/16 09:23
BG02	1601145-02	Soil	01/18/16 12:15	01/19/16 09:23
BG03	1601145-03	Soil	01/18/16 12:20	01/19/16 09:23
BG04	1601145-04	Soil	01/18/16 12:25	01/19/16 09:23

Summit Scientific

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

Project: Gregory 5-09H  
Project Number: 065815003  
Project Manager: Brett Forkner

**Reported:**  
01/24/16 15:16

**BG01**  
**1601145-01 (Soil)**

**Summit Scientific**

**Total Metals by EPA Method 6020 - Dry Weight Basis**

Date Sampled: **01/18/16 12:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	4.04	0.0945	mg/kg dry	1	1601205	01/21/16	01/21/16	EPA 6020A	

**Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis**

Date Sampled: **01/18/16 12:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Calcium	38.4	10.8	mg/kg dry	1	1601206	01/21/16	01/21/16	EPA 6020/Mod. USDA60 6(2, 3A)	
Magnesium	15.3	5.41	"	"	"	"	"	"	
Sodium	6.24	5.41	"	"	"	"	"	"	

Date Sampled: **01/18/16 12:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sodium Adsorption Ratio	0.215		units	"	1601219	01/22/16	01/22/16	"	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **01/18/16 12:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	0.259	0.0100	mmhos/cm	1	1601194	01/20/16	01/20/16	SM 2510B	

Date Sampled: **01/18/16 12:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	6.05	0.100	pH Units	"	1601193	01/20/16	01/20/16	EPA 9045	

Summit Scientific

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

Project: Gregory 5-09H  
Project Number: 065815003  
Project Manager: Brett Forkner

**Reported:**  
01/24/16 15:16

**BG01**  
**1601145-01 (Soil)**

**Summit Scientific**

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **01/18/16 12:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	92.5		%	1	1601195	01/20/16	01/21/16	% calculation	

Summit Scientific

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

Project: Gregory 5-09H  
Project Number: 065815003  
Project Manager: Brett Forkner

Reported:  
01/24/16 15:16

**BG02**  
**1601145-02 (Soil)**

**Summit Scientific**

**Total Metals by EPA Method 6020 - Dry Weight Basis**

Date Sampled: 01/18/16 12:15

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	6.09	0.182	mg/kg dry	1	1601205	01/21/16	01/21/16	EPA 6020A	

**Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis**

Date Sampled: 01/18/16 12:15

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Calcium	492	16.9	mg/kg dry	1	1601206	01/21/16	01/21/16	EPA 6020/Mod. USDA60 6(2, 3A)	
Magnesium	198	8.46	"	"	"	"	"	"	
Sodium	32.0	8.46	"	"	"	"	"	"	

Date Sampled: 01/18/16 12:15

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sodium Adsorption Ratio	0.308		units	"	1601219	01/22/16	01/22/16	"	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: 01/18/16 12:15

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	1.55	0.0100	mmhos/cm	1	1601194	01/20/16	01/20/16	SM 2510B	

Date Sampled: 01/18/16 12:15

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	7.01	0.100	pH Units	"	1601193	01/20/16	01/20/16	EPA 9045	

Summit Scientific

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

Project: Gregory 5-09H

Project Number: 065815003  
Project Manager: Brett Forkner

**Reported:**  
01/24/16 15:16

**BG02**  
**1601145-02 (Soil)**

**Summit Scientific**

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **01/18/16 12:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	47.3		%	1	1601195	01/20/16	01/21/16	% calculation	

Summit Scientific

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

Project: Gregory 5-09H  
Project Number: 065815003  
Project Manager: Brett Forkner

Reported:  
01/24/16 15:16

**BG03**  
**1601145-03 (Soil)**

**Summit Scientific**

**Total Metals by EPA Method 6020 - Dry Weight Basis**

Date Sampled: 01/18/16 12:20

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	1.91	0.120	mg/kg dry	1	1601205	01/21/16	01/21/16	EPA 6020A	

**Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis**

Date Sampled: 01/18/16 12:20

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Calcium	78.7	12.0	mg/kg dry	1	1601206	01/21/16	01/21/16	EPA 6020/Mod. USDA60 6(2, 3A)	
Magnesium	20.3	6.02	"	"	"	"	"	"	
Sodium	72.6	6.02	"	"	"	"	"	"	

Date Sampled: 01/18/16 12:20

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sodium Adsorption Ratio	1.89		units	"	1601219	01/22/16	01/22/16	"	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: 01/18/16 12:20

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	0.639	0.0100	mmhos/cm	1	1601194	01/20/16	01/20/16	SM 2510B	

Date Sampled: 01/18/16 12:20

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	7.06	0.100	pH Units	"	1601193	01/20/16	01/20/16	EPA 9045	

Summit Scientific

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

Project: Gregory 5-09H  
Project Number: 065815003  
Project Manager: Brett Forkner

**Reported:**  
01/24/16 15:16

**BG03**  
**1601145-03 (Soil)**

**Summit Scientific**

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **01/18/16 12:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	83.0		%	1	1601195	01/20/16	01/21/16	% calculation	

Summit Scientific

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

Project: Gregory 5-09H  
Project Number: 065815003  
Project Manager: Brett Forkner

Reported:  
01/24/16 15:16

**BG04**  
**1601145-04 (Soil)**

**Summit Scientific**

**Total Metals by EPA Method 6020 - Dry Weight Basis**

Date Sampled: 01/18/16 12:25

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	1.87	0.111	mg/kg dry	1	1601205	01/21/16	01/21/16	EPA 6020A	

**Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis**

Date Sampled: 01/18/16 12:25

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Calcium	59.6	8.97	mg/kg dry	1	1601206	01/21/16	01/21/16	EPA 6020/Mod. USDA60 6(2, 3A)	
Magnesium	15.1	4.48	"	"	"	"	"	"	
Sodium	50.7	4.48	"	"	"	"	"	"	

Date Sampled: 01/18/16 12:25

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sodium Adsorption Ratio	1.52		units	"	1601219	01/22/16	01/22/16	"	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: 01/18/16 12:25

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	0.278	0.0100	mmhos/cm	1	1601194	01/20/16	01/20/16	SM 2510B	

Date Sampled: 01/18/16 12:25

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	6.81	0.100	pH Units	"	1601193	01/20/16	01/20/16	EPA 9045	

Summit Scientific

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

Project: Gregory 5-09H  
Project Number: 065815003  
Project Manager: Brett Forkner

**Reported:**  
01/24/16 15:16

**BG04**  
**1601145-04 (Soil)**

**Summit Scientific**

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **01/18/16 12:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	90.1		%	1	1601195	01/20/16	01/21/16	% calculation	

Summit Scientific

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

Project: Gregory 5-09H  
Project Number: 065815003  
Project Manager: Brett Forkner

**Reported:**  
01/24/16 15:16

**Total Metals by EPA Method 6020 - Dry Weight Basis - Quality Control**  
**Summit Scientific**

Analyte	Reporting			Spike	Source		%REC		RPD	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

**Batch 1601205 - EPA 3050B**

**Blank (1601205-BLK1)**

Prepared & Analyzed: 01/21/16

Arsenic 0.367 0.125 mg/kg wet

**LCS (1601205-BS1)**

Prepared & Analyzed: 01/21/16

Arsenic 284 0.250 mg/kg wet 316 89.7 59-110

**Duplicate (1601205-DUP1)**

**Source: 1601144-01**

Prepared & Analyzed: 01/21/16

Arsenic 3.11 0.136 mg/kg dry 4.44 35.0 20 QR-03

**Matrix Spike (1601205-MS1)**

**Source: 1601144-01**

Prepared & Analyzed: 01/21/16

Arsenic 56.1 0.122 mg/kg dry 48.6 4.44 106 75-125

**Matrix Spike Dup (1601205-MSD1)**

**Source: 1601144-01**

Prepared & Analyzed: 01/21/16

Arsenic 60.6 0.136 mg/kg dry 52.3 4.44 107 75-125 7.68 25

Summit Scientific

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

Project: Gregory 5-09H  
Project Number: 065815003  
Project Manager: Brett Forkner

Reported:  
01/24/16 15:16

**Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis - Quality Control**  
**Summit Scientific**

Analyte	Reporting			Spike	Source		%REC		RPD	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

**Batch 1601206 - General Preparation**

**Blank (1601206-BLK1)**

Prepared & Analyzed: 01/21/16

Calcium	ND	10.0	mg/kg wet
Magnesium	ND	5.00	"
Sodium	ND	5.00	"

**LCS (1601206-BS1)**

Prepared & Analyzed: 01/21/16

Calcium	565	10.0	mg/kg wet	500	113	82.9-118
Magnesium	538	5.00	"	500	108	77.1-123
Sodium	549	5.00	"	500	110	71-129

**Duplicate (1601206-DUP1)**

Source: 1601145-01

Prepared & Analyzed: 01/21/16

Calcium	44.1	10.8	mg/kg dry	38.4	13.9	200
Magnesium	16.5	5.41	"	15.3	7.87	200
Sodium	4.33	5.41	"	6.24	36.1	200

**Matrix Spike (1601206-MS1)**

Source: 1601145-01

Prepared & Analyzed: 01/21/16

Calcium	660	10.8	mg/kg dry	536	38.4	116	75-125
Magnesium	594	5.41	"	536	15.3	108	75-125
Sodium	573	5.41	"	536	6.24	106	75-125

**Matrix Spike Dup (1601206-MSD1)**

Source: 1601145-01

Prepared & Analyzed: 01/21/16

Calcium	678	10.8	mg/kg dry	536	38.4	119	75-125	2.70	25
Magnesium	629	5.41	"	536	15.3	115	75-125	5.72	25
Sodium	603	5.41	"	536	6.24	111	75-125	5.13	25

Summit Scientific

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

Project: Gregory 5-09H  
Project Number: 065815003  
Project Manager: Brett Forkner

**Reported:**  
01/24/16 15:16

**Physical Parameters by APHA/ASTM/EPA Methods - Quality Control**  
**Summit Scientific**

Analyte	Reporting			Spike	Source	%REC		RPD		
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

**Batch 1601193 - General Preparation**

**LCS (1601193-BS1)**

Prepared & Analyzed: 01/20/16

pH	7.96	0.100	pH Units	8.00	99.5	95-105
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**Duplicate (1601193-DUP1)**

**Source: 1601051-04**

Prepared & Analyzed: 01/20/16

pH	8.92	0.100	pH Units	9.11	2.11	20
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**Batch 1601194 - General Preparation**

**Blank (1601194-BLK1)**

Prepared & Analyzed: 01/20/16

Specific Conductance (EC)	ND	0.0100	mmhos/cm
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**LCS (1601194-BS1)**

Prepared & Analyzed: 01/20/16

Specific Conductance (EC)	0.504	0.0100	mmhos/cm	0.500	101	90-110
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**Duplicate (1601194-DUP1)**

**Source: 1601051-04**

Prepared & Analyzed: 01/20/16

Specific Conductance (EC)	2.80	0.0100	mmhos/cm	2.24	22.1	20	QR-03
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**Batch 1601195 - General Preparation**

**Duplicate (1601195-DUP1)**

**Source: 1601144-01**

Prepared: 01/20/16 Analyzed: 01/21/16

% Solids	71.8		%	73.5	2.34	20
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Summit Scientific

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

Project: Gregory 5-09H  
Project Number: 065815003  
Project Manager: Brett Forkner

**Reported:**  
01/24/16 15:16

### Notes and Definitions

QR-03 The RPD value for the sample duplicate or MS/MSD was outside of QC acceptance limits due to matrix interference. QC batch accepted based on LCS and/or LCSD recovery and/or RPD values.

DET Analyte DETECTED

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis

RPD Relative Percent Difference

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Summit Scientific

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# Summit Scientific

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741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

September 22, 2016

Brett Forkner

LT Environmental, Inc.

4600 West 60th Avenue

Arvada, CO 80003

RE: Open Range Background Samples

Enclosed are the results of analyses for samples received by Summit Scientific on 09/16/16 16:25. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'P. Shrewsbury', with a stylized, cursive script.

Paul Shrewsbury  
President



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

Project: Open Range Background Samples

Project Number: 065815003.0003  
Project Manager: Brett Forkner

**Reported:**  
09/22/16 09:12

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
OR BG01 N	1609098-01	Soil	09/14/16 16:00	09/16/16 16:25
OR BG02 E	1609098-02	Soil	09/14/16 16:00	09/16/16 16:25
OR BG03 S	1609098-03	Soil	09/14/16 16:00	09/16/16 16:25
OR BG04 W	1609098-04	Soil	09/14/16 16:00	09/16/16 16:25

Summit Scientific

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

Project: Open Range Background Samples  
Project Number: 065815003.0003  
Project Manager: Brett Forkner

Reported:  
09/22/16 09:12

# Summit Scientific

741 Corporate Circle, Suite J • Golden, Colorado 80401  
303-277-9310 • 303-374-5933

1609098

Client: LTE Project Manager: BRETT FORKNER Page 1 of 1  
Address: 4600 W 60th Ave E-Mail: bfor@ltenv.com  
City/State/Zip: Arvada CO 80003  
Phone: 303 433 9788 Fax: Project Name: OPEN RANGE BACKGROUND SAMPLES  
Sampler Name: MICHAEL JAMES Project Number: 065815003.0003

ID	Sample Description	Date Sampled	Time Sampled	# of containers	Preservative				Matrix			Analysis Requested					Special Instructions
					HCl	HNO3	None	Other (Specify)	Groundwater	Soil	Air-Canister #	Other (Specify)	As	PH	EC	SA	
1	OR B601 N	9/14/16	1600	2			X			X		X	X	X			
2	OR B602 E			2			X			X		X	X	X			
3	OR B603 S			2			X			X		X					
4	OR B604 W			2			X			X		X					
5																	
6																	
7																	
8																	
9																	
10																	

Relinquished by: <u>[Signature]</u>	Date/Time: <u>9/16 1200</u>	Received by: <u>[Signature]</u>	Date/Time: <u>9/16/16 1200</u>	Turn Around Time (Check) Same Day <input type="checkbox"/> 72 hours 24 hours <input type="checkbox"/> Standard <input checked="" type="checkbox"/> 48 hours <input type="checkbox"/>	Notes: <u>on ice</u>
Relinquished by: <u>[Signature]</u>	Date/Time: <u>9/16/16 1625</u>	Received by: <u>[Signature]</u>	Date/Time: <u>9/16/16 1625</u>	Sample Integrity: Temperature Upon Receipt: <u>0.7°C</u>	
Relinquished by: <u>[Signature]</u>	Date/Time: <u>9/16/16 1730</u>	Received by: <u>[Signature]</u>	Date/Time: <u>9-16 1730</u>	Intact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

www.s2scientific.com

Summit Scientific

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

Project: Open Range Background Samples  
Project Number: 065815003.0003  
Project Manager: Brett Forkner

Reported:  
09/22/16 09:12

#### Sample Receipt Checklist

S2 Work Order: 1609098

Client: LTE

Client Project ID: Open Range Background Sample

Shipped Via: P/U

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

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

Matrix (check all that apply): ☐ Air ☒ Soil/Solid ☐ Water ☐ Other: \_\_\_\_\_  
(Describe)

Cooler ID					
Temp (°C)	<u>0.7</u>				

Thermometer ID: 61857155-K

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature just above 0°C to ≤ 6°C <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
NOTE: If samples are delivered the same day of sampling, this requirement is waived provided that there is evidence that cooling has begun.				
Were all samples received intact <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
If custody seals are present, are they intact <sup>(1)</sup> ?			<input checked="" type="checkbox"/>	
Are short holding time analytes or samples with HTs due within 48 hours present?			<input checked="" type="checkbox"/>	
Is a chain-of-custody (COC) form present and filled out completely <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client w/ date and time recorded <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.			<input checked="" type="checkbox"/>	
Are samples preserved that require preservation (excluding cooling) <sup>(1)</sup> ?			<input checked="" type="checkbox"/>	
Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect			<input checked="" type="checkbox"/>	
If samples are acid preserved for metals, is the pH ≤ 2 <sup>(1)</sup> ?			<input checked="" type="checkbox"/>	
Record the pH in Comments.			<input checked="" type="checkbox"/>	
If dissolved metals are requested, were samples field filtered?			<input checked="" type="checkbox"/>	
Additional Comments (if any):				

<sup>(1)</sup> If NO, then contact the client before proceeding with analysis and note in case narrative.

Makita  
Custodian Printed Name

[Signature]  
Signature or Initials of Custodian

9/16/16 1730  
Date/Time



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

Project: Open Range Background Samples

Project Number: 065815003.0003  
Project Manager: Brett Forkner

**Reported:**  
09/22/16 09:12

**OR BG01 N**  
**1609098-01 (Soil)**

**Summit Scientific**

**Total Metals by EPA Method 6020 - Dry Weight Basis**

Date Sampled: **09/14/16 16:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Arsenic</b>	<b>2.76</b>	0.212	mg/kg dry	1	1609122	09/16/16	09/19/16	EPA 6020A	

**Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis**

Date Sampled: **09/14/16 16:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Calcium</b>	<b>141</b>	8.54	mg/kg dry	1	1609138	09/19/16	09/19/16	EPA 6020/Mod. USDA60 6(2, 3A)	
<b>Magnesium</b>	<b>80.2</b>	4.27	"	"	"	"	"	"	
<b>Sodium</b>	<b>121</b>	4.27	"	"	"	"	"	"	

Date Sampled: **09/14/16 16:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Sodium Adsorption Ratio</b>	<b>2.02</b>		units	"	1609143	09/20/16	09/20/16	"	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **09/14/16 16:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Specific Conductance (EC)</b>	<b>0.374</b>	0.0100	mmhos/cm	1	1609132	09/19/16	09/19/16	SM 2510B	

Date Sampled: **09/14/16 16:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>pH</b>	<b>7.53</b>	0.100	pH Units	"	1609127	09/19/16	09/19/16	EPA 9045	

Summit Scientific

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

Project: Open Range Background Samples  
Project Number: 065815003.0003  
Project Manager: Brett Forkner

**Reported:**  
09/22/16 09:12

**OR BG01 N**  
**1609098-01 (Soil)**

**Summit Scientific**

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **09/14/16 16:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	94.4		%	1	1609135	09/19/16	09/20/16	% calculation	

Summit Scientific

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

Project: Open Range Background Samples  
Project Number: 065815003.0003  
Project Manager: Brett Forkner

**Reported:**  
09/22/16 09:12

**OR BG02 E**  
**1609098-02 (Soil)**

**Summit Scientific**

**Total Metals by EPA Method 6020 - Dry Weight Basis**

Date Sampled: **09/14/16 16:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	2.46	0.227	mg/kg dry	1	1609122	09/16/16	09/19/16	EPA 6020A	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **09/14/16 16:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	88.0		%	1	1609135	09/19/16	09/20/16	% calculation	

Summit Scientific

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

Project: Open Range Background Samples  
Project Number: 065815003.0003  
Project Manager: Brett Forkner

**Reported:**  
09/22/16 09:12

**OR BG03 S**  
**1609098-03 (Soil)**

**Summit Scientific**

**Total Metals by EPA Method 6020 - Dry Weight Basis**

Date Sampled: **09/14/16 16:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	3.16	0.229	mg/kg dry	1	1609122	09/16/16	09/19/16	EPA 6020A	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **09/14/16 16:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	87.3		%	1	1609135	09/19/16	09/20/16	% calculation	

Summit Scientific

*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

Project: Open Range Background Samples  
Project Number: 065815003.0003  
Project Manager: Brett Forkner

**Reported:**  
09/22/16 09:12

**OR BG04 W**  
**1609098-04 (Soil)**

**Summit Scientific**

**Total Metals by EPA Method 6020 - Dry Weight Basis**

Date Sampled: **09/14/16 16:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	2.68	0.237	mg/kg dry	1	1609122	09/16/16	09/19/16	EPA 6020A	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **09/14/16 16:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	84.3		%	1	1609135	09/19/16	09/20/16	% calculation	

Summit Scientific

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

Project: Open Range Background Samples  
Project Number: 065815003.0003  
Project Manager: Brett Forkner

**Reported:**  
09/22/16 09:12

**Total Metals by EPA Method 6020 - Dry Weight Basis - Quality Control**  
**Summit Scientific**

Analyte	Reporting			Spike	Source		%REC		RPD	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

**Batch 1609122 - EPA 3050B**

**Blank (1609122-BLK1)**

Prepared: 09/16/16 Analyzed: 09/19/16

Arsenic ND 0.200 mg/kg wet

**LCS (1609122-BS1)**

Prepared: 09/16/16 Analyzed: 09/19/16

Arsenic 133 0.500 mg/kg wet 132 101 82.6-117

**Duplicate (1609122-DUP1)**

**Source: 1609080-04**

Prepared: 09/16/16 Analyzed: 09/19/16

Arsenic 10.5 0.231 mg/kg dry 10.4 0.946 20

**Matrix Spike (1609122-MS1)**

**Source: 1609080-04**

Prepared: 09/16/16 Analyzed: 09/19/16

Arsenic 73.0 0.231 mg/kg dry 45.6 10.4 137 75-125 QM-07

**Matrix Spike Dup (1609122-MSD1)**

**Source: 1609080-04**

Prepared: 09/16/16 Analyzed: 09/19/16

Arsenic 64.1 0.231 mg/kg dry 45.6 10.4 118 75-125 13.0 25

Summit Scientific

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

Project: Open Range Background Samples  
Project Number: 065815003.0003  
Project Manager: Brett Forkner

Reported:  
09/22/16 09:12

**Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis - Quality Control**  
**Summit Scientific**

Analyte	Reporting			Spike	Source		%REC		RPD	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

**Batch 1609138 - General Preparation**

**Blank (1609138-BLK1)**

Prepared & Analyzed: 09/19/16

Calcium	ND	10.0	mg/kg wet
Magnesium	ND	5.00	"
Sodium	ND	5.00	"

**LCS (1609138-BS1)**

Prepared & Analyzed: 09/19/16

Calcium	541	10.0	mg/kg wet	500	108	82.9-118
Magnesium	532	5.00	"	500	106	77.1-123
Sodium	525	5.00	"	500	105	71-129

**Duplicate (1609138-DUP1)**

Source: 1609098-01

Prepared & Analyzed: 09/19/16

Calcium	121	8.54	mg/kg dry	141	15.2	200
Magnesium	72.5	4.27	"	80.2	10.1	200
Sodium	104	4.27	"	121	15.0	200

**Matrix Spike (1609138-MS1)**

Source: 1609098-01

Prepared & Analyzed: 09/19/16

Calcium	555	8.54	mg/kg dry	427	141	96.9	75-125
Magnesium	531	4.27	"	427	80.2	106	75-125
Sodium	556	4.27	"	427	121	102	75-125

**Matrix Spike Dup (1609138-MSD1)**

Source: 1609098-01

Prepared & Analyzed: 09/19/16

Calcium	600	8.54	mg/kg dry	427	141	107	75-125	7.76	25
Magnesium	560	4.27	"	427	80.2	112	75-125	5.25	25
Sodium	570	4.27	"	427	121	105	75-125	2.62	25

Summit Scientific

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

Project: Open Range Background Samples  
Project Number: 065815003.0003  
Project Manager: Brett Forkner

Reported:  
09/22/16 09:12

Physical Parameters by APHA/ASTM/EPA Methods - Quality Control  
Summit Scientific

Analyte	Reporting			Spike	Source	%REC		RPD		
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

Batch 1609127 - General Preparation

LCS (1609127-BS1)

Prepared & Analyzed: 09/19/16

pH	6.02	0.100	pH Units	6.00	100	95-105
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Duplicate (1609127-DUP1)

Source: 1609098-01

Prepared & Analyzed: 09/19/16

pH	7.50	0.100	pH Units	7.53	0.399	20
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Batch 1609132 - General Preparation

Blank (1609132-BLK1)

Prepared & Analyzed: 09/19/16

Specific Conductance (EC)	ND	0.0100	mmhos/cm
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LCS (1609132-BS1)

Prepared & Analyzed: 09/19/16

Specific Conductance (EC)	0.502	0.0100	mmhos/cm	0.500	100	90-110
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Duplicate (1609132-DUP1)

Source: 1609098-01

Prepared & Analyzed: 09/19/16

Specific Conductance (EC)	0.330	0.0100	mmhos/cm	0.374	12.7	20
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Batch 1609135 - General Preparation

Duplicate (1609135-DUP1)

Source: 1609098-01

Prepared: 09/19/16 Analyzed: 09/20/16

% Solids	94.4	%	94.4	0.0273	20
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Summit Scientific

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

Project: Open Range Background Samples  
Project Number: 065815003.0003  
Project Manager: Brett Forkner

**Reported:**  
09/22/16 09:12

### Notes and Definitions

QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS/LCSD recovery.

DET Analyte DETECTED

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis

RPD Relative Percent Difference

---

Summit Scientific

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A handwritten signature in black ink, appearing to be 'MSF'.

# Summit Scientific

---

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

September 22, 2016

Brett Forkner

LT Environmental, Inc.

4600 West 60th Avenue

Arvada, CO 80003

RE: Ray Ranch West Background Samples

Enclosed are the results of analyses for samples received by Summit Scientific on 09/16/16 16:25. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'P. Shrewsbury', with a stylized, cursive script.

Paul Shrewsbury  
President



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

Project: Ray Ranch West Background Samples  
Project Number: 065815003.0003  
Project Manager: Brett Forkner

**Reported:**  
09/22/16 13:58

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
RRW BG01 N	1609099-01	Soil	09/14/16 14:00	09/16/16 16:25
RRW BG02 E	1609099-02	Soil	09/14/16 14:00	09/16/16 16:25
RRW BG03 S	1609099-03	Soil	09/14/16 14:00	09/16/16 16:25
RRW BG04 W	1609099-04	Soil	09/14/16 14:00	09/16/16 16:25

Summit Scientific

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

Project: Ray Ranch West Background Samples  
Project Number: 065815003.0003  
Project Manager: Brett Forkner

Reported:  
09/22/16 13:58

# Summit Scientific

S<sub>2</sub>

741 Corporate Circle, Suite J • Golden, Colorado 80401  
303-277-9310 • 303-374-5933

1609 099

Client: LTE Project Manager: BRETT FORKNER Page 1 of 1  
Address: 4600 W 60TH AVE E-Mail: BRETT@S2SCIENTIFIC.COM  
City/State/Zip: ARVADA CO 80003  
Phone: 303 433 9758 Fax: Project Name: RAY RANCH WEST BACKGROUND SAMPLES  
Sampler Name: NORHAEL SOMES Project Number: 065815003.0003

ID	Sample Description	Date Sampled	Time Sampled	# of containers	Preservative				Matrix				Analysis Requested				Special Instructions
					HCl	HNO <sub>3</sub>	None	Other (Specify)	Groundwater	Soil	Air-Canister #	Other (Specify)	APHA	PH	EC	SAR	
1	RAW B601 N	9/14/16	1400	2			X			X			X	X	X		
2	RAW B602 E						X			X			X	X	X		
3	RAW B603 S						X			X			X				
4	RAW B604 W						X			X			X				
5																	
6																	
7																	
8																	
9																	
10																	

Relinquished by: <u>[Signature]</u>	Date/Time: <u>9/16 1250</u>	Received by: <u>[Signature]</u>	Date/Time: <u>9/16/16 1200</u>	Turn Around Time (Check)	Notes:  on ice
Relinquished by: <u>[Signature]</u>	Date/Time: <u>9/16/16 1625</u>	Received by: <u>[Signature]</u>	Date/Time: <u>9/16/16 1625</u>	Same Day <input type="checkbox"/> 72 hours <input type="checkbox"/>	
Relinquished by: <u>[Signature]</u>	Date/Time: <u>9/16/16 1730</u>	Received by: <u>[Signature]</u>	Date/Time: <u>9-16-16 1730</u>	24 hours <input type="checkbox"/> Standard <input checked="" type="checkbox"/>	
				48 hours <input type="checkbox"/>	
Sample Integrity:				Temperature Upon Receipt: <u>0.7°C</u>	
Intact: <input checked="" type="radio"/> Yes <input type="radio"/> No					

www.s2scientific.com

Summit Scientific

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

Project: Ray Ranch West Background Samples  
Project Number: 065815003.0003  
Project Manager: Brett Forkner

Reported:  
09/22/16 13:58

#### Sample Receipt Checklist

S2 Work Order: 1609099

Client: LTE

Client Project ID: Ray Ranch West Background Samples

Shipped Via: P/V

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

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

Matrix (check all that apply): ☐ Air ☒ Soil/Solid ☐ Water ☐ Other: \_\_\_\_\_  
(Describe)

Cooler ID					
Temp (°C)	<u>0.7</u>				

Thermometer ID: 61857155-K

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature just above 0°C to ≤ 6°C <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
NOTE: If samples are delivered the same day of sampling, this requirement is waived provided that there is evidence that cooling has begun.				
Were all samples received intact <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was adequate sample volume provided <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If custody seals are present, are they intact <sup>(1)</sup> ?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Are short holding time analytes or samples with HTs due within 48 hours present?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Is a chain-of-custody (COC) form present and filled out completely <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is the COC properly relinquished by the client w/ date and time recorded <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
For volatiles in water – is there headspace 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 (excluding cooling) <sup>(1)</sup> ?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If samples are acid preserved for metals, is the pH ≤ 2 <sup>(1)</sup> ?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Record the pH in Comments.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If dissolved metals are requested, were samples field filtered?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Additional Comments (if any):				

<sup>(1)</sup> If NO, then contact the client before proceeding with analysis and note in case narrative.

Nakita  
Custodian Printed Name

[Signature]  
Signature or Initials of Custodian

9/16/16 1730  
Date/Time



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

Project: Ray Ranch West Background Samples  
Project Number: 065815003.0003  
Project Manager: Brett Forkner

Reported:  
09/22/16 13:58

**RRW BG01 N**  
**1609099-01 (Soil)**

**Summit Scientific**

**Total Metals by EPA Method 6020 - Dry Weight Basis**

Date Sampled: **09/14/16 14:00**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Arsenic	0.235	0.214	mg/kg dry	1	1609122	09/16/16	09/19/16	EPA 6020A	

**Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis**

Date Sampled: **09/14/16 14:00**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Calcium	156	10.7	mg/kg dry	1	1609138	09/19/16	09/20/16	EPA 6020/Mod. USDA60 6(2, 3A)	
Magnesium	80.8	5.35	"	"	"	"	"	"	
Sodium	52.7	5.35	"	"	"	"	"	"	

Date Sampled: **09/14/16 14:00**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Sodium Adsorption Ratio	0.853		units	"	1609143	09/20/16	09/20/16	"	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **09/14/16 14:00**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Specific Conductance (EC)	0.224	0.0100	mmhos/cm	1	1609132	09/19/16	09/19/16	SM 2510B	

Date Sampled: **09/14/16 14:00**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
pH	7.36	0.100	pH Units	"	1609127	09/19/16	09/19/16	EPA 9045	

Summit Scientific

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

Project: Ray Ranch West Background Samples  
Project Number: 065815003.0003  
Project Manager: Brett Forkner

**Reported:**  
09/22/16 13:58

**RRW BG01 N**  
**1609099-01 (Soil)**

**Summit Scientific**

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **09/14/16 14:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	93.5		%	1	1609135	09/19/16	09/20/16	% calculation	

Summit Scientific

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

Project: Ray Ranch West Background Samples  
Project Number: 065815003.0003  
Project Manager: Brett Forkner

**Reported:**  
09/22/16 13:58

**RRW BG02 E**  
**1609099-02 (Soil)**

**Summit Scientific**

**Total Metals by EPA Method 6020 - Dry Weight Basis**

Date Sampled: **09/14/16 14:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	<b>0.354</b>	0.206	mg/kg dry	1	1609122	09/16/16	09/19/16	EPA 6020A	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **09/14/16 14:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	<b>97.0</b>		%	1	1609135	09/19/16	09/20/16	% calculation	

Summit Scientific

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

Project: Ray Ranch West Background Samples  
Project Number: 065815003.0003  
Project Manager: Brett Forkner

**Reported:**  
09/22/16 13:58

**RRW BG03 S**  
**1609099-03 (Soil)**

**Summit Scientific**

**Total Metals by EPA Method 6020 - Dry Weight Basis**

Date Sampled: **09/14/16 14:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	<b>0.534</b>	0.209	mg/kg dry	1	1609122	09/16/16	09/19/16	EPA 6020A	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **09/14/16 14:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	<b>95.6</b>		%	1	1609135	09/19/16	09/20/16	% calculation	

Summit Scientific

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

Project: Ray Ranch West Background Samples  
Project Number: 065815003.0003  
Project Manager: Brett Forkner

**Reported:**  
09/22/16 13:58

**RRW BG04 W**  
**1609099-04 (Soil)**

**Summit Scientific**

**Total Metals by EPA Method 6020 - Dry Weight Basis**

Date Sampled: **09/14/16 14:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	<b>0.677</b>	0.209	mg/kg dry	1	1609122	09/16/16	09/19/16	EPA 6020A	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **09/14/16 14:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	<b>95.6</b>		%	1	1609135	09/19/16	09/20/16	% calculation	

Summit Scientific

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

Project: Ray Ranch West Background Samples  
Project Number: 065815003.0003  
Project Manager: Brett Forkner

Reported:  
09/22/16 13:58

**Total Metals by EPA Method 6020 - Dry Weight Basis - Quality Control**  
**Summit Scientific**

Analyte	Reporting			Spike	Source		%REC		RPD	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

**Batch 1609122 - EPA 3050B**

**Blank (1609122-BLK1)**

Prepared: 09/16/16 Analyzed: 09/19/16

Arsenic ND 0.200 mg/kg wet

**LCS (1609122-BS1)**

Prepared: 09/16/16 Analyzed: 09/19/16

Arsenic 133 0.500 mg/kg wet 132 101 82.6-117

**Duplicate (1609122-DUP1)**

Source: 1609080-04

Prepared: 09/16/16 Analyzed: 09/19/16

Arsenic 10.5 0.231 mg/kg dry 10.4 0.946 20

**Matrix Spike (1609122-MS1)**

Source: 1609080-04

Prepared: 09/16/16 Analyzed: 09/19/16

Arsenic 73.0 0.231 mg/kg dry 45.6 10.4 137 75-125 QM-07

**Matrix Spike Dup (1609122-MSD1)**

Source: 1609080-04

Prepared: 09/16/16 Analyzed: 09/19/16

Arsenic 64.1 0.231 mg/kg dry 45.6 10.4 118 75-125 13.0 25

Summit Scientific

*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

Project: Ray Ranch West Background Samples  
Project Number: 065815003.0003  
Project Manager: Brett Forkner

Reported:  
09/22/16 13:58

**Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis - Quality Control**  
**Summit Scientific**

Analyte	Reporting			Spike	Source		%REC		RPD	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

**Batch 1609138 - General Preparation**

**Blank (1609138-BLK1)**

Prepared & Analyzed: 09/19/16

Calcium	ND	10.0	mg/kg wet
Magnesium	ND	5.00	"
Sodium	ND	5.00	"

**LCS (1609138-BS1)**

Prepared & Analyzed: 09/19/16

Calcium	541	10.0	mg/kg wet	500	108	82.9-118
Magnesium	532	5.00	"	500	106	77.1-123
Sodium	525	5.00	"	500	105	71-129

**Duplicate (1609138-DUP1)**

Source: 1609098-01

Prepared & Analyzed: 09/19/16

Calcium	121	8.54	mg/kg dry	141	15.2	200
Magnesium	72.5	4.27	"	80.2	10.1	200
Sodium	104	4.27	"	121	15.0	200

**Matrix Spike (1609138-MS1)**

Source: 1609098-01

Prepared & Analyzed: 09/19/16

Calcium	555	8.54	mg/kg dry	427	141	96.9	75-125
Magnesium	531	4.27	"	427	80.2	106	75-125
Sodium	556	4.27	"	427	121	102	75-125

**Matrix Spike Dup (1609138-MSD1)**

Source: 1609098-01

Prepared & Analyzed: 09/19/16

Calcium	600	8.54	mg/kg dry	427	141	107	75-125	7.76	25
Magnesium	560	4.27	"	427	80.2	112	75-125	5.25	25
Sodium	570	4.27	"	427	121	105	75-125	2.62	25

Summit Scientific

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

Project: Ray Ranch West Background Samples  
Project Number: 065815003.0003  
Project Manager: Brett Forkner

Reported:  
09/22/16 13:58

Physical Parameters by APHA/ASTM/EPA Methods - Quality Control  
Summit Scientific

Analyte	Reporting			Spike	Source	%REC		RPD		
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

Batch 1609127 - General Preparation

LCS (1609127-BS1)

Prepared & Analyzed: 09/19/16

pH	6.02	0.100	pH Units	6.00	100	95-105
----	------	-------	----------	------	-----	--------

Duplicate (1609127-DUP1)

Source: 1609098-01

Prepared & Analyzed: 09/19/16

pH	7.50	0.100	pH Units	7.53	0.399	20
----	------	-------	----------	------	-------	----

Batch 1609132 - General Preparation

Blank (1609132-BLK1)

Prepared & Analyzed: 09/19/16

Specific Conductance (EC)	ND	0.0100	mmhos/cm
---------------------------	----	--------	----------

LCS (1609132-BS1)

Prepared & Analyzed: 09/19/16

Specific Conductance (EC)	0.502	0.0100	mmhos/cm	0.500	100	90-110
---------------------------	-------	--------	----------	-------	-----	--------

Duplicate (1609132-DUP1)

Source: 1609098-01

Prepared & Analyzed: 09/19/16

Specific Conductance (EC)	0.330	0.0100	mmhos/cm	0.374	12.7	20
---------------------------	-------	--------	----------	-------	------	----

Batch 1609135 - General Preparation

Duplicate (1609135-DUP1)

Source: 1609098-01

Prepared: 09/19/16 Analyzed: 09/20/16

% Solids	94.4	%	94.4	0.0273	20
----------	------	---	------	--------	----

Summit Scientific

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

Project: Ray Ranch West Background Samples  
Project Number: 065815003.0003  
Project Manager: Brett Forkner

**Reported:**  
09/22/16 13:58

### Notes and Definitions

QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS/LCSD recovery.

DET Analyte DETECTED

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis

RPD Relative Percent Difference

---

Summit Scientific

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A handwritten signature in black ink, appearing to be 'MSF'.

**TABLE 1**  
**BACKGROUND SOIL SAMPLING ANALYTICAL RESULTS**  
**EVANS 2-21H & RAY RANCH 7-21h OIL AND GAS LOCATION**  
**SANDRIDGE ENERGY, INC.**

Parameter	COGCC Table 910-1 Concentration Levels	Units	BG01	BG02	BG03	BG04
Sample Date			5/4/2016	5/4/2016	5/4/2016	5/4/2016
Sample Type			Background	Background	Background	Background
Depth (feet bgs)			0-0.5	0-0.5	0-0.5	0-0.5
Benzene	0.17	mg/kg	--	--	--	--
Toluene	85	mg/kg	--	--	--	--
Ethylbenzene	100	mg/kg	--	--	--	--
Total Xylenes	175	mg/kg	--	--	--	--
TEPH-DRO	--	mg/kg	--	--	--	--
TVPH-GRO	--	mg/kg	--	--	--	--
TPH Total	500	mg/kg	--	--	--	--
Arsenic	0.39	mg/kg	<b>2.44</b>	<b>2.97</b>	<b>2.97</b>	<b>2.61</b>
Barium	15,000	mg/kg	--	--	--	--
Cadmium	70	mg/kg	--	--	--	--
Chromium (III)	120,000	mg/kg	--	--	--	--
Chromium (VI)	23	mg/kg	--	--	--	--
Copper	3,100	mg/kg	--	--	--	--
Lead	400	mg/kg	--	--	--	--
Mercury	23	mg/kg	--	--	--	--
Nickel	1,600	mg/kg	--	--	--	--
Selenium	390	mg/kg	--	--	--	--
Silver	390	mg/kg	--	--	--	--
Zinc	23,000	mg/kg	--	--	--	--
Acenaphthene	1,000	mg/kg	--	--	--	--
Anthracene	1,000	mg/kg	--	--	--	--
Benzo (A) anthracene	0.22	mg/kg	--	--	--	--
Benzo (B) fluoranthene	0.22	mg/kg	--	--	--	--
Benzo (K) fluoranthene	2.2	mg/kg	--	--	--	--
Benzo (A) pyrene	0.022	mg/kg	--	--	--	--
Chrysene	22	mg/kg	--	--	--	--
Dibenzo (A,H) anthracene	0.022	mg/kg	--	--	--	--
Fluoranthene	1,000	mg/kg	--	--	--	--
Fluorene	1,000	mg/kg	--	--	--	--
Indeno (1,2,3,C,D) pyrene	0.22	mg/kg	--	--	--	--
Napthalene	23	mg/kg	--	--	--	--
Pyrene	1,000	mg/kg	--	--	--	--
EC	4	mmhos/cm	--	--	--	0.349
pH	6 - 9	SU	--	--	--	8.16
SAR	12	unitless	--	--	--	0.341

**NOTES:**

**BOLD** - indicates result exceeds the COGCC Table 910-1 Concentration Level

bgs - below ground surface

COGCC - colorado oil and gas conservation commission

EC - electrical conductivity

mg/kg - milligrams per kilogram

mmhos/cm - millimhos per centimeter in saturated paste extract

SAR - sodium adsorption ratio

SU - standard unit on saturated paste

TEPH-DRO - total extractable petroleum hydrocarbon-diesel range organics

TVPH-GRO - total volume petroleum hydrocarbon-gasoline range organics

TPH - total petroleum hydrocarbons

-- - not analyzed/no standard

< - less than the stated analytical reporting limit





# Summit Scientific

---

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

May 13, 2016

Gentry Muniz

LT Environmental, Inc.

4600 West 60th Avenue

Arvada, CO 80003

RE: Evans 2-21H, Ray Ranch 7-21H

Enclosed are the results of analyses for samples received by Summit Scientific on 05/05/16 16:15. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'P. Shrewsbury', with a stylized, cursive script.

Paul Shrewsbury  
President



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

Project: Evans 2-21H, Ray Ranch 7-21H

Project Number: 06581002  
Project Manager: Gentry Muniz

**Reported:**  
05/13/16 06:51

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BG01	1605049-01	Soil	05/04/16 11:20	05/05/16 16:15
BG02	1605049-02	Soil	05/04/16 11:30	05/05/16 16:15
BG03	1605049-03	Soil	05/04/16 11:40	05/05/16 16:15
BG04	1605049-04	Soil	05/04/16 11:50	05/05/16 16:15

Summit Scientific

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

Project: Evans 2-21H, Ray Ranch 7-21H

Project Number: 06581002  
Project Manager: Gentry Muniz

**Reported:**  
05/13/16 06:51

## Summit Scientific

741 Corporate Circle Suite 1 • Golden, Colorado 80401  
303-277-9310 • 303-374-5933 FAX

Page 1 of 1

Client: LT Environmental Inc

Address: 4100 W 60<sup>th</sup> Ave

City/State/Zip: Arvada, CO 80003

Phone: 303-433-9789 Fax:

Sampler Name: DS

Project Manager: Gentry Muniz

E-Mail: amuniz@heav.com Bforkey@heav.com

Project Name: Evans 2-214, Box Ranch 7-214

Project Number: 06581002

[illegible]

[www.s2scientific.com](http://www.s2scientific.com)

Summit Scientific

*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

Project: Evans 2-21H, Ray Ranch 7-21H  
Project Number: 06581002  
Project Manager: Gentry Muniz

Reported:  
05/13/16 06:51

### Sample Receipt Checklist

S2 Work Order: 1605049

Client: LT Env.

Client Project ID: Evans 2-21H, Ray Ranch 7-21H

Shipped Via: Pick up

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

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

Matrix (check all that apply):      Air   ✓   Soil/Solid      Water      Other: \_\_\_\_\_  
(Describe)

Cooler ID					
Temp (°C)		<u>5.4°C</u>			

Thermometer ID: 61857155-K

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature just above 0°C to ≤ 6°C <sup>(1)</sup> ?		✓		
NOTE: If samples are delivered the same day of sampling, this requirement is waived provided that there is evidence that cooling has begun.				
Were all samples received intact <sup>(1)</sup> ?	✓			
Was adequate sample volume provided <sup>(1)</sup> ?	✓			
If custody seals are present, are they intact <sup>(1)</sup> ?			✓	
Are short holding time analytes or samples with HTs due within 48 hours present?			✓	
Is a chain-of-custody (COC) form present and filled out completely <sup>(1)</sup> ?	✓			
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	✓			
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	✓			
Is the COC properly relinquished by the client w/ date and time recorded <sup>(1)</sup> ?	✓			
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.			✓	
Are samples preserved that require preservation (excluding cooling) <sup>(1)</sup> ?			✓	
Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect			✓	
If samples are acid preserved for metals, is the pH ≤ 2 <sup>(1)</sup> ?			✓	
Record the pH in Comments.			✓	
If dissolved metals are requested, were samples field filtered?			✓	
Additional Comments (if any):				
<sup>(1)</sup> If NO, then contact the client before proceeding with analysis and note in case narrative.				

Nakita  
Custodian Printed Name

me  
Signature or Initials of Custodian

5/13/16 12:00  
Date/Time



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

Project: Evans 2-21H, Ray Ranch 7-21H

Project Number: 06581002  
Project Manager: Gentry Muniz

**Reported:**  
05/13/16 06:51

**BG01**  
**1605049-01 (Soil)**

**Summit Scientific**

**Total Metals by EPA Method 6020 - Dry Weight Basis**

Date Sampled: **05/04/16 11:20**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Arsenic	2.44	0.116	mg/kg dry		1	1605071	05/09/16	05/09/16	EPA 6020A	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **05/04/16 11:20**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
% Solids	86.0			%	1	1605074	05/09/16	05/09/16	% calculation	

Summit Scientific

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

Project: Evans 2-21H, Ray Ranch 7-21H

Project Number: 06581002  
Project Manager: Gentry Muniz

**Reported:**  
05/13/16 06:51

**BG02**  
**1605049-02 (Soil)**

**Summit Scientific**

**Total Metals by EPA Method 6020 - Dry Weight Basis**

Date Sampled: **05/04/16 11:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	2.97	0.135	mg/kg dry	1	1605071	05/09/16	05/09/16	EPA 6020A	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **05/04/16 11:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	74.1		%	1	1605074	05/09/16	05/09/16	% calculation	

Summit Scientific

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

Project: Evans 2-21H, Ray Ranch 7-21H

Project Number: 06581002  
Project Manager: Gentry Muniz

**Reported:**  
05/13/16 06:51

**BG03**  
**1605049-03 (Soil)**

**Summit Scientific**

**Total Metals by EPA Method 6020 - Dry Weight Basis**

Date Sampled: **05/04/16 11:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	2.97	0.138	mg/kg dry	1	1605071	05/09/16	05/09/16	EPA 6020A	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **05/04/16 11:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	72.6		%	1	1605074	05/09/16	05/09/16	% calculation	

Summit Scientific

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

Project: Evans 2-21H, Ray Ranch 7-21H

Project Number: 06581002  
Project Manager: Gentry Muniz

Reported:  
05/13/16 06:51

**BG04**  
**1605049-04 (Soil)**

**Summit Scientific**

**Total Metals by EPA Method 6020 - Dry Weight Basis**

Date Sampled: **05/04/16 11:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	2.61	0.134	mg/kg dry	1	1605071	05/09/16	05/09/16	EPA 6020A	

**Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis**

Date Sampled: **05/04/16 11:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Calcium	1030	13.4	mg/kg dry	1	1605094	05/10/16	05/11/16	EPA 6020/Mod. USDA60 6(2, 3A)	
Magnesium	239	6.70	"	"	"	"	"	"	
Sodium	46.7	6.70	"	"	"	"	"	"	

Date Sampled: **05/04/16 11:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sodium Adsorption Ratio	0.341		units	"	1605123	05/12/16	05/12/16	"	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **05/04/16 11:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	0.349	0.0100	mmhos/cm	1	1605066	05/06/16	05/06/16	SM 2510B	

Date Sampled: **05/04/16 11:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	8.16	0.100	pH Units	"	1605065	05/06/16	05/06/16	EPA 9045	

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

Project: Evans 2-21H, Ray Ranch 7-21H

Project Number: 06581002  
Project Manager: Gentry Muniz

**Reported:**  
05/13/16 06:51

**BG04**  
**1605049-04 (Soil)**

**Summit Scientific**

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **05/04/16 11:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	74.6		%	1	1605074	05/09/16	05/09/16	% calculation	

Summit Scientific

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

Project: Evans 2-21H, Ray Ranch 7-21H  
Project Number: 06581002  
Project Manager: Gentry Muniz

**Reported:**  
05/13/16 06:51

**Total Metals by EPA Method 6020 - Dry Weight Basis - Quality Control**

**Summit Scientific**

Analyte	Reporting			Spike	Source		%REC		RPD	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

**Batch 1605071 - EPA 3050B**

**Blank (1605071-BLK1)**

Prepared & Analyzed: 05/09/16

Arsenic ND 0.100 mg/kg wet

**LCS (1605071-BS1)**

Prepared & Analyzed: 05/09/16

Arsenic 39.7 0.100 mg/kg wet 40.0 99.2 59.7-113

**Duplicate (1605071-DUP1)**

**Source: 1605060-01**

Prepared & Analyzed: 05/09/16

Arsenic 2.91 0.120 mg/kg dry 3.05 4.62 20

**Matrix Spike (1605071-MS1)**

**Source: 1605060-01**

Prepared & Analyzed: 05/09/16

Arsenic 10.7 0.120 mg/kg dry 48.1 3.05 16.0 75-125 QM-07

**Matrix Spike Dup (1605071-MSD1)**

**Source: 1605060-01**

Prepared & Analyzed: 05/09/16

Arsenic 10.6 0.120 mg/kg dry 48.1 3.05 15.7 75-125 1.24 25 QM-07

Summit Scientific

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

Project: Evans 2-21H, Ray Ranch 7-21H  
Project Number: 06581002  
Project Manager: Gentry Muniz

Reported:  
05/13/16 06:51

**Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis - Quality Control**  
**Summit Scientific**

Analyte	Reporting			Spike	Source		%REC		RPD	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

**Batch 1605094 - General Preparation**

**Blank (1605094-BLK1)**

Prepared: 05/10/16 Analyzed: 05/11/16

Calcium	ND	10.0	mg/kg wet
Magnesium	ND	5.00	"
Sodium	ND	5.00	"

**LCS (1605094-BS1)**

Prepared: 05/10/16 Analyzed: 05/11/16

Calcium	564	10.0	mg/kg wet	500	113	82.9-118
Magnesium	529	5.00	"	500	106	77.1-123
Sodium	538	5.00	"	500	108	71-129

**Duplicate (1605094-DUP1)**

Source: 1605049-04

Prepared: 05/10/16 Analyzed: 05/11/16

Calcium	990	13.4	mg/kg dry	1030	3.48	200
Magnesium	222	6.70	"	239	7.43	200
Sodium	35.4	6.70	"	46.7	27.4	200

**Matrix Spike (1605094-MS1)**

Source: 1605049-04

Prepared: 05/10/16 Analyzed: 05/11/16

Calcium	1550	13.4	mg/kg dry	621	1030	84.2	75-125
Magnesium	855	6.70	"	621	239	99.3	75-125
Sodium	703	6.70	"	621	46.7	106	75-125

**Matrix Spike Dup (1605094-MSD1)**

Source: 1605049-04

Prepared: 05/10/16 Analyzed: 05/11/16

Calcium	1580	13.4	mg/kg dry	621	1030	89.8	75-125	2.22	25
Magnesium	886	6.70	"	621	239	104	75-125	3.59	25
Sodium	707	6.70	"	621	46.7	106	75-125	0.448	25

Summit Scientific

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

Project: Evans 2-21H, Ray Ranch 7-21H  
Project Number: 06581002  
Project Manager: Gentry Muniz

**Reported:**  
05/13/16 06:51

**Physical Parameters by APHA/ASTM/EPA Methods - Quality Control**  
**Summit Scientific**

Analyte	Reporting			Spike	Source	%REC		RPD		
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

**Batch 1605065 - General Preparation**

<b>LCS (1605065-BS1)</b>					Prepared & Analyzed: 05/06/16						
pH	8.01	0.100	pH Units	8.00	100	95-105					
<b>Duplicate (1605065-DUP1)</b>					Source: 1605053-01 Prepared & Analyzed: 05/06/16						
pH	8.25	0.100	pH Units	8.24	0.121	20					

**Batch 1605066 - General Preparation**

<b>Blank (1605066-BLK1)</b>					Prepared & Analyzed: 05/06/16						
Specific Conductance (EC)	ND	0.0100	mmhos/cm								
<b>LCS (1605066-BS1)</b>					Prepared & Analyzed: 05/06/16						
Specific Conductance (EC)	0.496	0.0100	mmhos/cm	0.500	99.2	90-110					
<b>Duplicate (1605066-DUP1)</b>					Source: 1605053-01 Prepared & Analyzed: 05/06/16						
Specific Conductance (EC)	0.806	0.0100	mmhos/cm	0.887	9.57	20					

**Batch 1605074 - General Preparation**

<b>Duplicate (1605074-DUP1)</b>					Source: 1605060-01 Prepared & Analyzed: 05/09/16						
% Solids	93.4		%	83.2	11.6	20					

Summit Scientific

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

Project: Evans 2-21H, Ray Ranch 7-21H

Project Number: 06581002  
Project Manager: Gentry Muniz

**Reported:**  
05/13/16 06:51

### Notes and Definitions

QM-07    The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS/LCSD recovery.

DET      Analyte DETECTED

ND      Analyte NOT DETECTED at or above the reporting limit

NR      Not Reported

dry      Sample results reported on a dry weight basis

RPD      Relative Percent Difference

---

Summit Scientific

*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.*

A handwritten signature in black ink, appearing to be 'MSM'.