



SCALE 1 : 9,000

500 0 500 1,000 1,500

FEET

LEGEND

 Site Location

N



Figure 1  
Site Location Map  
October 25, 2017 LBK

**McCallum Unit 52**  
**API: 05-057-06033**  
**SWSE, Sec 34, T10N, R79W, 6<sup>th</sup> PM**  
**Jackson County, Colorado**



Aerial photograph courtesy of Google Earth Pro

LEGEND

- |   |   |
|---|---|
| <span style="color: green;">---</span> Excavated 25' BGS  | <span style="color: red;">X</span> Release Location |
| <span style="color: blue;">---</span> Excavated 0-10' BGS | <span style="color: red;">●</span> Sample Location  |

N



Figure 2  
Site Map  
April 13, 2018 LBK

**McCallum Unit 52**  
**API: 05-057-06033**  
**SWSE, Sec 34, T10N, R79W, 6<sup>th</sup> PM**  
**Jackson County, Colorado**

**TABLE 1**  
**SOIL ANALYTICAL RESULTS**  
**MCCALLUM UNIT 52**  
**JACKSON COUNTY, COLORADO**  
**BONANZA CREEK ENERGY OPERATING COMPANY LLC.**

Parameters		COGCC Table 910-1 Concentration Level	SS01	SS02	SS03	SS04	SS05	SS06	SS07	SS08	SS09
Sample Date			11/29/2017	11/29/2017	11/29/2017	11/29/2017	11/29/2017	11/29/2017	11/29/2017	11/29/2017	11/29/2017
Sample Depth (feet)			2-4	5-10	4-10	4-10	23-25	23-25	23-25	23-25	23-25
<b>BTEX</b>	<b>Benzene</b>	<b>0.17</b>	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
	<b>Toluene</b>	<b>85</b>	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
	<b>Ethylbenzene</b>	<b>100</b>	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
	<b>Total Xylenes</b>	<b>175</b>	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
<b>TPH</b>	<b>DRO</b>	<b>--</b>	<50	87.4	332	<50	<50	<50	<50	<50	421
	<b>GRO</b>	<b>--</b>	<50	<50	<50	<50	<50	<50	<50	<50	<50
	<b>Total</b>	<b>500</b>	<50	87.4	332.0	<50	<50	<50	<50	<50	421

**Notes:**

COGCC - Colorado Oil and Gas Conservation Commission

-- - no concentration level is available

BTEX - benzene, toluene, ethylbenzene, xylenes (total)

DRO - diesel range organics

GRO - gasoline range organics

TPH - total petroleum hydrocarbons

All results are in mg/kg unless stated otherwise.



December 12, 2017

**Bonanza Creek Energy, Inc.**

**Brian Dodek**

**410 17th St, Suite 1400**

**Denver**

**CO 80211**

**Project Name - MCU 52**

**Project Number - [none]**

Attached are your analytical results for MCU 52 received by Origins Laboratory, Inc. December 05, 2017. This project is associated with Origins project number Y712045-01.

The analytical results in the following report were analyzed under the guidelines of EPA Methods. These methods are identified as follows; "SW" are defined in SW-846, "EPA" are defined in 40CFR part 136 and "SM" are defined in the most current revision of Standard Methods For the Examination of Water and Wastewater.

The analytical results apply specifically to the samples and analyses specified per the attached Chain of Custody. As such, this report shall not be reproduced except in full, without the written approval of Origin's laboratory.

Unless otherwise noted, the analytical results for all soil samples are reported on a wet weight basis. All analytical analyses were performed under NELAP guidelines unless noted by a data qualifier.

Any holding time exceedances, deviations from the method specifications or deviations from Origins Laboratory's Standard Operating Procedures are outlined in the case narrative.

Thank you for selecting Origins for your analytical needs. Please contact us with any questions concerning this report, or if we can help with anything at all.

Origins Laboratory, Inc.  
303.433.1322  
o-squad@oelabinc.com



1725 Elk Place, Denver, CO 80211 | Phone: 303.433.1322 | Fax: 303.265.9645

Bonanza Creek Energy, Inc.

410 17th St, Suite 1400

Denver CO 80211

Brian Dodek

Project Number: [none]

Project: MCU 52

## CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS01	Y712045-01	Soil	November 29, 2017 12:00	12/05/2017 07:10
SS02	Y712045-02	Soil	November 29, 2017 12:05	12/05/2017 07:10
SS03	Y712045-03	Soil	November 29, 2017 12:10	12/05/2017 07:10
SS04	Y712045-04	Soil	November 29, 2017 12:15	12/05/2017 07:10
SS05	Y712045-05	Soil	November 29, 2017 12:20	12/05/2017 07:10
SS06	Y712045-06	Soil	November 29, 2017 12:25	12/05/2017 07:10
SS07	Y712045-07	Soil	November 29, 2017 12:30	12/05/2017 07:10
SS08	Y712045-08	Soil	November 29, 2017 12:35	12/05/2017 07:10
SS09	Y712045-09	Soil	November 29, 2017 12:40	12/05/2017 07:10

Origins Laboratory, Inc.



*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Bonanza Creek Energy, Inc.

410 17th St, Suite 1400

Denver CO 80211

Brian Dodek

Project Number: [none]

Project: MCU 52

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1712045

**ORIGINS** LABORATORY, INC

Client: Bonanza Creek Energy

Address: 410 17th Street Suite 1700 Denver, CO 80202

Telephone Number: 720-225-6653

Email Address:

Project Manager: Brian Dodek/Luke Kelly

Project Name: MCU 52

Project Number:

Samples Collected By: Luke Kelly

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative	Matrix	Analysis	Sample Instructions
SS01	11/29/11	1200	2	X	Soil	TPH (D60 + G60) BTEX	1
SS02		1205	1				2
SS03		1210	1				3
SS04		1215	1				4
SS05		1220	1				5
SS06		1225	1				6
SS07		1230	1				7
SS08		1235	1				8
SS09		1240	1				9
							10
Relinquished By: <i>LK Kelly</i>	Date: 12/5/17	Time: 7:10	Received By: <i>AK</i>	Date: 12/5/17	Time: 7:10	Turnaround Time: Same Day <input type="checkbox"/> 24 Hr <input type="checkbox"/> 48 Hr <input type="checkbox"/> 72 Hr <input type="checkbox"/> Standard <input checked="" type="checkbox"/>	
Relinquished By:	Date:	Time:	Received By:	Date:	Time:		

1725 Elk Place | Denver, CO 80211 | Phone: 303.433.1322 | Fax: 303.265.9645

Origins Laboratory, Inc.

*Jen Pellegrini*

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Bonanza Creek Energy, Inc.

410 17th St, Suite 1400

Denver CO 80211

Brian Dodek

Project Number: [none]

Project: MCU 52

Origins Laboratory

F-012207-01-R1

Effective Date: 01/09/12

## Sample Receipt Checklist

Origins Work Order: 11712045

Client: Bonanza Creek Energy

Client Project ID: MCU 52

Checklist Completed by: DL

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

Date/time completed: 12-5-12

Airbill #: NR

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

Cooler Number/Temperature: 13.4 °C / \_\_\_\_\_ °C / \_\_\_\_\_ °C (Describe)

Thermometer ID: 1003 PL

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

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

Reviewed by: DL (Project Manager)

Date/Time Reviewed: 12/6/12

Origins Laboratory, Inc.

*Jefe Pellegrini*

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Bonanza Creek Energy, Inc.

410 17th St, Suite 1400

Denver CO 80211

Brian Dodek

Project Number: [none]

Project: MCU 52

SS01

11/29/2017 12:00:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
Y712045-01 (Soil)

## BTEX by EPA 8260C

Benzene	ND	0.050	mg/kg	25	B7L0803	12/08/2017	12/08/2017	U
Toluene	ND	0.050	"	"	"	"	"	U
Ethylbenzene	ND	0.050	"	"	"	"	"	U
Xylenes, total	ND	0.050	"	"	"	"	"	U

Surrogate: 1,2-Dichloroethane-d4

109 % 70-130

" " "

Surrogate: Toluene-d8

103 % 70-130

" " "

Surrogate: 4-Bromofluorobenzene

110 % 70-130

" " "

## GRO (TVPH)/DRO (TEPH)by EPA 8015C

Gasoline (C6-C10)	ND	50.0	mg/kg	1	B7L0802	12/08/2017	12/08/2017	U
Diesel (C10-C28)	ND	50.0	"	"	"	"	"	U

Surrogate: o-Terphenyl

92.7 % 59-131

" " "

Origins Laboratory, Inc.



The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Bonanza Creek Energy, Inc.

410 17th St, Suite 1400

Denver CO 80211

Brian Dodek

Project Number: [none]

Project: MCU 52

SS02

11/29/2017 12:05:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
Y712045-02 (Soil)

## BTEX by EPA 8260C

Benzene	ND	0.050	mg/kg	25	B7L0803	12/08/2017	12/08/2017	U
Toluene	ND	0.050	"	"	"	"	"	U
Ethylbenzene	ND	0.050	"	"	"	"	"	U
Xylenes, total	ND	0.050	"	"	"	"	"	U

Surrogate: 1,2-Dichloroethane-d4

111 % 70-130

" " "

Surrogate: Toluene-d8

104 % 70-130

" " "

Surrogate: 4-Bromofluorobenzene

108 % 70-130

" " "

## GRO (TVPH)/DRO (TEPH)by EPA 8015C

Gasoline (C6-C10)	ND	50.0	mg/kg	1	B7L0802	12/08/2017	12/09/2017	U
Diesel (C10-C28)	87.4	50.0	"	"	"	"	"	

Surrogate: o-Terphenyl

84.8 % 59-131

" " "

Origins Laboratory, Inc.



The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Bonanza Creek Energy, Inc.

410 17th St, Suite 1400

Denver CO 80211

Brian Dodek

Project Number: [none]

Project: MCU 52

**SS03**

**11/29/2017 12:10:00PM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**Y712045-03 (Soil)**

**BTEX by EPA 8260C**

Benzene	ND	0.050	mg/kg	25	B7L0803	12/08/2017	12/08/2017	U
Toluene	ND	0.050	"	"	"	"	"	U
Ethylbenzene	ND	0.050	"	"	"	"	"	U
Xylenes, total	ND	0.050	"	"	"	"	"	U

Surrogate: 1,2-Dichloroethane-d4	107 %	70-130			"	"	"	
Surrogate: Toluene-d8	103 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	107 %	70-130			"	"	"	

**GRO (TVPH)/DRO (TEPH)by EPA 8015C**

Gasoline (C6-C10)	ND	50.0	mg/kg	1	B7L0802	12/08/2017	12/09/2017	U
Diesel (C10-C28)	332	50.0	"	"	"	"	"	

Surrogate: o-Terphenyl	94.3 %	59-131			"	"	"	
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Origins Laboratory, Inc.



The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Bonanza Creek Energy, Inc.

410 17th St, Suite 1400

Denver CO 80211

Brian Dodek

Project Number: [none]

Project: MCU 52

**SS04****11/29/2017 12:15:00PM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**Y712045-04 (Soil)****BTEX by EPA 8260C**

Benzene	ND	0.050	mg/kg	25	B7L0803	12/08/2017	12/08/2017	U
Toluene	ND	0.050	"	"	"	"	"	U
Ethylbenzene	ND	0.050	"	"	"	"	"	U
Xylenes, total	ND	0.050	"	"	"	"	"	U

*Surrogate: 1,2-Dichloroethane-d4*

106 % 70-130

"

"

"

*Surrogate: Toluene-d8*

104 % 70-130

"

"

"

*Surrogate: 4-Bromofluorobenzene*

105 % 70-130

"

"

"

**GRO (TVPH)/DRO (TEPH)by EPA 8015C**

Gasoline (C6-C10)	ND	50.0	mg/kg	1	B7L0802	12/08/2017	12/09/2017	U
Diesel (C10-C28)	ND	50.0	"	"	"	"	"	U

*Surrogate: o-Terphenyl*

89.4 % 59-131

"

"

"

Origins Laboratory, Inc.



The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Bonanza Creek Energy, Inc.

410 17th St, Suite 1400

Denver CO 80211

Brian Dodek

Project Number: [none]

Project: MCU 52

SS05

11/29/2017 12:20:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
Y712045-05 (Soil)

## BTEX by EPA 8260C

Benzene	ND	0.050	mg/kg	25	B7L0803	12/08/2017	12/08/2017	U
Toluene	ND	0.050	"	"	"	"	"	U
Ethylbenzene	ND	0.050	"	"	"	"	"	U
Xylenes, total	ND	0.050	"	"	"	"	"	U

Surrogate: 1,2-Dichloroethane-d4

111 % 70-130

" " "

Surrogate: Toluene-d8

105 % 70-130

" " "

Surrogate: 4-Bromofluorobenzene

109 % 70-130

" " "

## GRO (TVPH)/DRO (TEPH)by EPA 8015C

Gasoline (C6-C10)	ND	50.0	mg/kg	1	B7L0802	12/08/2017	12/09/2017	U
Diesel (C10-C28)	ND	50.0	"	"	"	"	"	U

Surrogate: o-Terphenyl

87.6 % 59-131

" " "

Origins Laboratory, Inc.



The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Bonanza Creek Energy, Inc.

410 17th St, Suite 1400

Denver CO 80211

Brian Dodek

Project Number: [none]

Project: MCU 52

SS06

11/29/2017 12:25:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
Y712045-06 (Soil)

## BTEX by EPA 8260C

Benzene	ND	0.050	mg/kg	25	B7L0803	12/08/2017	12/08/2017	U
Toluene	ND	0.050	"	"	"	"	"	U
Ethylbenzene	ND	0.050	"	"	"	"	"	U
Xylenes, total	ND	0.050	"	"	"	"	"	U

Surrogate: 1,2-Dichloroethane-d4

107 % 70-130

" " "

Surrogate: Toluene-d8

102 % 70-130

" " "

Surrogate: 4-Bromofluorobenzene

106 % 70-130

" " "

## GRO (TVPH)/DRO (TEPH)by EPA 8015C

Gasoline (C6-C10)	ND	50.0	mg/kg	1	B7L0802	12/08/2017	12/09/2017	U
Diesel (C10-C28)	ND	50.0	"	"	"	"	"	U

Surrogate: o-Terphenyl

89.5 % 59-131

" " "

Origins Laboratory, Inc.



The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Bonanza Creek Energy, Inc.

410 17th St, Suite 1400

Denver CO 80211

Brian Dodek

Project Number: [none]

Project: MCU 52

**SS07****11/29/2017 12:30:00PM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**Y712045-07 (Soil)****BTEX by EPA 8260C**

Benzene	ND	0.050	mg/kg	25	B7L0803	12/08/2017	12/09/2017	U
Toluene	ND	0.050	"	"	"	"	"	U
Ethylbenzene	ND	0.050	"	"	"	"	"	U
Xylenes, total	ND	0.050	"	"	"	"	"	U

*Surrogate: 1,2-Dichloroethane-d4*

109 % 70-130

"

"

"

*Surrogate: Toluene-d8*

103 % 70-130

"

"

"

*Surrogate: 4-Bromofluorobenzene*

108 % 70-130

"

"

"

**GRO (TVPH)/DRO (TEPH)by EPA 8015C**

Gasoline (C6-C10)	ND	50.0	mg/kg	1	B7L0802	12/08/2017	12/09/2017	U
Diesel (C10-C28)	ND	50.0	"	"	"	"	"	U

*Surrogate: o-Terphenyl*

88.6 % 59-131

"

"

"

Origins Laboratory, Inc.



The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Bonanza Creek Energy, Inc.

410 17th St, Suite 1400

Denver CO 80211

Brian Dodek

Project Number: [none]

Project: MCU 52

SS08

11/29/2017 12:35:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
Y712045-08 (Soil)

## BTEX by EPA 8260C

Benzene	ND	0.050	mg/kg	25	B7L0803	12/08/2017	12/09/2017	U
Toluene	ND	0.050	"	"	"	"	"	U
Ethylbenzene	ND	0.050	"	"	"	"	"	U
Xylenes, total	ND	0.050	"	"	"	"	"	U

Surrogate: 1,2-Dichloroethane-d4

106 % 70-130

"

"

"

Surrogate: Toluene-d8

103 % 70-130

"

"

"

Surrogate: 4-Bromofluorobenzene

108 % 70-130

"

"

"

## GRO (TVPH)/DRO (TEPH)by EPA 8015C

Gasoline (C6-C10)	ND	50.0	mg/kg	1	B7L0802	12/08/2017	12/09/2017	U
Diesel (C10-C28)	ND	50.0	"	"	"	"	"	U

Surrogate: o-Terphenyl

87.5 % 59-131

"

"

"

Origins Laboratory, Inc.



The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Bonanza Creek Energy, Inc.

410 17th St, Suite 1400

Denver CO 80211

Brian Dodek

Project Number: [none]

Project: MCU 52

SS09

11/29/2017 12:40:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
Y712045-09 (Soil)

## BTEX by EPA 8260C

Benzene	ND	0.050	mg/kg	25	B7L0803	12/08/2017	12/09/2017	U
Toluene	ND	0.050	"	"	"	"	"	U
Ethylbenzene	ND	0.050	"	"	"	"	"	U
Xylenes, total	ND	0.050	"	"	"	"	"	U

Surrogate: 1,2-Dichloroethane-d4

107 % 70-130

" " "

Surrogate: Toluene-d8

104 % 70-130

" " "

Surrogate: 4-Bromofluorobenzene

111 % 70-130

" " "

## GRO (TVPH)/DRO (TEPH)by EPA 8015C

Gasoline (C6-C10)	ND	50.0	mg/kg	1	B7L0802	12/08/2017	12/09/2017	U
Diesel (C10-C28)	421	50.0	"	"	"	"	"	

Surrogate: o-Terphenyl

102 % 59-131

" " "

Origins Laboratory, Inc.



The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Bonanza Creek Energy, Inc.

410 17th St, Suite 1400

Denver CO 80211

Brian Dodek

Project Number: [none]

Project: MCU 52

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch B7L0803 - EPA 5030 (soil)**

**Blank (B7L0803-BLK1)**

Prepared: 12/08/2017 Analyzed: 12/08/2017

Benzene	ND	0.002	mg/kg							U
Toluene	ND	0.002	"							U
Ethylbenzene	ND	0.002	"							U
Xylenes, total	ND	0.002	"							U
Surrogate: 1,2-Dichloroethane-d4	64		ug/kg	62.5		103	70-130			
Surrogate: Toluene-d8	64		"	62.5		102	70-130			
Surrogate: 4-Bromofluorobenzene	67		"	62.5		106	70-130			

Origins Laboratory, Inc.



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Bonanza Creek Energy, Inc.

410 17th St, Suite 1400

Denver CO 80211

Brian Dodek

Project Number: [none]

Project: MCU 52

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B7L0803 - EPA 5030 (soil)

**LCS (B7L0803-BS1)**

Prepared: 12/08/2017 Analyzed: 12/08/2017

Benzene	0.085	0.002	mg/kg	0.100		85.3	77.1-124			
Toluene	0.087	0.002	"	0.100		87.1	74.5-128			
Ethylbenzene	0.092	0.002	"	0.100		92.1	66.4-127			
m,p-Xylene	0.187	0.004	"	0.200		93.4	76.6-124			
o-Xylene	0.096	0.002	"	0.100		95.6	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	72		ug/kg	62.5		116	70-130			
Surrogate: Toluene-d8	65		"	62.5		104	70-130			
Surrogate: 4-Bromofluorobenzene	67		"	62.5		108	70-130			

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Jen Pellegrini For Noelle Doyle Mathis, President

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Denver CO 80211

Brian Dodek

Project Number: [none]

Project: MCU 52

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch B7L0803 - EPA 5030 (soil)**

Matrix Spike (B7L0803-MS1)		Source: Y712045-01			Prepared: 12/08/2017 Analyzed: 12/08/2017					
Benzene	2.56	0.050	mg/kg	2.50	ND	102	71.8-126			
Toluene	2.61	0.050	"	2.50	ND	104	65.1-130			
Ethylbenzene	2.82	0.050	"	2.50	ND	113	62.2-130			
m,p-Xylene	5.73	0.100	"	5.00	ND	115	46.5-137			
o-Xylene	2.83	0.050	"	2.50	ND	113	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	70		ug/kg	62.5		113	70-130			
Surrogate: Toluene-d8	65		"	62.5		105	70-130			
Surrogate: 4-Bromofluorobenzene	67		"	62.5		107	70-130			

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Denver CO 80211

Brian Dodek

Project Number: [none]

Project: MCU 52

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch B7L0803 - EPA 5030 (soil)**

Matrix Spike Dup (B7L0803-MSD1)		Source: Y712045-01			Prepared: 12/08/2017 Analyzed: 12/08/2017					
Benzene	2.50	0.050	mg/kg	2.50	ND	100	71.8-126	2.25	11.3	
Toluene	2.64	0.050	"	2.50	ND	106	65.1-130	1.27	15.4	
Ethylbenzene	2.81	0.050	"	2.50	ND	112	62.2-130	0.444	19.6	
m,p-Xylene	5.70	0.100	"	5.00	ND	114	46.5-137	0.420	19.2	
o-Xylene	2.84	0.050	"	2.50	ND	114	54.2-134	0.282	17.9	
Surrogate: 1,2-Dichloroethane-d4	70		ug/kg	62.5		112	70-130			
Surrogate: Toluene-d8	64		"	62.5		102	70-130			
Surrogate: 4-Bromofluorobenzene	68		"	62.5		109	70-130			

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Denver CO 80211

Brian Dodek

Project Number: [none]

Project: MCU 52

## Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control

### Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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## Extractable Petroleum Hydrocarbons by 8015C - Quality Control

### Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch B7L0802 - EPA 3580

#### Blank (B7L0802-BLK1)

Prepared: 12/08/2017 Analyzed: 12/08/2017

Gasoline (C6-C10)	ND	50.0	mg/kg							U
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Diesel (C10-C28)	ND	50.0	"							U
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Surrogate: o-Terphenyl	51		"	50.0		102	59-131			
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#### Blank (B7L0802-BLK2)

Prepared: 12/08/2017 Analyzed: 12/08/2017

Gasoline (C6-C10)	ND	50.0	mg/kg							U
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Diesel (C10-C28)	ND	50.0	"							U
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Surrogate: o-Terphenyl	48		"	50.0		96.0	59-131			
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#### LCS (B7L0802-BS1)

Prepared: 12/08/2017 Analyzed: 12/08/2017

Gasoline (C6-C10)	1030	50.0	mg/kg	1000		103	59-133			
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Diesel (C10-C28)	1030	50.0	"	1000		103	64-121			
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Surrogate: o-Terphenyl	54		"	50.0		107	59-131			
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#### LCS (B7L0802-BS2)

Prepared: 12/08/2017 Analyzed: 12/08/2017

Gasoline (C6-C10)	992	50.0	mg/kg	1000		99.2	59-133			
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Diesel (C10-C28)	951	50.0	"	1000		95.1	64-121			
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Surrogate: o-Terphenyl	50		"	50.0		101	59-131			
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#### Matrix Spike (B7L0802-MS1)

Source: Y712034-01

Prepared: 12/08/2017 Analyzed: 12/08/2017

Gasoline (C6-C10)	1110	50.0	mg/kg	1000	ND	111	57-139			
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Diesel (C10-C28)	1060	50.0	"	1000	ND	106	53-125			
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Denver CO 80211

Brian Dodek

Project Number: [none]

Project: MCU 52

## Extractable Petroleum Hydrocarbons by 8015C - Quality Control

### Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch B7L0802 - EPA 3580</b>										
<b>Matrix Spike (B7L0802-MS1)</b>		<b>Source: Y712034-01</b>			Prepared: 12/08/2017 Analyzed: 12/08/2017					
Surrogate: o-Terphenyl	55		mg/kg	50.0		110	59-131			
<b>Matrix Spike (B7L0802-MS2)</b>		<b>Source: Y712034-02</b>			Prepared: 12/08/2017 Analyzed: 12/08/2017					
Gasoline (C6-C10)	1030	50.0	mg/kg	1000	ND	103	57-139			
Diesel (C10-C28)	1000	50.0	"	1000	ND	100	53-125			
Surrogate: o-Terphenyl	54		"	50.0		108	59-131			
<b>Matrix Spike Dup (B7L0802-MSD1)</b>		<b>Source: Y712034-01</b>			Prepared: 12/08/2017 Analyzed: 12/08/2017					
Gasoline (C6-C10)	1020	50.0	mg/kg	1000	ND	102	57-139	8.80	20	
Diesel (C10-C28)	1010	50.0	"	1000	ND	101	53-125	4.40	20	
Surrogate: o-Terphenyl	54		"	50.0		107	59-131			
<b>Matrix Spike Dup (B7L0802-MSD2)</b>		<b>Source: Y712034-02</b>			Prepared: 12/08/2017 Analyzed: 12/08/2017					
Gasoline (C6-C10)	1060	50.0	mg/kg	1000	ND	106	57-139	2.20	20	
Diesel (C10-C28)	1030	50.0	"	1000	ND	103	53-125	2.35	20	
Surrogate: o-Terphenyl	52		"	50.0		105	59-131			

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Brian Dodek

Project Number: [none]

Project: MCU 52

### Notes and Definitions

U Sample is Non-Detect.

ND Analyte NOT DETECTED at or above the reporting limit

RPD Relative Percent Difference

All soil results are reported at a wet weight basis.

Origins Laboratory, Inc.



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Jen Pellegrini For Noelle Doyle Mathis, President