



PDC Energy, Inc.
Third Quarter 2018 Groundwater Monitoring Summary

October 22, 2018

Former J&L Farms 14, 24-29 Tank Battery
SWSW Section 29 T6N R63W
Spill Point ID # 451446
Remediation # 10537

This groundwater monitoring summary has been prepared by Tasman Geosciences, Inc. for the former J&L Farms 14, 24-29 tank battery. On September 4, 2018, groundwater monitoring was conducted at all nine monitoring well locations (BH01 – BH09). Nine groundwater samples were submitted to Summit Scientific Laboratory for analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) by USEPA Method 8260B. Analytical results are summarized in Table 1 and the laboratory report is included as Attachment A. Sample locations and corresponding analytical results are illustrated on Figure 1. Third quarter 2018 analytical results indicate that BTEX concentrations are above the applicable COGCC Table 910-1 groundwater standards in monitoring wells BH05, BH06, and BH09. BTEX concentrations are below applicable regulatory standards in six monitoring wells.

Monitored natural attenuation (MNA) was selected as the remediation strategy for this site during the fourth quarter 2017 and will remain as the selected remediation strategy through the fourth quarter 2018.

Per the conditions of approval (COA) issued by the COGCC on August 22, 2018, two additional monitoring wells (BH10 and BH11) were installed on October 8, 2018, to provide down-gradient points of compliance and will be sampled during the fourth quarter 2018 sampling event. Fourth quarter 2018 groundwater sampling will be conducted during December 2018.

BH02		
Compound (µg/L)	6/20/2018	9/4/2018
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<2.0	<2.0
Depth to Water (ft. bgs)	18.61	18.10

BH06		
Compound (µg/L)	6/20/2018	9/4/2018
Benzene	240	240
Toluene	170	230
Ethylbenzene	390	370
Total Xylenes	2,100	2,100
Depth to Water (ft. bgs)	18.22	17.79

BH09		
Compound (µg/L)	6/20/2018	9/4/2018
Benzene	46	6.6
Toluene	<1.0	<1.0
Ethylbenzene	69	45
Total Xylenes	30	53
Depth to Water (ft. bgs)	18.65	18.26

BH05		
Compound (µg/L)	6/20/2018	9/4/2018
Benzene	6.7	120
Toluene	<1.0	<1.0
Ethylbenzene	18	200
Total Xylenes	8.8	<2.0
Depth to Water (ft. bgs)	18.35	18.03

BH08		
Compound (µg/L)	6/20/2018	9/4/2018
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<2.0	<2.0
Depth to Water (ft. bgs)	18.83	18.48

BH01		
Compound (µg/L)	6/20/2018	9/4/2018
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<2.0	<2.0
Depth to Water (ft. bgs)	18.00	17.48

BH03		
Compound (µg/L)	6/20/2018	9/4/2018
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<2.0	<2.0
Depth to Water (ft. bgs)	17.87	17.40

BH04		
Compound (µg/L)	6/20/2018	9/4/2018
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<2.0	<2.0
Depth to Water (ft. bgs)	17.74	17.42

BH07		
Compound (µg/L)	6/20/2018	9/4/2018
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<2.0	<2.0
Depth to Water (ft. bgs)	17.86	17.58



Legend

- Monitoring Well (Location collected via Trimble GPS)
- Excavation Extent (Collected via Trimble GPS)
- Excavation Groundwater Sample
- Point of Release
- Groundwater Flow Direction (3Q18)

Notes

All locations are approximate unless otherwise noted.

Surface drainage direction is estimated based on topography and is not related to regional topography.

GPS – Global Positioning System

µg/L – Micrograms per liter

ft. bgs – Feet below ground surface

Red text denotes exceedances of COGCC Table 910-1 standards.

COGCC – Colorado Oil and Gas Conservation Commission

0 ft. 20ft. 40ft.

Image Source: Google Earth; 2016 Google
Projection: WGS 84 UTM Zone 13 North

DATE:	9/4/2018
DESIGNED BY:	C. Hamlin
DRAWN BY:	B. Nelson

TASMAN GEOSCIENCES
Tasman Geosciences, Inc.
6899 Pecos Street – Unit C
Denver, CO 80221

PDC Energy, Inc. – DJ Basin
Former J&L Farms 14, 24-29 Tank Battery
SWSW, Section 29, Township 6 North, Range 63 West
Weld County, Colorado

GROUNDWATER ANALYTICAL RESULTS MAP

FIGURE 1



Legend

- Monitoring Well (Collected via Trimble GPS)
- Groundwater Elevation Contour (Dashed where inferred)
- 4643.22** Measured Groundwater Elevation (feet AMSL)
- Point of Release
- Excavation Extent (Collected via Trimble GPS)
- Groundwater Flow Direction (3Q18)

Notes

All locations are approximate unless otherwise noted.

Surface drainage direction is estimated based on site topography and is not related to regional topography.

GPS – Global Positioning System

FT. AMSL – Feet Above Mean Seal Level

0 ft. 20 ft. 40 ft.

Image Source: Google Earth; 2016 Google
Projection: WGS 84 UTM Zone 13 North

DATE:	October 11, 2018
DESIGNED BY:	C. Hamlin
DRAWN BY:	D. Cavinder



Tasman Geosciences, Inc.
6899 Pecos Street – Unit C
Denver, CO 80221

PDC Energy, Inc. – DJ Basin
Former J&L Farms 14, 24-29 Tank Battery
SWSW, Section 29, Township 6 North, Range 63 West
Weld County, Colorado

**GROUNDWATER
ELEVATION CONTOUR
MAP**

**FIGURE
2**

TABLE 1
FORMER J&L FARMS 14, 24-29 TANK BATTERY
GROUNDWATER ANALYTICAL RESULTS SUMMARY TABLE

Sample ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Depth to Water ⁽²⁾ (feet)	Groundwater Elevation (ft AMSL)
COGCC Table 910-1 Groundwater Standard (µg/L) ⁽¹⁾		5	560	700	1,400		
GW01	8/31/2017	6.4	<1.0	<1.0	<2.0	~ 18	NM
GW02	9/5/2017	60	3.4	2.2	170	~ 18	NM
BH01	12/13/2017	<1.0	<1.0	<1.0	<2.0	16.91	4644.06
BH01	3/28/2018	<1.0	<1.0	<1.0	<2.0	17.94	4643.18
BH01	6/20/2018	<1.0	<1.0	<1.0	<2.0	18.00	4643.12
BH01	9/4/2018	<1.0	<1.0	<1.0	<2.0	17.48	4643.64
BH02	12/13/2017	<1.0	<1.0	<1.0	<2.0	17.91	4643.82
BH02	3/28/2018	<1.0	<1.0	<1.0	<2.0	18.61	4642.97
BH02	6/20/2018	<1.0	<1.0	<1.0	<2.0	18.61	4642.97
BH02	9/4/2018	<1.0	<1.0	<1.0	<2.0	18.10	4643.48
BH03	12/13/2017	<1.0	<1.0	<1.0	<2.0	16.93	4644.07
BH03	3/28/2018	<1.0	<1.0	<1.0	<2.0	17.79	4643.22
BH03	6/20/2018	<1.0	<1.0	<1.0	<2.0	17.87	4643.14
BH03	9/4/2018	<1.0	<1.0	<1.0	<2.0	17.40	4643.61
BH04	12/13/2017	<1.0	<1.0	<1.0	<2.0	16.78	4643.99
BH04	3/28/2018	<1.0	<1.0	<1.0	<2.0	17.63	4643.15
BH04	6/20/2018	<1.0	<1.0	<1.0	<2.0	17.74	4643.04
BH04	9/4/2018	<1.0	<1.0	<1.0	<2.0	17.42	4643.36
BH05	12/13/2017	67	<1.0	260	300	17.44	4643.74
BH05	3/28/2018	<1.0	<1.0	<1.0	<2.0	18.31	4642.90
BH05	6/20/2018	6.7	<1.0	18	8.8	18.35	4642.86
BH05	9/4/2018	120	<1.0	200	<2.0	18.03	4643.18
BH06 ⁽³⁾	12/13/2017	490	540	600	2,700	17.26	4643.96
BH06 ⁽³⁾	3/28/2018	250	48	220	1,200	18.11	4643.09
BH06 ⁽³⁾	6/20/2018	240	170	390	2,100	18.22	4642.98
BH06 ⁽³⁾	9/4/2018	240	230	370	2,100	17.79	4643.41
BH07	3/28/2018	<1.0	<1.0	<1.0	<2.0	17.75	4642.99
BH07	6/20/2018	<1.0	<1.0	<1.0	<2.0	17.86	4642.88
BH07	9/4/2018	<1.0	<1.0	<1.0	<2.0	17.58	4643.16
BH08	3/28/2018	<1.0	<1.0	<1.0	<2.0	18.67	4642.89
BH08	6/20/2018	<1.0	<1.0	<1.0	<2.0	18.83	4642.73
BH08	9/4/2018	<1.0	<1.0	<1.0	<2.0	18.48	4643.08
BH09	3/28/2018	<1.0	<1.0	<1.0	<2.0	18.52	4642.90
BH09	6/20/2018	46	<1.0	69	30	18.65	4642.77
BH09	9/4/2018	6.6	<1.0	45	53	18.26	4643.16

TABLE 1
FORMER J&L FARMS 14, 24-29 TANK BATTERY
GROUNDWATER ANALYTICAL RESULTS SUMMARY TABLE

Sample ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Depth to Water ⁽²⁾ (feet)	Groundwater Elevation (ft AMSL)
COGCC Table 910-1 Groundwater Standard (µg/L) ⁽¹⁾		5	560	700	1,400		

Notes:

1. Groundwater standards referenced from 2 CCR 404-1, Table 910-1, effective May 1, 2018.
2. Depth to water measurements were measured from top of casing or ground surface for monitoring well samples and excavation samples respectively. Subsequent monitoring well measurements were collected from top of casing and adjusted using survey data and product thickness to reflect depth of water from ground surface.
3. Sheen observed on groundwater.

COGCC = Colorado Oil and Gas Conservation Commission

µg/L = Micrograms per liter

(<) = Analytical result is less than the indicated laboratory reporting limit.

ft AMSL = Feet Above Mean Sea Level

NM = Not measured

BOLD = Analytical result is in exceedance of COGCC groundwater standards.

ATTACHMENT A

Summit Scientific

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

September 11, 2018

Mark Longhurst

PDC Energy

1775 Sherman St. STE. 3000

Denver, CO 80203

RE: J&L Farms 14, 24-29

Enclosed are the results of analyses for samples received by Summit Scientific on 09/04/18 16:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'Paul Shrewsbury', written in a cursive style.

Paul Shrewsbury For Ben Shrewsbury

Laboratory Manager



PDC Energy
1775 Sherman St. STE. 3000
Denver CO, 80203

Project: J&L Farms 14, 24-29

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/11/18 15:17

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	1809016-01	Water	09/04/18 12:51	09/04/18 16:30
BH02	1809016-02	Water	09/04/18 12:46	09/04/18 16:30
BH03	1809016-03	Water	09/04/18 12:36	09/04/18 16:30
BH04	1809016-04	Water	09/04/18 12:26	09/04/18 16:30
BH05	1809016-05	Water	09/04/18 12:58	09/04/18 16:30
BH06	1809016-06	Water	09/04/18 13:10	09/04/18 16:30
BH07	1809016-07	Water	09/04/18 12:25	09/04/18 16:30
BH08	1809016-08	Water	09/04/18 12:37	09/04/18 16:30
BH09	1809016-09	Water	09/04/18 13:07	09/04/18 16:30

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.

Summit Scientific

1809016

741 Corporate Circle Suite 1 ♦ Golden, Colorado 80401
303-277-9310 ♦ 303-374-5933 Fax

Page 1 of 1

Client: PDC/Tasman
Address: 6899 N Pecos St
City/State/Zip: Denver, CO 80221
Phone: 970.481.6909 Fax: _____
Sampler Name: Brian Gabel

Project Manager: Mark Longhuist
E-Mail: mark.longhuist@pdce.com
Project Name: J+L Farms 14, 24-29
Project Number: _____

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative				Matrix			Analyze For:				Special Instructions		
				HCl	HNO ₃	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)	BTEX					
BH01	9/04/2018	1251	3	X				X				X					
BH02		1246															
BH03		1236															
BH04		1226															
BH05		1258															
BH06		1310															
BH07		1225															
BH08		1237															
BH09		1307															

Relinquished by: <u>Brian Gabel</u>	Date/Time: <u>16:30 9/04/18</u>	Received by: <u>[Signature]</u>	Date/Time: <u>9-4-18 16:30</u>	Turn Around Time (Check)		Notes:	
Relinquished by:	Date/Time:	Received by:	Date/Time:	Same Day	<input type="checkbox"/>	72 Hours	<input type="checkbox"/>
				24 Hours	<input type="checkbox"/>	Standard	<input checked="" type="checkbox"/>
				48 Hours	<input type="checkbox"/>		
Relinquished by:	Date/Time:	Received in Lab by:	Date/Time:	Sample Integrity:			
				Temperature Upon Receipt:	<u>.4</u>		
				Intact: Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>

Sample Receipt Checklist

S2 Work Order: 1809016

Client: PDC/TASMAN Client Project ID: J-L FARMS 14, 24-29

Shipped Via: P.O. Airbill #: _____
(UPS, FedEx, Hand Delivered, Pick-up, etc.)

Matrix (check all that apply): Air Soil/Solid Water Other: _____
(Describe)

Temp (°C)	<u>.4</u>
-----------	-----------

Thermometer ID: 61857155-K

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature at 4°C +/- 2°C ⁽¹⁾ ? NOTE: If samples are delivered the same day of sampling, this requirement is met provided that there is evidence that cooling has begun.	x			
Were all samples received intact ⁽¹⁾ ?	x			
Was adequate sample volume provided ⁽¹⁾ ?	x			
If custody seals are present, are they intact ⁽¹⁾ ?			x	
Are samples with holding times due within 48 hours sample due within 48 hours present?			x	
Is a chain-of-custody (COC) form present and filled out completely ⁽¹⁾ ?	x			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	x			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	x			
Is the COC properly relinquished by the client w/ date and time recorded ⁽¹⁾ ?	x			
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.		x		
Are samples preserved that require preservation (excluding cooling) ⁽¹⁾ ? Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect	x			<u>HCL</u>
If samples are acid preserved for metals, is the pH ≤ 2 ⁽¹⁾ ? Record the pH in Comments.			x	
If dissolved metals are requested, were samples field filtered?			x	
Additional Comments (if any):				
⁽¹⁾ If NO, then contact the client before proceeding with analysis and note in case narrative.				

Muri
Custodian Printed Name or Initials

MA 9-4-18
Signature or Initials of Custodian

17:05
Date/Time



PDC Energy
 1775 Sherman St. STE. 3000
 Denver CO, 80203

Project: J&L Farms 14, 24-29

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 09/11/18 15:17

BH01
1809016-01 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/04/18 12:51**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	1809020	09/05/18	09/10/18	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **09/04/18 12:51**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		102 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		99.1 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.2 %		21-167		"	"	"	"	

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.



PDC Energy
 1775 Sherman St. STE. 3000
 Denver CO, 80203

Project: J&L Farms 14, 24-29

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 09/11/18 15:17

BH02
1809016-02 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/04/18 12:46**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	1809020	09/05/18	09/10/18	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **09/04/18 12:46**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		102 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		98.3 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		95.9 %		21-167		"	"	"	"	

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.



PDC Energy
 1775 Sherman St. STE. 3000
 Denver CO, 80203

Project: J&L Farms 14, 24-29

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 09/11/18 15:17

BH03
1809016-03 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/04/18 12:36**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	1809020	09/05/18	09/10/18	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **09/04/18 12:36**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		100 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		97.4 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		95.3 %		21-167		"	"	"	"	

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.



PDC Energy
 1775 Sherman St. STE. 3000
 Denver CO, 80203

Project: J&L Farms 14, 24-29

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 09/11/18 15:17

BH04
1809016-04 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/04/18 12:26**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	1809020	09/05/18	09/10/18	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **09/04/18 12:26**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		103 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		97.3 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.2 %		21-167		"	"	"	"	

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.



PDC Energy
 1775 Sherman St. STE. 3000
 Denver CO, 80203

Project: J&L Farms 14, 24-29

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 09/11/18 15:17

BH05
1809016-05 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/04/18 12:58**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	120	1.0		ug/l	1	1809020	09/05/18	09/10/18	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	200	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **09/04/18 12:58**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		107 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		99.2 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		96.0 %		21-167		"	"	"	"	

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.



PDC Energy
 1775 Sherman St. STE. 3000
 Denver CO, 80203

Project: J&L Farms 14, 24-29

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 09/11/18 15:17

BH06
1809016-06 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/04/18 13:10**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	240	25		ug/l	25	1809020	09/05/18	09/11/18	EPA 8260B	
Toluene	230	25		"	"	"	"	"	"	
Ethylbenzene	370	25		"	"	"	"	"	"	
Xylenes (total)	2100	50		"	"	"	"	"	"	

Date Sampled: **09/04/18 13:10**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
<i>Surrogate: 1,2-Dichloroethane-d4</i>		98.4 %		23-173		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		99.2 %		20-170		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		98.2 %		21-167		"	"	"	"	

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.



PDC Energy
 1775 Sherman St. STE. 3000
 Denver CO, 80203

Project: J&L Farms 14, 24-29

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 09/11/18 15:17

BH07
1809016-07 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/04/18 12:25**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	1809020	09/05/18	09/10/18	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **09/04/18 12:25**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		104 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		98.4 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.0 %		21-167		"	"	"	"	

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.



PDC Energy
 1775 Sherman St. STE. 3000
 Denver CO, 80203

Project: J&L Farms 14, 24-29

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 09/11/18 15:17

BH08
1809016-08 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/04/18 12:37**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	1809020	09/05/18	09/10/18	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **09/04/18 12:37**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		105 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		99.5 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		95.9 %		21-167		"	"	"	"	

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.



PDC Energy
 1775 Sherman St. STE. 3000
 Denver CO, 80203

Project: J&L Farms 14, 24-29

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 09/11/18 15:17

BH09
1809016-09 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/04/18 13:07**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	6.6	1.0		ug/l	1	1809020	09/05/18	09/10/18	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	45	1.0		"	"	"	"	"	"	
Xylenes (total)	53	2.0		"	"	"	"	"	"	

Date Sampled: **09/04/18 13:07**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		105 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		99.5 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		96.4 %		21-167		"	"	"	"	

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.



PDC Energy
1775 Sherman St. STE. 3000
Denver CO, 80203

Project: J&L Farms 14, 24-29

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/11/18 15:17

Volatile Organic Compounds by EPA Method 8260B - Quality Control

Summit Scientific

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

Batch 1809020 - EPA 5030 Water MS

Blank (1809020-BLK1)

Prepared: 09/05/18 Analyzed: 09/06/18

Benzene	ND	1.0	ug/l								
Toluene	ND	1.0	"								
Ethylbenzene	ND	1.0	"								
Xylenes (total)	ND	2.0	"								
Surrogate: 1,2-Dichloroethane-d4	11.6		"	13.2		88.1	23-173				
Surrogate: Toluene-d8	12.9		"	13.3		97.1	20-170				
Surrogate: 4-Bromofluorobenzene	13.0		"	13.3		97.5	21-167				

LCS (1809020-BS1)

Prepared: 09/05/18 Analyzed: 09/06/18

Benzene	29.3	1.0	ug/l	33.3		87.9	70-130				
Toluene	31.9	1.0	"	33.3		95.8	70-130				
Ethylbenzene	34.4	1.0	"	33.3		103	70-130				
m,p-Xylene	65.2	2.0	"	66.7		97.8	70-130				
o-Xylene	32.4	1.0	"	33.3		97.3	70-130				
Surrogate: 1,2-Dichloroethane-d4	12.2		"	13.2		92.5	23-173				
Surrogate: Toluene-d8	13.3		"	13.3		99.5	20-170				
Surrogate: 4-Bromofluorobenzene	12.5		"	13.3		93.7	21-167				

Matrix Spike (1809020-MS1)

Source: 1808435-01

Prepared: 09/05/18 Analyzed: 09/06/18

Benzene	30.2	1.0	ug/l	33.3	ND	90.6	70-130				
Toluene	33.2	1.0	"	33.3	ND	99.5	70-130				
Ethylbenzene	35.5	1.0	"	33.3	ND	107	70-130				
m,p-Xylene	66.6	2.0	"	66.7	ND	99.8	70-130				
o-Xylene	33.1	1.0	"	33.3	ND	99.3	70-130				
Surrogate: 1,2-Dichloroethane-d4	12.8		"	13.2		96.7	23-173				
Surrogate: Toluene-d8	13.4		"	13.3		100	20-170				
Surrogate: 4-Bromofluorobenzene	12.4		"	13.3		93.0	21-167				

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.



PDC Energy
 1775 Sherman St. STE. 3000
 Denver CO, 80203

Project: J&L Farms 14, 24-29

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 09/11/18 15:17

Volatile Organic Compounds by EPA Method 8260B - Quality Control

Summit Scientific

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

Batch 1809020 - EPA 5030 Water MS

Matrix Spike Dup (1809020-MSD1)

Source: 1808435-01

Prepared: 09/05/18 Analyzed: 09/06/18

Benzene	25.7	1.0	ug/l	33.3	ND	77.0	70-130	16.1	30	
Toluene	28.3	1.0	"	33.3	ND	84.9	70-130	15.8	30	
Ethylbenzene	30.8	1.0	"	33.3	ND	92.3	70-130	14.3	30	
m,p-Xylene	58.8	2.0	"	66.7	ND	88.2	70-130	12.3	30	
o-Xylene	29.1	1.0	"	33.3	ND	87.4	70-130	12.8	30	
Surrogate: 1,2-Dichloroethane-d4	12.4		"	13.2		93.6	23-173			
Surrogate: Toluene-d8	13.1		"	13.3		98.1	20-170			
Surrogate: 4-Bromofluorobenzene	12.5		"	13.3		93.5	21-167			

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.



PDC Energy
1775 Sherman St. STE. 3000
Denver CO, 80203

Project: J&L Farms 14, 24-29

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/11/18 15:17

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