



PDC Energy, Inc.
Second Quarter 2018 Groundwater Monitoring Summary

July 23, 2018

Barrell 41-4 Tank Battery
NENE Section 4 T6N R64W
Form 19 Document #: 2213128
Remediation # 7846

This groundwater monitoring summary has been prepared by Tasman Geosciences, Inc. for the Barrell 41-4 tank battery. On May 17, 2018, groundwater monitoring was conducted at all eight monitoring well locations (BH03 – BH09, SS02A-R2). Eight 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. Second quarter 2018 analytical results indicate that benzene concentrations are above the applicable COGCC Table 910-1 groundwater standard in monitoring wells BH05, BH09, and SS02A-R2. BTEX concentrations are below applicable regulatory standards in five sample locations.

A solar SVE system was installed at the site during first quarter 2013. The SVE system was operational for six months before being decommissioned during the third quarter 2013. During the solar SVE period of operation, approximately 1.82 pounds of hydrocarbon mass was removed from the subsurface. Enhanced fluid recovery (EFR) which extracted soil vapor only was conducted between May 2014 and March 2015. A summary of EFR/AS operation data is provided in Table 2.

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 third quarter 2018, while additional remediation strategies are being evaluated.

Third quarter 2018 groundwater sampling will be conducted during August 2018. Plans to install point of compliance wells per the COGCC February 8, 2018 Condition of Approval (COA) are in progress and will be completed following source mass removal activities, anticipated to occur in August 2018. An updated figure will be included in the third quarter 2018 groundwater monitoring report.

BH03		
Compound (µg/L)	2/7/2018	5/17/2018
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	12	<2.0
Depth to Water (ft. bgs)	36.47	36.77

BH06		
Compound (µg/L)	2/7/2018	5/17/2018
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)	36.76	37.12

BH08		
Compound (µg/L)	2/7/2018	5/17/2018
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)	36.45	36.78

BH07		
Compound (µg/L)	2/7/2018	5/17/2018
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)	36.31	36.63

BH04		
Compound (µg/L)	2/7/2018	5/17/2018
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)	35.76	37.08

BH05		
Compound (µg/L)	2/7/2018	5/17/2018
Benzene	130	51
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<2.0	<2.0
Depth to Water (ft. bgs)	36.56	36.90

BH09		
Compound (µg/L)	2/7/2018	5/17/2018
Benzene	240	11
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<2.0	<2.0
Depth to Water (ft. bgs)	36.29	36.58

SS02A-R2		
Compound (µg/L)	2/7/2018	5/17/2018
Benzene	9.0	6.6
Toluene	<1.0	<1.0
Ethylbenzene	9.1	<1.0
Total Xylenes	3.7	7.4
Depth to Water (ft. bgs) ⁽¹⁾	39.67	40.03

Surface Drainage

Legend

- Excavation Extent – LTE (2011)
- Point of Release
- Remediation Well Location – Angled (Trimble GPS)
- Monitoring / Remediation Well (Trimble GPS)
- Monitoring / Remediation Well – Angled (Trimble GPS)
- Groundwater Flow Direction (2Q18)

Notes

All locations are approximate unless otherwise noted.

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

Monitoring well SS02A-R2 is an angled monitoring well with the terminus located southwest of the well monument, beneath the above ground storage tank.

Red text denotes an exceedance of COGCC standards

COGCC – Colorado Oil and Gas Conservation Commission

ft. bgs – Feet below ground surface

(1) – ft. along angled well casing

µg/L – Micrograms per liter

GPS – Global Positioning System

0 ft. 15 ft. 30 ft.

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



DATE: May 25, 2018

DESIGNED BY: C. Hamlin

DRAWN BY: T. Blessing



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

PDC Energy, Inc. – DJ Basin
Barrell 41-4 Tank Battery
NENE, Section 4, Township 6 North, Range 64 West
Weld County, Colorado

GROUNDWATER
ANALYTICAL RESULTS
MAP

FIGURE
1

TABLE 1
BARRELL 41-4 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)
COGCC Table 910-1 Groundwater Standard (µg/L) ⁽¹⁾		5	560	700	1,400	
SS02A-R2 ⁽³⁾	9/22/2017	120	150	120	1,200	39.08
SS02A-R2 ⁽³⁾	11/16/2017	74	8.1	19	76	38.92
SS02A-R2 ⁽³⁾	2/7/2018	9.0	<1.0	9.1	3.7	39.67
SS02A-R2 ⁽³⁾	5/17/2018	6.6	<1.0	<1.0	7.4	40.03
BH03	10/16/2017	<1.0	<1.0	<1.0	<2.0	35.74
BH03	11/16/2017	<1.0	<1.0	<1.0	<2.0	35.68
BH03	2/7/2018	<1.0	<1.0	<1.0	12	36.47
BH03	5/17/2018	<1.0	<1.0	<1.0	<2.0	36.77
BH04	10/16/2017	<1.0	1.7	<1.0	<2.0	36.21
BH04	11/16/2017	<1.0	<1.0	<1.0	<2.0	36.10
BH04	2/7/2018	<1.0	<1.0	<1.0	<2.0	35.76
BH04	5/17/2018	<1.0	<1.0	<1.0	<2.0	37.08
BH05	10/16/2017	<1.0	<1.0	<1.0	<2.0	36.07
BH05	11/16/2017	17	<1.0	<1.0	<2.0	35.94
BH05	2/7/2018	130	<1.0	<1.0	<2.0	36.56
BH05	5/17/2018	51	<1.0	<1.0	<2.0	36.90
BH06	10/16/2017	<1.0	<1.0	<1.0	<2.0	36.14
BH06	11/16/2017	<1.0	<1.0	<1.0	<2.0	36.04
BH06	2/7/2018	<1.0	<1.0	<1.0	<2.0	36.76
BH06	5/17/2018	<1.0	<1.0	<1.0	<2.0	37.12
BH07	11/16/2017	<1.0	<1.0	<1.0	<2.0	32.63
BH07	2/7/2018	<1.0	<1.0	<1.0	<2.0	36.31
BH07	5/17/2018	<1.0	<1.0	<1.0	<2.0	36.63
BH08	11/16/2017	<1.0	<1.0	<1.0	<2.0	35.71
BH08	2/7/2018	<1.0	<1.0	<1.0	<2.0	36.45
BH08	5/17/2018	<1.0	<1.0	<1.0	<2.0	36.78
BH09	11/16/2017	470	<1.0	6.0	8.0	35.65
BH09	2/7/2018	240	<1.0	<1.0	<2.0	36.29
BH09	5/17/2018	11	<1.0	<1.0	<2.0	36.58

TABLE 1
BARRELL 41-4 TANK BATTERY
GROUNDWATER ANALYTICAL RESULTS SUMMARY TABLE

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 ground surface for excavation samples. 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. Monitoring well SS02A-R2 was drilled as an angled remediation well. Depth to water does not represent true depth to water.

COGCC = Colorado Oil and Gas Conservation Commission

µg/L = Micrograms per liter

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

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

ATTACHMENT A

Summit Scientific

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

May 22, 2018

Mark Longhurst
PDC Energy
1775 Sherman St. STE. 3000
Denver, CO 80203
RE: Barrell 41-4

Enclosed are the results of analyses for samples received by Summit Scientific on 05/17/18 13:45. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Paul Shrewsbury For Ben Shrewsbury
Laboratory Manager



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

Project: Barrell 41-4

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
05/22/18 10:22

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH08	1805228-01	Water	05/17/18 09:49	05/17/18 13:45
BH06	1805228-02	Water	05/17/18 12:12	05/17/18 13:45
BH09	1805228-03	Water	05/17/18 11:13	05/17/18 13:45
BH05	1805228-04	Water	05/17/18 11:49	05/17/18 13:45
BH07	1805228-05	Water	05/17/18 10:11	05/17/18 13:45
BH04	1805228-06	Water	05/17/18 12:01	05/17/18 13:45
BH03	1805228-07	Water	05/17/18 12:20	05/17/18 13:45
SS02A-R2	1805228-08	Water	05/17/18 10:27	05/17/18 13:45

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.

Sample Receipt Checklist

S2 Work Order: 1805228

Client: PDC Energy Client Project ID: Barrel 41-4

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

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

Temp (°C)	11.5
-----------	------

Thermometer ID: 61857155-K

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

LP
Custodian Printed Name or Initials

[Signature]
Signature or Initials of Custodian

5/17/18 1350
Date/Time



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

Project: Barrell 41-4

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 05/22/18 10:22

BH08
1805228-01 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **05/17/18 09:49**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1805226	05/18/18	05/19/18	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **05/17/18 09:49**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		102 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		91.3 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		96.2 %	21-167		"	"	"	"	

Summit Scientific

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

Project: Barrell 41-4

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 05/22/18 10:22

BH06
1805228-02 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **05/17/18 12:12**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1805226	05/18/18	05/19/18	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **05/17/18 12:12**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		103 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		90.8 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.2 %	21-167		"	"	"	"	

Summit Scientific

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

Project: Barrell 41-4

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 05/22/18 10:22

BH09
1805228-03 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **05/17/18 11:13**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	11	1.0	ug/l	1	1805226	05/18/18	05/19/18	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **05/17/18 11:13**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		103 %	23-173		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		91.1 %	20-170		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		97.7 %	21-167		"	"	"	"	

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

Project: Barrell 41-4

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 05/22/18 10:22

BH05
1805228-04 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **05/17/18 11:49**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	51	1.0	ug/l	1	1805226	05/18/18	05/19/18	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **05/17/18 11:49**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		103 %	23-173		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		91.4 %	20-170		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		100 %	21-167		"	"	"	"	

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

Project: Barrell 41-4

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 05/22/18 10:22

BH07
1805228-05 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **05/17/18 10:11**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1805226	05/18/18	05/19/18	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **05/17/18 10:11**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		102 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		89.6 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.3 %	21-167		"	"	"	"	

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

Project: Barrell 41-4

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 05/22/18 10:22

BH04
1805228-06 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **05/17/18 12:01**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1805226	05/18/18	05/19/18	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **05/17/18 12:01**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		100 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		90.8 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.3 %	21-167		"	"	"	"	

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

Project: Barrell 41-4

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 05/22/18 10:22

BH03
1805228-07 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **05/17/18 12:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1805226	05/18/18	05/19/18	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **05/17/18 12:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		102 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		89.6 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.3 %	21-167		"	"	"	"	

Summit Scientific

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

Project: Barrell 41-4

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 05/22/18 10:22

SS02A-R2
1805228-08 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **05/17/18 10:27**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	6.6	1.0	ug/l	1	1805226	05/18/18	05/19/18	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	1.0	1.0	"	"	"	"	"	"	
Xylenes (total)	7.4	2.0	"	"	"	"	"	"	

Date Sampled: **05/17/18 10:27**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		100 %	23-173		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		89.8 %	20-170		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		99.1 %	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: Barrell 41-4

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
05/22/18 10:22

Volatile Organic Compounds by EPA Method 8260B - Quality Control

Summit Scientific

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

Batch 1805226 - EPA 5030 Water MS

Blank (1805226-BLK1)

Prepared: 05/18/18 Analyzed: 05/19/18

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	2.0	"							
Surrogate: 1,2-Dichloroethane-d4	13.2		"	13.2		100	23-173			
Surrogate: Toluene-d8	12.0		"	13.3		90.2	20-170			
Surrogate: 4-Bromofluorobenzene	13.4		"	13.3		100	21-167			

LCS (1805226-BS1)

Prepared: 05/18/18 Analyzed: 05/19/18

Benzene	27.4	1.0	ug/l	33.3		82.3	70-130			
Toluene	30.7	1.0	"	33.3		92.0	70-130			
Ethylbenzene	37.6	1.0	"	33.3		113	70-130			
m,p-Xylene	76.7	2.0	"	66.7		115	70-130			
o-Xylene	37.4	1.0	"	33.3		112	70-130			
Surrogate: 1,2-Dichloroethane-d4	13.5		"	13.2		102	23-173			
Surrogate: Toluene-d8	12.0		"	13.3		90.1	20-170			
Surrogate: 4-Bromofluorobenzene	13.0		"	13.3		97.2	21-167			

Matrix Spike (1805226-MS1)

Source: 1805228-01

Prepared: 05/18/18 Analyzed: 05/19/18

Benzene	28.0	1.0	ug/l	33.3	ND	84.0	70-130			
Toluene	32.1	1.0	"	33.3	ND	96.3	70-130			
Ethylbenzene	38.3	1.0	"	33.3	ND	115	70-130			
m,p-Xylene	78.8	2.0	"	66.7	ND	118	70-130			
o-Xylene	38.4	1.0	"	33.3	ND	115	70-130			
Surrogate: 1,2-Dichloroethane-d4	13.6		"	13.2		103	23-173			
Surrogate: Toluene-d8	12.2		"	13.3		91.1	20-170			
Surrogate: 4-Bromofluorobenzene	12.6		"	13.3		94.7	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: Barrell 41-4

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 05/22/18 10:22

Volatile Organic Compounds by EPA Method 8260B - Quality Control
Summit Scientific

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

Batch 1805226 - EPA 5030 Water MS

Matrix Spike Dup (1805226-MSD1)	Source: 1805228-01			Prepared: 05/18/18		Analyzed: 05/19/18				
Benzene	28.6	1.0	ug/l	33.3	ND	85.9	70-130	2.19	30	
Toluene	32.7	1.0	"	33.3	ND	98.0	70-130	1.73	30	
Ethylbenzene	38.6	1.0	"	33.3	ND	116	70-130	0.962	30	
m,p-Xylene	79.5	2.0	"	66.7	ND	119	70-130	0.783	30	
o-Xylene	38.8	1.0	"	33.3	ND	116	70-130	0.984	30	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>13.8</i>		<i>"</i>	<i>13.2</i>		<i>105</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>12.2</i>		<i>"</i>	<i>13.3</i>		<i>91.3</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>12.8</i>		<i>"</i>	<i>13.3</i>		<i>95.9</i>	<i>21-167</i>			

Summit Scientific

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1775 Sherman St. STE. 3000
Denver CO, 80203

Project: Barrell 41-4

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Reported:
05/22/18 10:22

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