PDC Energy, Inc.

Fourth Quarter 2018 Groundwater Monitoring Summary

December 19, 2018

Barrell 41-4 Tank Battery
NENE Section 4 T6N R64W
Remediation # 7846

This groundwater monitoring summary has been prepared by Tasman Geosciences, Inc. for the Barrell 41-4 tank battery. On November 15, 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.

Fourth quarter 2018 analytical results indicate that the benzene concentration is above the applicable COGCC Table 910-1 groundwater standard in monitoring wells BH05 and BH09. BTEX concentrations are below applicable regulatory standards in six sample locations.

Monitored natural attenuation (MNA) will continue as the selected remediation strategy through the first quarter 2019.

First quarter 2019 groundwater sampling will be conducted during February 2019. Per the Condition of Approval (COA) issued by the COGCC on February 8, 2018, supplementary monitoring wells will be installed in January 2019 to establish down-gradient point of compliance (POC). The supplementary monitoring wells will be incorporated into the site monitoring well network for the first quarter 2019 groundwater monitoring event. 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. Groundwater elevation data is illustrated on Figure 2.

BH03		
Compound (µg/L)	5/17/2018	8/9/2018
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)	36.47	36.21

BH06		
Compound (µg/L)	5/17/2018	8/9/2018
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)	37.12	36.62

BH08		
Compound (µg/L)	5/17/2018	8/9/2018
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)	36.78	36.27

BH07		
Compound (µg/L)	5/17/2018	8/9/2018
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)	36.63	36.20

Surface Drainage

BH08
BH03
BH06
BH07
SS02A-R2
BH02
X
BH04
BH09
BH05

BH04		
Compound (µg/L)	5/17/2018	8/9/2018
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)	37.08	36.67

BH05		
Compound (µg/L)	5/17/2018	8/9/2018
Benzene	**51**	**150**
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<2.0	<2.0
Depth to Water (ft. bgs)	36.90	36.56

BH09		
Compound (µg/L)	5/17/2018	8/9/2018
Benzene	**11**	**150**
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<2.0	<2.0
Depth to Water (ft. bgs)	36.58	36.25

SS02A-R2		
Compound (µg/L)	5/17/2018	8/9/2018
Benzene	**6.6**	**5.7**
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	2.1
Total Xylenes	7.4	3.3
Depth to Water (ft. bgs)(1)	40.03	39.54

Legend

- Excavation Extent – LTE (2011)
- X — Point of Release
- Remediation Well Location – Angled (Trimble GPS)
- Monitoring / Remediation Well (Trimble GPS)
- Monitoring / Remediation Well – Angled (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.

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.

N

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

DATE: August 21, 2018
DESIGNED BY: C. Hamlin
DRAWN BY: C. Armbruster

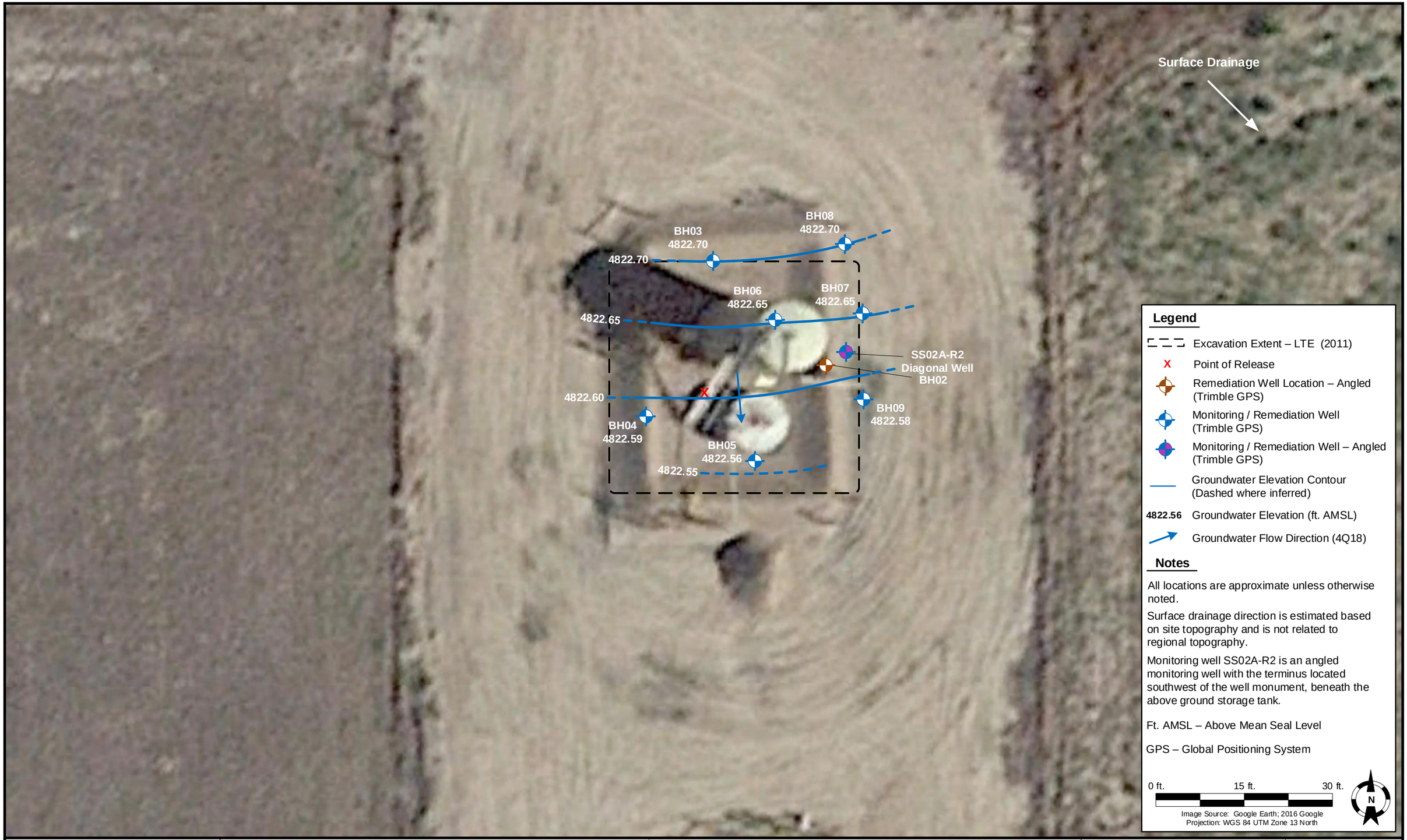
TASMAN GEOSCIENCES

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



DATE: December 10, 2018 DESIGNED BY: C. Hamlin DRAWN BY: D. Cavinder	TASMAN GEOSCIENCES **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 ELEVATION CONTOUR MAP	FIGURE 2

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
SS02A-R2[3]	8/9/2018	**5.7**	<1.0	2.1	3.3	39.54
SS02A-R2[3]	11/15/2018	1.8	<1.0	<1.0	<2.0	39.00
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
BH03	8/9/2018	<1.0	<1.0	<1.0	<2.0	36.21
BH03	11/15/2018	<1.0	<1.0	<1.0	<2.0	35.77
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
BH04	8/9/2018	<1.0	<1.0	<1.0	<2.0	36.67
BH04	11/15/2018	<1.0	<1.0	<1.0	<2.0	36.19
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
BH05	8/9/2018	**150**	<1.0	<1.0	<2.0	36.56
BH05	11/15/2018	**46**	<1.0	<1.0	7.6	36.03
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
BH06	8/9/2018	<1.0	<1.0	<1.0	<2.0	36.62
BH06	11/15/2018	<1.0	<1.0	<1.0	<2.0	36.15
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

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**	
BH07	5/17/2018	<1.0	<1.0	<1.0	<2.0	36.63
BH07	8/9/2018	<1.0	<1.0	<1.0	<2.0	36.20
BH07	11/15/2018	<1.0	<1.0	<1.0	<2.0	35.71
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
BH08	8/9/2018	<1.0	<1.0	<1.0	<2.0	36.27
BH08	11/15/2018	<1.0	<1.0	<1.0	<2.0	35.80
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
BH09	8/9/2018	**150**	<1.0	<1.0	<2.0	36.25
BH09	11/15/2018	**720**	<1.0	<1.0	<2.0	35.74

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.

TABLE 2
BARRELL 41-45 TANK BATTERY
EFR / AS OPERATIONAL SUMMARY TABLE

Date	EFR Wells	Total EFR/AS Duration (hours)	Approximate Gallons Extracted	AS Wells	Air Injection Pressure (psi)	Average Air Flow Rate (cfm)
Second Quarter 2014						
5/15/2014	BH02	6	0	N/A	N/A	N/A
5/29/2014	BH02	6	0		N/A	N/A
6/12/2014	BH02	6	0		N/A	N/A
Quarterly Totals		**18**	**0**		-	-
Third Quarter 2014						
9/3/2014	BH02	6	0	N/A	N/A	N/A
Quarterly Totals		**6**	**0**		-	-
Fourth Quarter 2014						
12/17/2014	BH02	6	0	N/A	N/A	N/A
Quarterly Totals		**6**	**0**		-	-
First Quarter 2015						
1/29/2015	BH02	6	0	N/A	N/A	N/A
1/30/2015		6	0		N/A	N/A
2/3/2015		6	0		N/A	N/A
2/10/2015		6	0		N/A	N/A
2/17/2015		6	0		N/A	N/A
3/5/2015	BH01	6	0		N/A	N/A
Quarterly Totals		**36**	**0**		-	-

Notes:
EFR = Enhanced fluid recovery
AS = Air sparge
psi = Pounds per square inch
cfm = Cubic feet per minute

ATTACHMENT A

Summit Scientific

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

November 26, 2018

Mark Longhurst

PDC Energy

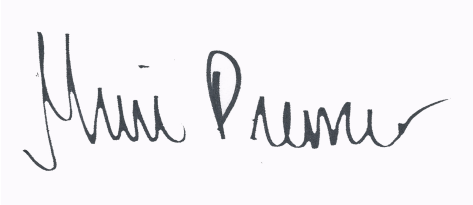
1775 Sherman St. STE. 3000

Denver, CO 80203

RE: Barrell 41-4

Enclosed are the results of analyses for samples received by Summit Scientific on 11/15/18 19:40. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Muri Premer For Ben Shrewsbury

Laboratory Manager

S2

PDC Energy	Project: Barrell 41-4	
1775 Sherman St. STE. 3000	Project Number: [none]	**Reported:**
Denver CO, 80203	Project Manager: Mark Longhurst	11/26/18 11:12

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH03	1811191-01	Water	11/15/18 14:37	11/15/18 19:40
BH04	1811191-02	Water	11/15/18 14:50	11/15/18 19:40
BH05	1811191-03	Water	11/15/18 15:30	11/15/18 19:40
BH06	1811191-04	Water	11/15/18 14:54	11/15/18 19:40
BH07	1811191-05	Water	11/15/18 13:08	11/15/18 19:40
BH08	1811191-06	Water	11/15/18 14:35	11/15/18 19:40
BH09	1811191-07	Water	11/15/18 15:26	11/15/18 19:40
SS02A-R2	1811191-08	Water	11/15/18 15:09	11/15/18 19:40

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

1811191

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

Page 1 of 1

Client: PDC / Tasman
Address: 6899 Pecos St
City/State/Zip: Denver / CO / 80221
Phone: 815-979-8348 Fax:
Sampler Name: Alison Dahl, Brian Gabel

Project Manager: Mark Longhurst
E-Mail: mark.longhurst@pdce.com
Project Name: Barrell 41-4
Project Number:

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative: HCl	Preservative: HNO_3	Preservative: None	Preservative: Other (Specify)	Matrix: Groundwater	Matrix: Soil	Matrix: Air - Canister Serial #	Matrix: Other (Specify)	Analyze For: BTEX	Special Instructions
BH03	11/15/2018	1437	3	X				X				X	
BH04		1450											
BH05		1530											
BH06		1454											
BH07		1308											
BH08		1435											
BH09		1526											
SS02A-R2		1509											

Relinquished by: Alison Dahl Date/Time: 1940 11/15/2018
Received by: Date/Time: 11.15.18 1940

Relinquished by: Date/Time:
Received by: Date/Time:

Relinquished by: Date/Time:
Received in Lab by: Date/Time:

Turn Around Time (Check)
Same Day ☐ 72 Hours ☐
24 Hours ☐ Standard ☒
48 Hours ☐

Sample Integrity:
Temperature Upon Receipt: 4.5
Intact: Yes ☑ No ☐

Notes:

Sample Receipt Checklist

S2 Work Order 1811191

Client: PDC/Tasman Client Project ID: Bassett 4k4

Shipped Via: H.D./P.U./FedEx/UPS/USPS/Other P.U. Airbill #: _____

Matrix (check all that apply): ____Air ____Soil/Solid ✓ Water ____Other:_____ (Describe)

Temp (°C)	4.5

Thermometer ID: 61857155-K

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature at 4°C +/- 2°C (1)? NOTE: If samples are delivered the same day of sampling, this requirement is met provided that there is evidence that cooling has begun.	✓			
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)? Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect	✓			HCl
If samples are acid preserved for metals, is the pH ≤ 2(1)? Record the pH in Comments.			✓	
If dissolved metals are requested, were samples field filtered?			✓	
Additional Comments (if any):				

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

UP
Custodian Printed Name or Initials

Signature of Custodian

11.15.18 1940
Date/Time

S2

PDC Energy	Project: Barrell 41-4	
1775 Sherman St. STE. 3000	Project Number: [none]	**Reported:**
Denver CO, 80203	Project Manager: Mark Longhurst	11/26/18 11:12

BH03

1811191-01 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **11/15/18 14:37**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1811221	11/16/18	11/19/18	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **11/15/18 14:37**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		*97.3 %*	*23-173*		"	"	"	"	
Surrogate: Toluene-d8		*93.3 %*	*20-170*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*85.4 %*	*21-167*		"	"	"	"	

S2

PDC Energy	Project: Barrell 41-4	
1775 Sherman St. STE. 3000	Project Number: [none]	**Reported:**
Denver CO, 80203	Project Manager: Mark Longhurst	11/26/18 11:12

BH04

1811191-02 (Water)

Summit Scientific

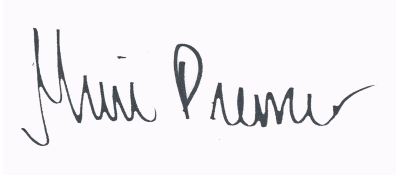
Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **11/15/18 14:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1811221	11/16/18	11/19/18	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **11/15/18 14:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		*95.4 %*	*23-173*		"	"	"	"	
Surrogate: Toluene-d8		*95.9 %*	*20-170*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*85.7 %*	*21-167*		"	"	"	"	



S2

PDC Energy	Project: Barrell 41-4	
1775 Sherman St. STE. 3000	Project Number: [none]	**Reported:**
Denver CO, 80203	Project Manager: Mark Longhurst	11/26/18 11:12

BH05

1811191-03 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **11/15/18 15:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	**46**	1.0	ug/l	1	1811221	11/16/18	11/19/18	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	**7.6**	2.0	"	"	"	"	"	"	

Date Sampled: **11/15/18 15:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		*89.9 %*	*23-173*		"	"	"	"	
Surrogate: Toluene-d8		*95.6 %*	*20-170*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*89.0 %*	*21-167*		"	"	"	"	

S2

PDC Energy	Project: Barrell 41-4	
1775 Sherman St. STE. 3000	Project Number: [none]	**Reported:**
Denver CO, 80203	Project Manager: Mark Longhurst	11/26/18 11:12

BH06

1811191-04 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **11/15/18 14:54**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1811221	11/16/18	11/19/18	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **11/15/18 14:54**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		*98.1 %*	*23-173*		"	"	"	"	
Surrogate: Toluene-d8		*95.7 %*	*20-170*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*87.1 %*	*21-167*		"	"	"	"	

S2

PDC Energy	Project: Barrell 41-4	
1775 Sherman St. STE. 3000	Project Number: [none]	**Reported:**
Denver CO, 80203	Project Manager: Mark Longhurst	11/26/18 11:12

BH07

1811191-05 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **11/15/18 13:08**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1811221	11/16/18	11/19/18	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **11/15/18 13:08**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		*97.3 %*	*23-173*		"	"	"	"	
Surrogate: Toluene-d8		*93.2 %*	*20-170*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*87.8 %*	*21-167*		"	"	"	"	

S2

PDC Energy	Project: Barrell 41-4	
1775 Sherman St. STE. 3000	Project Number: [none]	**Reported:**
Denver CO, 80203	Project Manager: Mark Longhurst	11/26/18 11:12

BH08

1811191-06 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **11/15/18 14:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1811221	11/16/18	11/19/18	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **11/15/18 14:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		*94.4 %*	*23-173*		"	"	"	"	
Surrogate: Toluene-d8		*95.1 %*	*20-170*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*88.6 %*	*21-167*		"	"	"	"	

S2

PDC Energy	Project: Barrell 41-4	
1775 Sherman St. STE. 3000	Project Number: [none]	**Reported:**
Denver CO, 80203	Project Manager: Mark Longhurst	11/26/18 11:12

BH09

1811191-07 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **11/15/18 15:26**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	**720**	10	ug/l	10	1811221	11/16/18	11/19/18	EPA 8260B	
Toluene	ND	1.0	"	1	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **11/15/18 15:26**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		*98.0 %*	*23-173*		"	"	"	"	
Surrogate: Toluene-d8		*93.5 %*	*20-170*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*88.9 %*	*21-167*		"	"	"	"	

S2

PDC Energy	Project: Barrell 41-4	
1775 Sherman St. STE. 3000	Project Number: [none]	**Reported:**
Denver CO, 80203	Project Manager: Mark Longhurst	11/26/18 11:12

SS02A-R2

1811191-08 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **11/15/18 15:09**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	**1.8**	1.0	ug/l	1	1811221	11/16/18	11/19/18	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **11/15/18 15:09**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		*90.1 %*	*23-173*		"	"	"	"	
Surrogate: Toluene-d8		*92.6 %*	*20-170*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*89.3 %*	*21-167*		"	"	"	"	

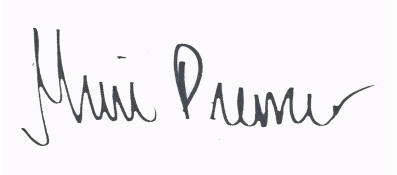
S2

PDC Energy	Project: Barrell 41-4	
1775 Sherman St. STE. 3000	Project Number: [none]	**Reported:**
Denver CO, 80203	Project Manager: Mark Longhurst	11/26/18 11:12

Volatile Organic Compounds by EPA Method 8260B - Quality Control

Summit Scientific

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1811221 - EPA 5030 Water MS										
Blank (1811221-BLK1)				Prepared: 11/16/18 Analyzed: 11/19/18						
Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	2.0	"							
Surrogate: 1,2-Dichloroethane-d4	*12.2*		*"*	*13.2*		*92.0*	*23-173*			
Surrogate: Toluene-d8	*12.9*		*"*	*13.3*		*96.5*	*20-170*			
Surrogate: 4-Bromofluorobenzene	*11.7*		*"*	*13.3*		*88.0*	*21-167*			
LCS (1811221-BS1)				Prepared: 11/16/18 Analyzed: 11/19/18						
Benzene	36.4	1.0	ug/l	33.3		109	70-130			
Toluene	38.5	1.0	"	33.3		116	70-130			
Ethylbenzene	35.1	1.0	"	33.3		105	70-130			
m,p-Xylene	86.9	2.0	"	66.7		130	70-130			
o-Xylene	40.2	1.0	"	33.3		121	70-130			
Surrogate: 1,2-Dichloroethane-d4	*12.4*		*"*	*13.2*		*94.2*	*23-173*			
Surrogate: Toluene-d8	*12.8*		*"*	*13.3*		*95.7*	*20-170*			
Surrogate: 4-Bromofluorobenzene	*11.9*		*"*	*13.3*		*89.3*	*21-167*			
Matrix Spike (1811221-MS1)	**Source: 1811191-01**			Prepared: 11/16/18 Analyzed: 11/19/18						
Benzene	36.2	1.0	ug/l	33.3	ND	109	70-130			
Toluene	38.6	1.0	"	33.3	ND	116	70-130			
Ethylbenzene	34.6	1.0	"	33.3	ND	104	70-130			
m,p-Xylene	85.0	2.0	"	66.7	ND	128	70-130			
o-Xylene	39.5	1.0	"	33.3	ND	119	70-130			
Surrogate: 1,2-Dichloroethane-d4	*12.6*		*"*	*13.2*		*95.5*	*23-173*			
Surrogate: Toluene-d8	*12.5*		*"*	*13.3*		*93.5*	*20-170*			
Surrogate: 4-Bromofluorobenzene	*12.0*		*"*	*13.3*		*90.4*	*21-167*			



S2

PDC Energy	Project: Barrell 41-4	
1775 Sherman St. STE. 3000	Project Number: [none]	**Reported:**
Denver CO, 80203	Project Manager: Mark Longhurst	11/26/18 11:12

Volatile Organic Compounds by EPA Method 8260B - Quality Control

Summit Scientific

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1811221 - EPA 5030 Water MS										
Matrix Spike Dup (1811221-MSD1)	**Source: 1811191-01**			Prepared: 11/16/18 Analyzed: 11/19/18						
Benzene	36.3	1.0	ug/l	33.3	ND	109	70-130	0.248	30	
Toluene	39.5	1.0	"	33.3	ND	118	70-130	2.38	30	
Ethylbenzene	35.9	1.0	"	33.3	ND	108	70-130	3.61	30	
m,p-Xylene	68.6	2.0	"	66.7	ND	103	70-130	21.4	30	
o-Xylene	40.7	1.0	"	33.3	ND	122	70-130	2.89	30	
Surrogate: 1,2-Dichloroethane-d4	*12.4*		*"*	*13.2*		*94.3*	*23-173*			
Surrogate: Toluene-d8	*12.5*		*"*	*13.3*		*94.0*	*20-170*			
Surrogate: 4-Bromofluorobenzene	*12.0*		*"*	*13.3*		*89.6*	*21-167*			

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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	Project: Barrell 41-4	
1775 Sherman St. STE. 3000	Project Number: [none]	**Reported:**
Denver CO, 80203	Project Manager: Mark Longhurst	11/26/18 11:12

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