

**PDC Energy, Inc.**  
Second Quarter 2020 Groundwater Monitoring Summary

May 5, 2020,

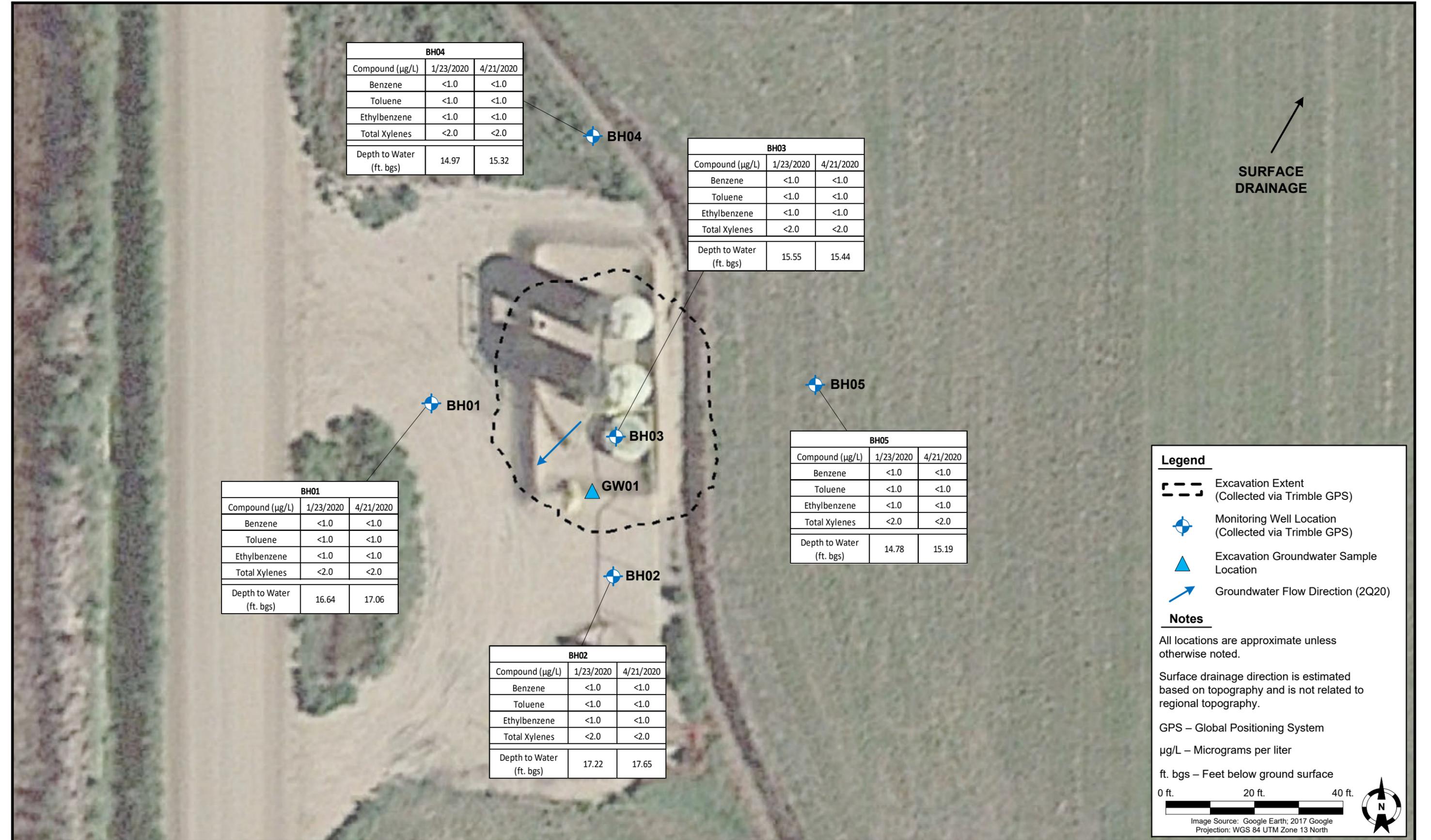
Bauer 5; 12, 21-4 Tank Battery  
NWNW Section 4 T5N R64W  
Remediation # 13570

This groundwater monitoring summary has been prepared by Tasman Geosciences, Inc. for the Bauer 5; 12, 21-4 tank battery. On April 21, 2020, groundwater monitoring was conducted at all five monitoring wells (BH01 – BH05). Five groundwater samples were submitted to Summit Scientific Laboratory for analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) by USEPA Method 8260B.

Second quarter 2020 analytical results indicated that BTEX concentrations were below the applicable COGCC Table 910-1 standards in all five monitoring well locations. Sample locations and corresponding analytical results are illustrated on Figure 1. Groundwater elevation data is illustrated on Figure 2. Groundwater analytical results are summarized in Table 1. The laboratory analytical report is included in Attachment A.

Monitored natural attenuation (MNA) was selected as the remediation strategy for this site during the fourth quarter 2019 and will remain the selected remediation strategy for the third quarter 2020.

Third quarter 2020 groundwater sampling will be conducted in July 2020.



DATE: May 5, 2020

DESIGNED BY: B. Nelson

DRAWN BY: M. Dahlgren



**Tasman Geosciences, Inc.**  
6855 W. 119<sup>th</sup> Ave.  
Broomfield, CO 80020

**PDC Energy, Inc. – DJ Basin**  
**Bauer 5; 12, 21-4 Tank Battery**  
NWNW, Section 4, Township 5 North, Range 64 West  
Weld County, Colorado

**GROUNDWATER ANALYTICAL RESULTS MAP**

**FIGURE 1**



**Legend**

- Monitoring Well Location (Collected via Trimble GPS)
- Excavation Extent (Collected via Trimble GPS)
- Groundwater Elevation Contour (Dashed where inferred)
- 4681.91** Groundwater Elevation (ft. AMSL)
- Groundwater Flow Direction (2Q20)

**Notes**

All locations are approximate unless otherwise noted.

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

ft. AMSL – Feet Above Mean Sea Level

GPS – Global Positioning System

0 ft. 20 ft. 40 ft.

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

DATE: April 22, 2020

DESIGNED BY: C. Hamlin

DRAWN BY: L. Martin



**Tasman Geosciences, Inc.**  
6855 West 119<sup>th</sup> Avenue  
Broomfield, CO 80020

**PDC Energy, Inc. – DJ Basin**  
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NWNW, Section 4, Township 5 North, Range 64 West  
Weld County, Colorado

**GROUNDWATER ELEVATION CONTOUR MAP (04/21/2020)**

**FIGURE 2**

**TABLE 1**  
**BAUER 5; 12, 21-4 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 <sup>(2)</sup> (ft.)	Groundwater Elevation (ft. AMSL)
COGCC Table 910-1 Groundwater Standard (µg/L) <sup>(1)</sup>		5	560	700	1,400		
GW01	7/3/2019	3.5	<1.0	1.6	16	~16	NM
BH01	10/31/2019	<1.0	<1.0	<1.0	<2.0	15.52	4612.68
BH01	1/23/2020	<1.0	<1.0	<1.0	<2.0	16.64	4611.56
BH01	4/21/2020	<1.0	<1.0	<1.0	<2.0	17.06	4611.14
BH02	10/31/2019	<1.0	<1.0	<1.0	<2.0	16.00	4612.22
BH02	1/23/2020	<1.0	<1.0	<1.0	<2.0	17.22	4611.00
BH02	4/21/2020	<1.0	<1.0	<1.0	<2.0	17.65	4610.57
BH03	10/31/2019	<1.0	<1.0	<1.0	<2.0	14.21	4613.61
BH03	1/23/2020	<1.0	<1.0	<1.0	<2.0	15.55	4612.27
BH03	4/21/2020	<1.0	<1.0	<1.0	<2.0	15.44	4612.38
BH04	10/31/2019	<1.0	<1.0	<1.0	<2.0	13.94	4613.81
BH04	1/23/2020	<1.0	<1.0	<1.0	<2.0	14.97	4612.78
BH04	4/21/2020	<1.0	<1.0	<1.0	<2.0	15.32	4612.43
BH05	10/31/2019	<1.0	<1.0	<1.0	<2.0	13.70	4613.71
BH05	1/23/2020	<1.0	<1.0	<1.0	<2.0	14.78	4612.63
BH05	4/21/2020	<1.0	<1.0	<1.0	<2.0	15.19	4612.22

**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 to reflect depth of water from ground surface.

COGCC = Colorado Oil and Gas Conservation Commission

µg/L = Micrograms per liter

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

ft. = Feet

AMSL = Above Mean Sea Level

NM = Not measured

## Attachment A

# Summit Scientific

---

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

April 24, 2020

Mark Longhurst

PDC Energy

1775 Sherman St. STE. 3000

Denver, CO 80203

RE: Bauer 5; 12, 21-4

Work Order #2004269

Enclosed are the results of analyses for samples received by Summit Scientific on 04/21/20 17:10. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Muri Premer". The signature is written in a cursive style with a large initial "M" and a long, sweeping underline.

Muri Premer For Paul Shrewsbury  
President



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

Project: Bauer 5; 12, 21-4

Project Number: [none]

Project Manager: Mark Longhurst

**Reported:**  
04/24/20 14:52

**ANALYTICAL REPORT FOR SAMPLES**

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	2004269-01	Water	04/21/20 13:29	04/21/20 17:10
BH02	2004269-02	Water	04/21/20 13:13	04/21/20 17:10
BH03	2004269-03	Water	04/21/20 13:21	04/21/20 17:10
BH04	2004269-04	Water	04/21/20 13:30	04/21/20 17:10
BH05	2004269-05	Water	04/21/20 13:25	04/21/20 17:10

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**

2004269

S2 Work Order \_\_\_\_\_

Client: PDC / TASMAN Client Project ID: BAUER 5; 12, 21 - 4

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

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

Temp (°C)	4.9
-----------	-----

Thermometer ID: 61857155-K

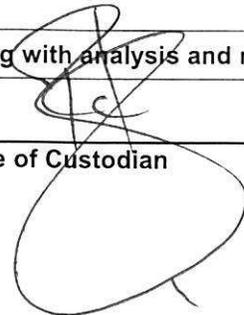
	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature at 4°C +/- 2°C <sup>(1)</sup> ? NOTE: If samples are delivered the same day of sampling, this requirement is met provided that there is evidence that cooling has begun.	✓			
Were all samples received intact <sup>(1)</sup> ?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

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

RZ  
Custodian Printed Name or Initials

Signature of Custodian

4/21/20  
Date/Time





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

Project: Bauer 5; 12, 21-4

Project Number: [none]  
 Project Manager: Mark Longhurst

**Reported:**  
 04/24/20 14:52

**BH01**  
**2004269-01 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **04/21/20 13:29**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	2004268	04/22/20	04/23/20	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **04/21/20 13:29**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		102 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		96.5 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		103 %		21-167		"	"	"	"	

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

Project: Bauer 5; 12, 21-4

Project Number: [none]  
 Project Manager: Mark Longhurst

**Reported:**  
 04/24/20 14:52

**BH02**  
**2004269-02 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **04/21/20 13:13**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	2004268	04/22/20	04/23/20	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **04/21/20 13:13**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		95.0 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		99.8 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		107 %		21-167		"	"	"	"	

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 1775 Sherman St. STE. 3000  
 Denver CO, 80203

Project: Bauer 5; 12, 21-4

Project Number: [none]

Project Manager: Mark Longhurst

**Reported:**  
 04/24/20 14:52

**BH03**  
**2004269-03 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **04/21/20 13:21**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	2004268	04/22/20	04/23/20	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **04/21/20 13:21**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		96.5 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		99.8 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		107 %		21-167		"	"	"	"	

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

Project: Bauer 5; 12, 21-4

Project Number: [none]  
 Project Manager: Mark Longhurst

**Reported:**  
 04/24/20 14:52

**BH04**  
**2004269-04 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **04/21/20 13:30**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	2004268	04/22/20	04/23/20	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **04/21/20 13:30**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		92.7 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		99.2 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		102 %		21-167		"	"	"	"	

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

Project: Bauer 5; 12, 21-4

Project Number: [none]  
 Project Manager: Mark Longhurst

**Reported:**  
 04/24/20 14:52

**BH05**  
**2004269-05 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **04/21/20 13:25**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	2004268	04/22/20	04/23/20	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **04/21/20 13:25**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		95.9 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		101 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.6 %		21-167		"	"	"	"	

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

Project: Bauer 5; 12, 21-4

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
04/24/20 14:52

**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 2004268 - EPA 5030 Water MS**

**Blank (2004268-BLK1)**

Prepared: 04/22/20 Analyzed: 04/23/20

Benzene	ND	1.0	ug/l								
Toluene	ND	1.0	"								
Ethylbenzene	ND	1.0	"								
Xylenes (total)	ND	2.0	"								
Surrogate: 1,2-Dichloroethane-d4	12.4		"	13.3		92.8		23-173			
Surrogate: Toluene-d8	13.2		"	13.3		99.1		20-170			
Surrogate: 4-Bromofluorobenzene	13.6		"	13.3		102		21-167			

**LCS (2004268-BS1)**

Prepared: 04/22/20 Analyzed: 04/23/20

Benzene	19.9	1.0	ug/l	33.3		59.7		51-132			
Toluene	24.4	1.0	"	33.3		73.1		51-138			
Ethylbenzene	23.6	1.0	"	33.3		70.7		58-146			
m,p-Xylene	45.5	2.0	"	66.7		68.3		57-144			
o-Xylene	23.2	1.0	"	33.3		69.5		53-146			
Surrogate: 1,2-Dichloroethane-d4	11.8		"	13.3		88.1		23-173			
Surrogate: Toluene-d8	13.2		"	13.3		98.8		20-170			
Surrogate: 4-Bromofluorobenzene	13.5		"	13.3		101		21-167			

**Matrix Spike (2004268-MS1)**

Source: 2004269-02

Prepared: 04/22/20 Analyzed: 04/23/20

Benzene	20.5	1.0	ug/l	33.3	ND	61.5		34-141			
Toluene	25.4	1.0	"	33.3	ND	76.3		27-151			
Ethylbenzene	23.9	1.0	"	33.3	ND	71.8		29-160			
m,p-Xylene	45.8	2.0	"	66.7	ND	68.7		20-166			
o-Xylene	23.9	1.0	"	33.3	ND	71.6		33-159			
Surrogate: 1,2-Dichloroethane-d4	12.4		"	13.3		93.0		23-173			
Surrogate: Toluene-d8	13.4		"	13.3		101		20-170			
Surrogate: 4-Bromofluorobenzene	13.6		"	13.3		102		21-167			

Summit Scientific

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

Project: Bauer 5; 12, 21-4

Project Number: [none]  
 Project Manager: Mark Longhurst

**Reported:**  
 04/24/20 14:52

**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 2004268 - EPA 5030 Water MS**

**Matrix Spike Dup (2004268-MSD1)**

Source: 2004269-02

Prepared: 04/22/20 Analyzed: 04/23/20

Benzene	20.0	1.0	ug/l	33.3	ND	60.2	34-141	2.22	30	
Toluene	25.0	1.0	"	33.3	ND	74.9	27-151	1.94	30	
Ethylbenzene	23.2	1.0	"	33.3	ND	69.6	29-160	3.05	30	
m,p-Xylene	43.9	2.0	"	66.7	ND	65.9	20-166	4.12	30	
o-Xylene	23.4	1.0	"	33.3	ND	70.3	33-159	1.82	30	
Surrogate: 1,2-Dichloroethane-d4	13.2		"	13.3		99.4	23-173			
Surrogate: Toluene-d8	13.4		"	13.3		100	20-170			
Surrogate: 4-Bromofluorobenzene	13.6		"	13.3		102	21-167			

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

Project: Bauer 5; 12, 21-4

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
04/24/20 14:52

### 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