

**PDC Energy, Inc.**  
**Fourth Quarter 2019 Groundwater Monitoring Summary**

November 20, 2019

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 September 25, 2019, five monitoring wells (BH01 – BH05) were installed to confirm the absence of dissolved-phase hydrocarbon impacts following excavation activities. Lithologic descriptions and volatile organic compound (VOC) concentrations measured using a photoionization detector (PID) were recorded for each monitoring well. Boring and well completion logs are provided in Attachment A.

On October 31, 2019, 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, total xylenes (BTEX) by USEPA Method 8260B.

Fourth quarter 2019 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 B.

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 first quarter 2020.

First quarter 2020 groundwater sampling will be conducted in January 2020.







**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)
<b>COGCC Table 910-1 Groundwater Standard (µg/L) <sup>(1)</sup></b>		<b>5</b>	<b>560</b>	<b>700</b>	<b>1,400</b>		
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
BH02	10/31/2019	<1.0	<1.0	<1.0	<2.0	16.00	4612.22
BH03	10/31/2019	<1.0	<1.0	<1.0	<2.0	14.21	4613.61
BH04	10/31/2019	<1.0	<1.0	<1.0	<2.0	13.94	4613.81
BH05	10/31/2019	<1.0	<1.0	<1.0	<2.0	13.70	4613.71

**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**



# Borehole Logging Form

BOREHOLE ID: <b>BH01</b>	SITE NAME: <b>Banner 5:12, 21-4</b>	CLIENT NAME: <b>PDC ENERGY</b>
Date Completed: <b>9/25/19</b>	Location: <b>W of former excavation</b>	
Drilling Company: <b>Tasman geosciences</b>	Surface Completion: <b>Flush mount</b>	DTW: <b>14'</b> TD: <b>22'</b>
Type of Drill: <b>Direct Push Probe</b>	Geologist: <b>J. McIner</b>	Project Manager: <b>Coltmanlin</b>
Bit Size <b>2 3/4"</b>	Logging Method: <b>Continuous macro-core liner / hand auger</b>	
Well Const. Material: Diameter: <b>1"</b>	Screen: <b>Sch 40 PVC Slotted .010</b>	Riser: <b>Sch 40 PVC Blank</b>

Depth (feet)	Well Completion	Sample Type	% Recovery	PID (ppm)	Laboratory Sample	USCS	Description
1		hand auger	↑	0.1		SW	Tan sand, fine-coarse gr. well graded, dry, no odor, some gravel
2			↑	↓		↓	↓
3			100%	1.5		SC	dk brn sandy clay, low plastic, dry, no odor
4			↓	↓		↓	↓
5			↓	↓		↓	↓
6			↓	2.3		SM	Tan silty sand, fine-med gr. well graded, dry, no odor
7		Push Probe	↑	2.2		↓	light gray, sandy clay, low plastic, fine gr. dry, no odor
8			90%	↓		↓	↓
9			↓	↓		↓	↓
10			↓	1.6		SM	Same as above, light brn / gray
11			↑	0.6		SM	light brn silty sand, fine gr. poor grading, dry, no odor
12			80%	↓		↓	↓
13			↓	106.1	B Hole 12-14 0939	SM	Gray silty sand, fine gr. poor grading, moist, no odor
14			↓	↓		↓	↓
15			↑	150.7		SM	Same as above, saturated
16			90%	↓		↓	↓
17			↓	9.2		↓	↓
18			↓	↓		↓	↓
19			↑	3.4		SM	light brn / gray silty sand, fine-gr. poor grading saturated, no odor
20			↓	↓		↓	↓
21			↑	2.9	B Hole 20-22' 0953	↓	↓
22			↓	↓		↓	↓
23							
24							
25							





# Borehole Logging Form

BOREHOLE ID: <b>BH02</b>	SITE NAME: <b>Bauer S312, 21-4</b>	CLIENT NAME: <b>PDC ENERGY</b>
Date Completed: <b>9/25/14</b>	Location: <b>S of former excavation</b>	
Drilling Company: <b>Tasman Geosciences</b>	Surface Completion: <b>Flush mount</b>	DTW: <b>16'</b> TD: <b>22'</b>
Type of Drill: <b>Direct Push Probe</b>	Geologist: <b>J. McInerney</b>	Project Manager: <b>C. Hamlin</b>
Bit Size: <b>2 3/8"</b>	Logging Method: <b>Continuous macro-core liner / hand auger</b>	
Well Const. Material: Diameter: <b>1"</b> Screen: <b>Sch 40 PVC Slotted 0.010"</b> Riser: <b>Sch 40 PVC Blank</b>		

Depth (feet)	Well Completion	Sample Type	% Recovery	PID (ppm)	Laboratory Sample	USCS	Description
1		Hand Auger	↑	0.3		SW	Tan sand, fine - coarse gr., well graded, dry, no odor, some gravel
2							
3			100%				
4				0.8		CL	DK brn clay, low plastic, dry, no odor
5							
6				1.1		SM	Tan silty sand, fine gr., poor grading, dry, no odor
7		Push Probe	↑	4.8		ML	light brn/gray clayey silt, low plastic, dry, no odor
8			90%				
9				4.5			
10							
11				4.5		ML	Same as above
12			80%				
13				7.3		SM	Gray silty sand, fine gr., poor grading, moist, no odor, black stains
14							
15				4.2		SM	Same as above
16			90%				
17				5.1			Saturated
18							
19				4.1		SM	light brn/gray silty sand, fine gr., poor grading, saturated, no odor
20			90%				
21				5.4			
22							
23							
24							
25							

for



# Borehole Logging Form

BOREHOLE ID: <u>B1403</u>	SITE NAME: <u>Bauer S12, 21-4</u>	CLIENT NAME: <u>PDC ENERGY</u>
Date Completed: <u>9/25/19</u>	Location: <u>Source Boring</u>	
Drilling Company: <u>Tasman Geoscience</u>	Surface Completion: <u>Flush mount</u>	DTW: <u>14'</u> TD: <u>20'</u>
Type of Drill: <u>Direct Push Probe</u>	Geologist: <u>J. McGarver</u>	Project Manager: <u>C. Hamlin</u>
Bit Size: <u>2 3/8"</u>	Logging Method: <u>Continuous macro-core liner/hand auger</u>	
Well Const. Material: <u>Diameter: 1"</u>	Screen:	Riser:

Depth (feet)	Well Completion	Sample Type	% Recovery	PID (ppm)	Laboratory Sample	USCS	Description
1		Hand auger	↑	0.3		SW	Tan sand, fine-coarse gr., well graded, dry, no odor, some gravel
2			100% <sub>CO</sub>	↓		CL	DK brn sandy clay, low plastic, fine-med gr., dry, no odor
3				1.8			
4							
5							
6							
7		Push Probe	↑	4.5		SM	Brn silty sand, fine-coarse gr., well graded, dry, no odor, some gravel
8			90% <sub>CO</sub>				
9							
10							
11			50% <sub>CO</sub>	0.6		SM	Brn silty sand, fine-coarse gr., well graded, moist, no odor
12							
13							
14			X			SM	same as above, saturated
15				0.8			
16			10% <sub>CO</sub>				
17							
18							
19			0% <sub>CO</sub>				No recovery
20							
21							
22							
23							
24							
25							





# Borehole Logging Form

BOREHOLE ID: <u>BH04</u>	SITE NAME: <u>Bauer S1221-4</u>	CLIENT NAME: <u>PDC ENERGY</u>
Date Completed: <u>9/25/19</u>	Location: <u>Not former excavation</u>	
Drilling Company: <u>Tasman geosciences</u>	Surface Completion: <u>Flush mount</u>	DTW: <u>13'</u> TD: <u>22'</u>
Type of Drill: <u>Direct Push Probe</u>	Geologist: <u>S. McIner</u>	Project Manager: <u>C. Hamlin</u>
Bit Size <u>2 3/8"</u>	Logging Method: <u>Continuous macro-core liner / hand auger</u>	
Well Const. Material: Diameter: <u>1"</u>	Screen <u>Sch 40 PVC Slotted .010</u>	Riser <u>Sch 40 PVC Blank</u>

Depth (feet)	Well Completion	Sample Type	% Recovery	PID (ppm)	Laboratory Sample	USCS	Description
1		Hand Auger	↑	0.9		SW	Tan sand, fine-med gr., well graded, dry, no odor
2			↑	↓		SM	some gravel
3			100%	1.1			Brn silty sand, fine-med gr., well graded, dry, no odor
4							
5							
6							
7		Push Probe	↑	2.3		SM	light brn silty sand, fine gr., poor grading, dry, no odor
8			80%				
9							
10			*	3.9		SM	Same as above, moist
11							
12			90%	5.1			
13							
14							Saturated, same as above
15			↑	3.2		SM	light brn silty sand, fine gr., poor grading, saturated, no odor
16			60%				
17							
18							
19			↑			SM	Same as above
20			60%	4.4			
21							
22							
23							
24							
25							



# Borehole Logging Form

BOREHOLE ID: <u>BH05</u>	SITE NAME: <u>Bauer 5; 12, 21-4</u>	CLIENT NAME: <u>PDC ENERGY</u>
Date Completed: <u>9/25/19</u>	Location: <u>E of former excavation</u>	
Drilling Company: <u>Tasman Geosciences</u>	Surface Completion: <u>Stick up</u>	DTW: <u>14'</u> TD: <u>22'</u>
Type of Drill: <u>Direct Push probe</u>	Geologist: <u>J. McLaner</u>	Project Manager: <u>C. Hamlin</u>
Bit Size: <u>2 3/4"</u>	Logging Method: <u>Continuous macro-core liner / hand auger</u>	
Well Const. Material: Diameter: <u>1"</u> Screen: <u>Sch 40 PVC Slotted .010</u> Riser: <u>Sch 40 PVC Blank</u>		

Depth (feet)	Well Completion	Sample Type	% Recovery	PID (ppm)	Laboratory Sample	USCS	Description
1		Hand auger	↑	↑		SC	DK Brn clayey sand, fine gr, poor grading, dry, no odor
2							
3			100%	0.2			
4							
5							
6							
7		Push Probe	↑	↑		SM	light brn silty sand, fine-med gr, well graded, dry, no odor
8			90%	4.8			
9							
10							
11				3.9		SM	Brn silty sand, fine gr, poor grading, moist, no odor
12			90%	4.4			
13							
14							
15						SM	same as above, saturated
16			90%	4.6			
17							
18							
19							No recovery
20			0%				
21							
22							
23							
24							
25							

## **ATTACHMENT B**



# Summit Scientific

---

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

November 07, 2019

Mark Longhurst

PDC Energy

1775 Sherman St. STE. 3000

Denver, CO 80203

RE: Bauer 5; 12, 21-4

Work Order # 1910378

Enclosed are the results of analyses for samples received by Summit Scientific on 10/31/19 17:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, reading "Muri Premier", on a light blue background.

Muri Premier 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:**  
11/07/19 17:04

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	1910378-01	Water	10/31/19 14:00	10/31/19 17:30
BH02	1910378-02	Water	10/31/19 13:53	10/31/19 17:30
BH03	1910378-03	Water	10/31/19 13:52	10/31/19 17:30
BH04	1910378-04	Water	10/31/19 13:55	10/31/19 17:30
BH05	1910378-05	Water	10/31/19 13:58	10/31/19 17:30

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

S<sub>2</sub>

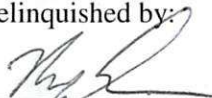
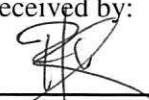
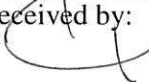
4653 Table Mountain Drive ♦ Golden, Colorado 80403  
303-277-9310

1910378

Page 1 of 1

Client: PDC / Tasman Project Manager: Mark Longhurst  
Address: 6855 W 119th Ave E-Mail: mark.longhurst@PDCE.com  
City/State/Zip: Broomfield/ CO/ 80020  
Phone: 303-487-1228 Project Name: Baver 5; 12, 21-4  
Sampler Name: Max Dahlgren Project Number:

					Preservative				Matrix				Analysis Requested						Special Instructions	
ID	Sample Description	Date Sampled	Time Sampled	# of containers	HCl	HNO <sub>3</sub>	None	Other	Water	Soil	Air-Canister #	Other	8260 BTEX	8260B GBTEXN	8015 DRO	pH / EC				
1	BH01	10/31/19	1400	3	X				X				X							
2	BH02		1353	3	X															
3	BH03		1352	1			X													
4	BH04		1355	3	X															
5	BH05		1354	3	X															
6																				
7																				
8																				
9																				
10																				

Relinquished by: 	Date/Time: 10/31/19 1715	Received by: Tasman's Lock Box	Date/Time: 10/31/19 1715	Turn Around Time (Check) Same Day <input type="checkbox"/> 72 hours 24 hours <input type="checkbox"/> Standard <input checked="" type="checkbox"/> 48 hours <input type="checkbox"/>	Notes:
Relinquished by: Tasman's Lock Box	Date/Time: 10/31/19 1730	Received by: 	Date/Time: 10/31/19 1730	Sample Integrity: Temperature Upon Receipt: 4.5	
Relinquished by:	Date/Time:	Received by: 	Date/Time:	Samples Intact: <input checked="" type="radio"/> Yes <input type="radio"/> No	



1910378

POL / TASMAN

Bauer 5:12, 21-4

Shipped Via: H.D./P.O./FedEx/UPS/USPS/Other

Airbill #:

Matrix (check all that apply):

Air

Soil/Solid

☒ Water

Other:

(Describe)

Temp (°C)

4.5

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

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

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

Custodian Printed Name or Initials

Signature of Custodian

Date/Time

-1805



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

Project: Bauer 5; 12, 21-4

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/07/19 17:04

**BH01**  
**1910378-01 (Water)**

**Summit Scientific**

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

Date Sampled: **10/31/19 14:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	1911054	11/06/19	11/07/19	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **10/31/19 14:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		115 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		79.1 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.1 %		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: Bauer 5; 12, 21-4

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/07/19 17:04

**BH02**  
**1910378-02 (Water)**

**Summit Scientific**

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

Date Sampled: **10/31/19 13:53**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	1.0	ug/l	1	1911054	11/06/19	11/07/19	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **10/31/19 13:53**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		104 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		77.2 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		96.5 %	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: Bauer 5; 12, 21-4

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/07/19 17:04

**BH03**  
**1910378-03 (Water)**

**Summit Scientific**

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

Date Sampled: **10/31/19 13:52**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	1.0	ug/l	1	1911054	11/06/19	11/07/19	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **10/31/19 13:52**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		104 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		125 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.0 %	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: Bauer 5; 12, 21-4

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/07/19 17:04

**BH04**  
**1910378-04 (Water)**

**Summit Scientific**

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

Date Sampled: **10/31/19 13:55**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	1.0	ug/l	1	1911054	11/06/19	11/07/19	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **10/31/19 13:55**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		117 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		79.6 %	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: Bauer 5; 12, 21-4

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/07/19 17:04

**BH05**  
**1910378-05 (Water)**

**Summit Scientific**

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

Date Sampled: **10/31/19 13:58**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	1.0	ug/l	1	1911054	11/06/19	11/07/19	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **10/31/19 13:58**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		118 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		78.6 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		96.5 %	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: Bauer 5; 12, 21-4

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/07/19 17:04

## Volatile Organic Compounds by EPA Method 8260B - Quality Control

### Summit Scientific

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

#### Batch 1911054 - EPA 5030 Water MS

##### Blank (1911054-BLK1)

Prepared: 11/06/19 Analyzed: 11/07/19

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	2.0	"							
Surrogate: 1,2-Dichloroethane-d4	11.3		"	13.3		84.9	23-173			
Surrogate: Toluene-d8	10.5		"	13.3		78.6	20-170			
Surrogate: 4-Bromofluorobenzene	12.8		"	13.3		96.4	21-167			

##### LCS (1911054-BS1)

Prepared: 11/06/19 Analyzed: 11/07/19

Benzene	32.8	1.0	ug/l	33.3		98.4	51-132			
Toluene	29.9	1.0	"	33.3		89.7	51-138			
Ethylbenzene	35.6	1.0	"	33.3		107	58-146			
m,p-Xylene	68.9	2.0	"	66.7		103	57-144			
o-Xylene	35.4	1.0	"	33.3		106	53-146			
Surrogate: 1,2-Dichloroethane-d4	13.3		"	13.3		99.5	23-173			
Surrogate: Toluene-d8	11.0		"	13.3		82.7	20-170			
Surrogate: 4-Bromofluorobenzene	14.1		"	13.3		106	21-167			

##### Matrix Spike (1911054-MS1)

Source: 1910378-01

Prepared: 11/06/19 Analyzed: 11/07/19

Benzene	35.6	1.0	ug/l	33.3	ND	107	34-141			
Toluene	38.5	1.0	"	33.3	ND	116	27-151			
Ethylbenzene	36.4	1.0	"	33.3	ND	109	29-160			
m,p-Xylene	69.1	2.0	"	66.7	ND	104	20-166			
o-Xylene	35.3	1.0	"	33.3	ND	106	33-159			
Surrogate: 1,2-Dichloroethane-d4	13.4		"	13.3		100	23-173			
Surrogate: Toluene-d8	14.0		"	13.3		105	20-170			
Surrogate: 4-Bromofluorobenzene	13.0		"	13.3		97.6	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: Bauer 5; 12, 21-4

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/07/19 17:04

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

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

**Batch 1911054 - EPA 5030 Water MS**

Matrix Spike Dup (1911054-MSD1)		Source: 1910378-01			Prepared: 11/06/19 Analyzed: 11/07/19					
Benzene	34.1	1.0	ug/l	33.3	ND	102	34-141	4.50	30	
Toluene	37.0	1.0	"	33.3	ND	111	27-151	4.16	30	
Ethylbenzene	36.4	1.0	"	33.3	ND	109	29-160	0.0275	30	
m,p-Xylene	69.5	2.0	"	66.7	ND	104	20-166	0.592	30	
o-Xylene	35.1	1.0	"	33.3	ND	105	33-159	0.596	30	
Surrogate: 1,2-Dichloroethane-d4	13.0		"	13.3		97.3	23-173			
Surrogate: Toluene-d8	13.6		"	13.3		102	20-170			
Surrogate: 4-Bromofluorobenzene	13.0		"	13.3		97.4	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: Bauer 5; 12, 21-4

Project Number: [none]

Project Manager: Mark Longhurst

**Reported:**

11/07/19 17:04

### 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