

**TABLE 1**  
**FORMER CBO 11, 21-32 TANK BATTERY**  
**SOIL ANALYTICAL RESULTS SUMMARY TABLE**

Sample ID	Date Sampled	Depth (feet bgs)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	Naphthalene (mg/kg)	TPH <sup>(2)</sup> (mg/kg)	pH (units)	EC (mmhos/cm)
COGCC standards for soil (mg/kg) <sup>(1)</sup>			0.17	85	100	175	23	500	6-9	<4
SS01 @ 4'	4/23/2019	4	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	7.81	0.499

**Notes:**

1. Standards for soil are taken from 2 CCR 404-1, Table 910-1, effective May 1, 2018.
  2. TPH - Total volatile and extractable petroleum hydrocarbons. Value calculated by adding GRO and DRO concentrations.
- COGCC = Colorado Oil and Gas Conservation Commission  
(<) = Analytical result is less than the indicated laboratory reporting limit.  
GRO = Total volatile petroleum hydrocarbons - gasoline range organics  
DRO = Total extractable petroleum hydrocarbons - diesel range organics  
mg/kg = Milligrams per kilogram  
bgs = Below ground surface  
EC = Electrical conductivity  
mmhos/cm = millimhos per centimeter

**TABLE 2**  
**FORMER CBO 11, 21-32 TANK BATTERY**  
**VOC CONCENTRATIONS SUMMARY TABLE**

Sample ID	Date Sampled	Depth (feet bgs)	Sample Location <sup>(1)</sup>	Field Measured VOC Concentration <sup>(2)</sup> (ppm)
SS01 @ 4'	4/23/2019	4	Excavation Base	0.0
SS02 @ 3'	4/23/2019	3	North Sidewall	0.0
SS03 @ 3'	4/23/2019	3	West Sidewall	0.0
SS04 @ 3'	4/23/2019	3	South Sidewall	0.0
SS05 @ 3'	4/23/2019	3	East Sidewall	0.0

**Notes:**

1. Refers to the sample location within the excavation area below the former produced water vessel.

2. Volatile organic compound (VOC) concentrations are measured in the field using a photoionization detector (PID).

bgs = Below ground surface

ppm = Parts per million

= Sample submitted for laboratory analysis.

**ATTACHMENT A**

# Summit Scientific

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4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

April 29, 2019

Mark Longhurst

PDC Energy

1775 Sherman St. STE. 3000

Denver, CO 80203

RE: CBO 11, 21-32

Enclosed are the results of analyses for samples received by Summit Scientific on 04/23/19 17:30. 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 Ben Shrewsbury

Laboratory Manager



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

Project: CBO 11, 21-32

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
04/29/19 10:27

**ANALYTICAL REPORT FOR SAMPLES**

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS01@4'	1904320-01	Soil	04/23/19 10:11	04/23/19 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

1904320

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

Page 1 of 1

Client: PDC  
Address: \_\_\_\_\_  
City/State/Zip: \_\_\_\_\_  
Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
Sampler Name: Jake McCarver

Project Manager: Mark Longhurst  
E-Mail: Mark.Longhurst@pdce.com  
Project Name: CBO 11, 21-32  
Project Number: \_\_\_\_\_

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative				Matrix				Analyze For:						Special Instructions			
				HCl	HNO <sub>3</sub>	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)	GBTEXN (8260)	TPH - DRO	EC/pH			HOLD				
SS01 @ 4'	4/23/2019	10:11	1		X			X					X	X	X						
SS02 @ 3'	4/23/2019	10:14	1		X			X									X				
SS03 @ 3'	4/23/2019	10:17	1		X			X									X				
SS04 @ 3'	4/23/2019	10:20	1		X			X									X				
SS05 @ 3'	4/23/2019	10:23	1		X			X									X				
Relinquished by: <u>[Signature]</u> <u>4/23/19</u> Date/Time: <u>3:18</u> <u>1730</u>				Received by: <u>[Signature]</u> Date/Time: <u>4.23.19</u> <u>1730</u>				Turn Around Time (Check)						Hold SS02-SS05							
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>6.7</u> Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>													

**Sample Receipt Checklist**

S2 Work Order 1904320

Client: PDC Client Project ID: CBO 11,21-32

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)	<u>6.7</u>
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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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all samples received intact <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was adequate sample volume provided <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If custody seals are present, are they intact <sup>(1)</sup> ?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Are samples with holding times due within 48 hours sample due within 48 hours present?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Is a chain-of-custody (COC) form present and filled out completely <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is the COC properly relinquished by the client w/ date and time recorded <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
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	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If samples are acid preserved for metals, is the pH ≤ 2 <sup>(1)</sup> ? Record the pH in Comments.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If dissolved metals are requested, were samples field filtered?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Additional Comments (if any):

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

UP  
Custodian Printed Name or Initials

[Signature]  
Signature of Custodian

4-23-19 1845  
Date/Time



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

Project: CBO 11, 21-32

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
04/29/19 10:27

**SS01@4'**  
**1904320-01 (Soil)**

**Summit Scientific**

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

Date Sampled: **04/23/19 10:11**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	0.0020		mg/kg	1	1904377	04/24/19	04/27/19	EPA 8260B	
Toluene	ND	0.0050		"	"	"	"	"	"	
Ethylbenzene	ND	0.0050		"	"	"	"	"	"	
Xylenes (total)	ND	0.010		"	"	"	"	"	"	
Naphthalene	ND	0.010		"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50		"	"	"	"	"	"	

Date Sampled: **04/23/19 10:11**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		110 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		102 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		101 %		21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **04/23/19 10:11**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
C10-C28 (DRO)	ND	50		mg/kg	1	1904378	04/24/19	04/25/19	EPA 8015M	

Date Sampled: **04/23/19 10:11**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: o-Terphenyl		101 %		30-150		"	"	"	"	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **04/23/19 10:11**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
<b>pH</b>	<b>7.81</b>			pH Units	1	1904373	04/24/19	04/24/19	EPA 9045D	

Summit Scientific

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PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: CBO 11, 21-32 Project Number: [none] Project Manager: Mark Longhurst	<b>Reported:</b> 04/29/19 10:27
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**SS01@4'**  
**1904320-01 (Soil)**

**Summit Scientific**

**Physical Parameters by APHA/ASTM/EPA Methods**

**Specific Conductance by EPA Method 120.1**

Date Sampled: **04/23/19 10:11**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	<b>0.499</b>	0.0100	mmhos/cm	1	1904372	04/24/19	04/24/19	EPA 120.1	

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

Project: CBO 11, 21-32

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
04/29/19 10:27

### 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 1904377 - EPA 5030 Soil MS

##### Blank (1904377-BLK1)

Prepared: 04/24/19 Analyzed: 04/26/19

Benzene	ND	0.0020	mg/kg							
Toluene	ND	0.0050	"							
Ethylbenzene	ND	0.0050	"							
Xylenes (total)	ND	0.010	"							
Naphthalene	ND	0.010	"							
Gasoline Range Hydrocarbons	ND	0.50	"							
Surrogate: 1,2-Dichloroethane-d4	0.0431		"	0.0400		108	23-173			
Surrogate: Toluene-d8	0.0397		"	0.0400		99.3	20-170			
Surrogate: 4-Bromofluorobenzene	0.0402		"	0.0400		100	21-167			

##### LCS (1904377-BS1)

Prepared: 04/24/19 Analyzed: 04/26/19

Benzene	0.0929	0.0020	mg/kg	0.100		92.9	70-130			
Toluene	0.0941	0.0050	"	0.100		94.1	70-130			
Ethylbenzene	0.0983	0.0050	"	0.100		98.3	70-130			
m,p-Xylene	0.188	0.010	"	0.200		93.9	70-130			
o-Xylene	0.0949	0.0050	"	0.100		94.9	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0424		"	0.0400		106	23-173			
Surrogate: Toluene-d8	0.0411		"	0.0400		103	20-170			
Surrogate: 4-Bromofluorobenzene	0.0411		"	0.0400		103	21-167			

##### Matrix Spike (1904377-MS1)

Source: 1904318-01

Prepared: 04/24/19 Analyzed: 04/26/19

Benzene	0.0828	0.0020	mg/kg	0.100	ND	82.8	70-130			
Toluene	0.0825	0.0050	"	0.100	0.00321	79.3	70-130			
Ethylbenzene	0.0856	0.0050	"	0.100	ND	85.6	70-130			
m,p-Xylene	0.163	0.010	"	0.200	0.00561	78.8	70-130			
o-Xylene	0.0816	0.0050	"	0.100	ND	81.6	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0424		"	0.0400		106	23-173			
Surrogate: Toluene-d8	0.0405		"	0.0400		101	20-170			
Surrogate: 4-Bromofluorobenzene	0.0386		"	0.0400		96.4	21-167			

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

Project: CBO 11, 21-32

Project Number: [none]  
 Project Manager: Mark Longhurst

**Reported:**  
 04/29/19 10:27

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

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

**Batch 1904377 - EPA 5030 Soil MS**

**Matrix Spike Dup (1904377-MSD1)**

**Source: 1904318-01**

Prepared: 04/24/19 Analyzed: 04/26/19

Benzene	0.0819	0.0020	mg/kg	0.100	ND	81.9	70-130	1.13	30	
Toluene	0.0834	0.0050	"	0.100	0.00321	80.2	70-130	1.08	30	
Ethylbenzene	0.0862	0.0050	"	0.100	ND	86.2	70-130	0.629	30	
m,p-Xylene	0.166	0.010	"	0.200	0.00561	80.3	70-130	1.79	30	
o-Xylene	0.0844	0.0050	"	0.100	ND	84.4	70-130	3.40	30	
Surrogate: 1,2-Dichloroethane-d4	0.0409		"	0.0400		102	23-173			
Surrogate: Toluene-d8	0.0409		"	0.0400		102	20-170			
Surrogate: 4-Bromofluorobenzene	0.0394		"	0.0400		98.4	21-167			

Summit Scientific

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PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: CBO 11, 21-32 Project Number: [none] Project Manager: Mark Longhurst	Reported: 04/29/19 10:27
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**Extractable Petroleum Hydrocarbons by 8015 - Quality Control**  
**Summit Scientific**

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

**Batch 1904378 - EPA 3550A**

<b>Blank (1904378-BLK1)</b>		Prepared: 04/24/19 Analyzed: 04/25/19									
C10-C28 (DRO)	ND	50	mg/kg								
<b>LCS (1904378-BS1)</b>		Prepared: 04/24/19 Analyzed: 04/25/19									
C10-C28 (DRO)	572	50	mg/kg	500	114	70-130					
<b>Matrix Spike (1904378-MS1)</b>		<b>Source: 1904318-01</b>		Prepared: 04/24/19 Analyzed: 04/25/19							
C10-C28 (DRO)	604	50	mg/kg	500	ND	121	70-130				
<b>Matrix Spike Dup (1904378-MSD1)</b>		<b>Source: 1904318-01</b>		Prepared: 04/24/19 Analyzed: 04/25/19							
C10-C28 (DRO)	512	50	mg/kg	500	ND	102	70-130	16.4	20		

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

Project: CBO 11, 21-32

Project Number: [none]  
 Project Manager: Mark Longhurst

**Reported:**  
 04/29/19 10:27

**Physical Parameters by APHA/ASTM/EPA Methods - Quality Control**

**Summit Scientific**

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

**Batch 1904373 - General Preparation**

**LCS (1904373-BS1)**

Prepared & Analyzed: 04/24/19

pH	9.37		pH Units	9.23		102	95-105		
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**Duplicate (1904373-DUP1)**

Source: 1904285-01

Prepared & Analyzed: 04/24/19

pH	7.87		pH Units			7.81		0.765	20
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PDC Energy  
 1775 Sherman St. STE. 3000  
 Denver CO, 80203

Project: CBO 11, 21-32

Project Number: [none]  
 Project Manager: Mark Longhurst

**Reported:**  
 04/29/19 10:27

**Specific Conductance by EPA Method 120.1 - Quality Control**  
**Summit Scientific**

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

**Batch 1904372 - General Preparation**

**Blank (1904372-BLK1)**

Prepared & Analyzed: 04/24/19

Specific Conductance (EC) ND 0.0100 mmhos/cm

**LCS (1904372-BS1)**

Prepared & Analyzed: 04/24/19

Specific Conductance (EC) 0.742 0.0100 mmhos/cm 90-110

**Duplicate (1904372-DUP1)**

**Source: 1904285-01**

Prepared & Analyzed: 04/24/19

Specific Conductance (EC) 3.88 0.0100 mmhos/cm 3.92 0.897 20

Summit Scientific

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

Project: CBO 11, 21-32

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
04/29/19 10:27

### 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