

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

---

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

April 29, 2019

Mark Longhurst

PDC Energy

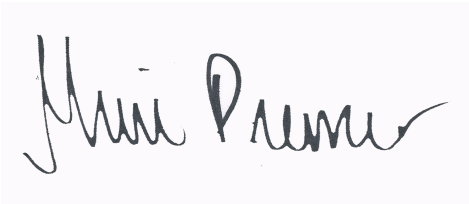
1775 Sherman St. STE. 3000

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, reading "Muri Premer". The signature is written in a cursive style with a large, stylized "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> <u>4.28.19</u> Date/Time: <u>1730</u>				Turn Around Time (Check) 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"/>												Hold SS02-SS05	
Relinquished by: _____ Date/Time: _____				Received by: _____ Date/Time: _____				Sample Integrity: Temperature Upon Receipt: <u>6.7</u> Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>													
Relinquished by: _____ Date/Time: _____				Received in Lab by: _____ Date/Time: _____																	

# 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>
-----------	------------

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> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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> ?	<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> ?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
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> ?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Record the pH in Comments.				
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		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
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		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
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		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
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		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: o-Terphenyl		101 %	30-150		"	"	"	"	

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

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

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

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: CBO 11, 21-32

Project Number: [none]  
Project Manager: Mark Longhurst

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

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

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: 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 Level	Source		%REC		RPD	
	Result	Limit	Units		Result	%REC	Limits	RPD	Limit	Notes

#### 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			

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: 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	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

**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

*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: CBO 11, 21-32

Project Number: [none]  
Project Manager: Mark Longhurst

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

**Extractable Petroleum Hydrocarbons by 8015 - Quality Control**  
**Summit Scientific**

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

**Batch 1904378 - EPA 3550A**

**Blank (1904378-BLK1)**

Prepared: 04/24/19 Analyzed: 04/25/19

C10-C28 (DRO) ND 50 mg/kg

**LCS (1904378-BS1)**

Prepared: 04/24/19 Analyzed: 04/25/19

C10-C28 (DRO) 572 50 mg/kg 500 114 70-130

**Matrix Spike (1904378-MS1)**

**Source: 1904318-01**

Prepared: 04/24/19 Analyzed: 04/25/19

C10-C28 (DRO) 604 50 mg/kg 500 ND 121 70-130

**Matrix Spike Dup (1904378-MSD1)**

**Source: 1904318-01**

Prepared: 04/24/19 Analyzed: 04/25/19

C10-C28 (DRO) 512 50 mg/kg 500 ND 102 70-130 16.4 20

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: 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 Level	Source		%REC		RPD	
		Limit	Units		Result	%REC	Limits	RPD	Limit	Notes

**Batch 1904373 - General Preparation**

**LCS (1904373-BS1)**

Prepared & Analyzed: 04/24/19

pH	9.37	pH Units	9.23	102	95-105
----	------	----------	------	-----	--------

**Duplicate (1904373-DUP1)**

**Source: 1904285-01**

Prepared & Analyzed: 04/24/19

pH	7.87	pH Units	7.81	0.765	20
----	------	----------	------	-------	----

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: 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	
		Limit	Units		Result	%REC	Limits	RPD	Limit	Notes

**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

*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: 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