

**TABLE 1**  
**FORMER MARK 11, 12, 14-35 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)
COGCC standards for soil (mg/kg) <sup>(1)</sup>			0.17	85	100	175	23	500
SS01@10'	11/7/2018	10	0.0048	0.029	0.14	0.76	0.021	51
GS01@6'	11/7/2018	6	18	<0.0050	45	510	0.42	1,072
GS02@8'	11/7/2018	8	17	<0.0050	15	230	0.070	3,500
GS03@8'	11/8/2018	8	1.2	<0.0050	0.20	0.51	0.085	865
SS02@6'	11/9/2018	6	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
SS03@8'	11/9/2018	8	<0.0020	<0.0050	<0.0050	0.013	<0.010	<50
SS04@6'	11/9/2018	6	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
SS05@8'	11/9/2018	8	<0.0020	<0.0050	<0.0050	<0.010	0.010	<50
SS06@6'	11/13/2018	6	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
SS07@8'	11/13/2018	8	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
SS08@6'	11/14/2018	6	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
SS09@8'	11/14/2018	8	0.058	<0.0050	0.016	<0.010	<0.010	<50
SS10@10'	11/14/2018	10	0.10	<0.0050	0.031	<0.010	<0.010	4.4
SS11@6'	11/14/2018	6	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
SS12@8'	11/14/2018	8	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
SS13@6'	11/14/2018	6	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
SS14@8'	11/14/2018	8	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
SS15@10'	11/15/2018	10	<0.0020	<0.0050	<0.0050	0.057	<0.010	4.0
SS16@6'	11/15/2018	6	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
SS17@8'	11/15/2018	8	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
SS18@6'	11/15/2018	6	<0.0020	<0.0050	<0.0050	<0.010	<0.010	9.6
SS19@8'	11/15/2018	8	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
SS20@6'	11/15/2018	6	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
SS21@8'	11/15/2018	8	<0.0020	<0.0050	<0.0050	0.024	<0.010	2.8
SS22@6'	11/15/2018	6	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
SS23@8'	11/15/2018	8	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
WSS01@10'	11/15/2018	10	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
WSS02@10'	11/16/2018	10	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
WSS03@6'	11/16/2018	6	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
WSS04@8'	11/16/2018	8	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
WSS05@6'	11/16/2018	6	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
WSS06@8'	11/16/2018	8	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
WSS07@10'	11/16/2018	10	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
WSS08@6'	11/16/2018	6	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
WSS09@8'	11/16/2018	8	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
WSS10@6'	11/16/2018	6	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
WSS11@8'	11/16/2018	8	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
WSS12@10'	11/16/2018	10	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
WSS13@6'	11/16/2018	6	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
WSS14@8'	11/16/2018	8	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
WSS15@10'	11/19/2018	10	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
WSS16@6'	11/19/2018	6	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
WSS17@8'	11/19/2018	8	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
WSS18@6'	11/19/2018	6	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
WSS19@8'	11/19/2018	8	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
WSS20@6'	11/19/2018	6	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50

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**FORMER MARK 11, 12, 14-35 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)
COGCC standards for soil (mg/kg) <sup>(1)</sup>			0.17	85	100	175	23	500
WSS21@8'	11/19/2018	8	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
WSS22@10'	11/19/2018	10	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
WSS23@10'	11/20/2018	10	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
WSS24@6'	11/20/2018	6	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
WSS25@8'	11/20/2018	8	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
WSS26@6'	11/20/2018	6	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
WSS27@8'	11/20/2018	8	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
WSS28@6'	11/20/2018	6	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
WSS29@8'	11/20/2018	8	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
WSS30@10'	11/20/2018	10	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
WSS31@6'	11/20/2018	6	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
WSS32@8'	11/20/2018	8	0.095	<0.0050	0.020	0.048	<0.010	<50

**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

**BOLD** = Analytical result is in exceedance of COGCC soil standards.

**TABLE 2**  
**FORMER MARK 11, 12, 14-35 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 (feet bgs) <sup>(2)</sup>
<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	11/19/2018	<b>21</b>	4.5	3.6	710	~ 7
W-GW01	11/27/2018	2.9	<1.0	<1.0	22	~ 7

**Notes:**

1. Groundwater standards referenced from 2 CCR 404-1, Table 910-1, effective May 1, 2018.

2. Depth to groundwater measured from ground surface.

COGCC = Colorado Oil and Gas Conservation Commission

µg/L= Micrograms per liter

bgs = Below ground surface

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

**BOLD** = Analytical result is in exceedance of COGCC groundwater standards.

## **ATTACHMENT A**



# Summit Scientific

---

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

November 08, 2018

Mark Longhurst

PDC Energy

1775 Sherman St. STE. 3000

Denver, CO 80203

RE: Mark 11,12,14-3 S

Enclosed are the results of analyses for samples received by Summit Scientific on 11/07/18 18:20. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'P. Shrewsbury', with a stylized, cursive script.

Paul Shrewsbury

President



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

Project: Mark 11,12,14-3 S

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/08/18 06:30

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS01@10'	1811075-01	Soil	11/07/18 09:30	11/07/18 18:20
GS01@6'	1811075-02	Soil	11/07/18 11:02	11/07/18 18:20
GS02@8'	1811075-03	Soil	11/07/18 15:28	11/07/18 18:20

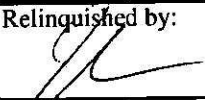
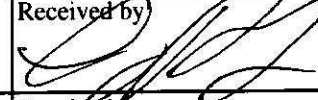
Summit Scientific

*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.*

1811075

Page 1 of 1

Project Manager:	Mark Longhurst
E-Mail:	Mark.Longhurst@pdce.com
Project Name:	Mark 11, 12, 14-3 S
Project Number:	

				Preservative				Matrix				Analyze For:											
Sample Description	Date Sampled	Time Sampled	Number of Containers	HCl	HNO <sub>3</sub>	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)	GBTEXN (8260)	TPH - DRO								Special Instructions		
SS01 @ 10'	11/7/2018	9:30	1			X		X				X	X										
GS01 @ 6'	11/7/2018	11:02	1			X		X				X	X										
GS02 @ 8'	11/7/2018	3:28	1			X		X				X	X										
Relinquished by: 				Date/Time: 11/7/18 R20				Received by: 				Date/Time: 11-7-18 1820				Turn Around Time (Check)							
Relinquished by:				Date/Time:				Received by:				Date/Time:				Same Day <input checked="" type="checkbox"/> 72 Hours <input type="checkbox"/> 24 Hours <input type="checkbox"/> Standard <input type="checkbox"/> 48 Hours <input type="checkbox"/>							
Relinquished by:				Date/Time:				Received in Lab by:				Date/Time:				Sample Integrity: Temperature Upon Receipt: 7.6 Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>							

# Sample Receipt Checklist

S2 Work Order 1811075

Client: PDC Client Project ID: Mark 11, 12, 14-3S

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>7.6</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> ?				
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? If yes, contact client and note in narrative.			✓	
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				
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.

LP  
Custodian Printed Name or Initials

[Signature]  
Signature of Custodian

11-7-18 1820  
Date/Time



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

Project: Mark 11,12,14-3 S

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/08/18 06:30

**SS01@10'**  
**1811075-01 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/07/18 09:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	0.0048	0.0020	mg/kg	1	1811105	11/07/18	11/08/18	EPA 8260B	
Toluene	0.029	0.0050	"	"	"	"	"	"	
Ethylbenzene	0.14	0.0050	"	"	"	"	"	"	
Xylenes (total)	0.76	0.10	"	10	"	"	"	"	
Naphthalene	0.021	0.010	"	1	"	"	"	"	
Gasoline Range Hydrocarbons	51	0.50	"	"	"	"	"	"	

Date Sampled: **11/07/18 09:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		131 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		101 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		119 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/07/18 09:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1811106	11/07/18	11/07/18	EPA 8015M	

Date Sampled: **11/07/18 09:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		94.7 %	30-150		"	"	"	"	

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

Project: Mark 11,12,14-3 S

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/08/18 06:30

**GS01@6'**  
**1811075-02 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/07/18 11:02**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>18</b>	0.20	mg/kg	100	1811105	11/07/18	11/07/18	EPA 8260B	
Toluene	ND	0.0050	"	1	"	"	"	"	
<b>Ethylbenzene</b>	<b>45</b>	0.50	"	100	"	"	"	"	
<b>Xylenes (total)</b>	<b>510</b>	1.0	"	"	"	"	"	"	E
<b>Naphthalene</b>	<b>0.42</b>	0.010	"	1	"	"	"	"	
<b>Gasoline Range Hydrocarbons</b>	<b>72</b>	0.50	"	"	"	"	"	"	

Date Sampled: **11/07/18 11:02**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		143 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		97.7 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		333 %	21-167		"	"	"	"	S-02

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/07/18 11:02**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>C10-C28 (DRO)</b>	<b>1000</b>	50	mg/kg	1	1811106	11/07/18	11/07/18	EPA 8015M	

Date Sampled: **11/07/18 11:02**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		98.2 %	30-150		"	"	"	"	

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

Project: Mark 11,12,14-3 S

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/08/18 06:30

**GS02@8'**  
**1811075-03 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/07/18 15:28**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>17</b>	0.20	mg/kg	100	1811105	11/07/18	11/07/18	EPA 8260B	
Toluene	ND	0.0050	"	1	"	"	"	"	
<b>Ethylbenzene</b>	<b>15</b>	0.50	"	100	"	"	"	"	
<b>Xylenes (total)</b>	<b>230</b>	1.0	"	"	"	"	"	"	E
<b>Naphthalene</b>	<b>0.070</b>	0.010	"	1	"	"	"	"	
<b>Gasoline Range Hydrocarbons</b>	<b>3300</b>	50	"	100	"	"	"	"	

Date Sampled: **11/07/18 15:28**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		116 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		97.6 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		180 %	21-167		"	"	"	"	S-02

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/07/18 15:28**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>C10-C28 (DRO)</b>	<b>200</b>	50	mg/kg	1	1811106	11/07/18	11/07/18	EPA 8015M	

Date Sampled: **11/07/18 15:28**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		95.6 %	30-150		"	"	"	"	

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

Project: Mark 11,12,14-3 S

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/08/18 06:30

## 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 1811105 - EPA 5030 Soil MS

##### Blank (1811105-BLK1)

Prepared & Analyzed: 11/07/18

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	0.0356		"	0.0396		89.8	23-173			
Surrogate: Toluene-d8	0.0392		"	0.0400		98.0	20-170			
Surrogate: 4-Bromofluorobenzene	0.0396		"	0.0400		98.9	21-167			

##### LCS (1811105-BS1)

Prepared: 11/07/18 Analyzed: 11/08/18

Benzene	0.108	0.0020	mg/kg	0.100	108	70-130				
Toluene	0.109	0.0050	"	0.100	109	70-130				
Ethylbenzene	0.118	0.0050	"	0.100	118	70-130				
m,p-Xylene	0.259	0.010	"	0.200	129	70-130				
o-Xylene	0.112	0.0050	"	0.100	112	70-130				
Surrogate: 1,2-Dichloroethane-d4	0.0342		"	0.0396	86.4	23-173				
Surrogate: Toluene-d8	0.0393		"	0.0400	98.2	20-170				
Surrogate: 4-Bromofluorobenzene	0.0400		"	0.0400	100	21-167				

##### Matrix Spike (1811105-MS1)

Source: 1811069-01

Prepared: 11/07/18 Analyzed: 11/08/18

Benzene	0.0907	0.0020	mg/kg	0.100	ND	90.7	70-130			
Toluene	0.0825	0.0050	"	0.100	ND	82.5	70-130			
Ethylbenzene	0.0962	0.0050	"	0.100	ND	96.2	70-130			
m,p-Xylene	0.234	0.010	"	0.200	ND	117	70-130			
o-Xylene	0.0931	0.0050	"	0.100	ND	93.1	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0356		"	0.0396	90.0	23-173				
Surrogate: Toluene-d8	0.0386		"	0.0400	96.6	20-170				
Surrogate: 4-Bromofluorobenzene	0.0448		"	0.0400	112	21-167				

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

Project: Mark 11,12,14-3 S

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/08/18 06:30

**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 1811105 - EPA 5030 Soil MS**

**Matrix Spike Dup (1811105-MSD1)**

**Source: 1811069-01**

Prepared: 11/07/18 Analyzed: 11/08/18

Benzene	0.0842	0.0020	mg/kg	0.100	ND	84.2	70-130	7.38	30	
Toluene	0.0784	0.0050	"	0.100	ND	78.4	70-130	5.03	30	
Ethylbenzene	0.0860	0.0050	"	0.100	ND	86.0	70-130	11.1	30	
m,p-Xylene	0.187	0.010	"	0.200	ND	93.6	70-130	22.2	30	
o-Xylene	0.0872	0.0050	"	0.100	ND	87.2	70-130	6.56	30	
Surrogate: 1,2-Dichloroethane-d4	0.0366		"	0.0396		92.5	23-173			
Surrogate: Toluene-d8	0.0398		"	0.0400		99.6	20-170			
Surrogate: 4-Bromofluorobenzene	0.0408		"	0.0400		102	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: Mark 11,12,14-3 S

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/08/18 06:30

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

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

**Batch 1811106 - EPA 3550A**

**Blank (1811106-BLK1)**

Prepared & Analyzed: 11/07/18

C10-C28 (DRO) ND 50 mg/kg

**LCS (1811106-BS1)**

Prepared & Analyzed: 11/07/18

C10-C28 (DRO) 618 50 mg/kg 500 124 70-130

**Matrix Spike (1811106-MS1)**

**Source: 1811069-01**

Prepared: 11/07/18 Analyzed: 11/08/18

C10-C28 (DRO) 576 50 mg/kg 500 18.3 112 70-130

**Matrix Spike Dup (1811106-MSD1)**

**Source: 1811069-01**

Prepared: 11/07/18 Analyzed: 11/08/18

C10-C28 (DRO) 579 50 mg/kg 500 18.3 112 70-130 0.443 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: Mark 11,12,14-3 S

Project Number: [none]

Project Manager: Mark Longhurst

**Reported:**

11/08/18 06:30

### Notes and Definitions

S-02	The surrogate recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample extract.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument.
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

# Summit Scientific

---

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

November 09, 2018

Mark Longhurst

PDC Energy

1775 Sherman St. STE. 3000

Denver, CO 80203

RE: Mark 11,12,14-35

Enclosed are the results of analyses for samples received by Summit Scientific on 11/08/18 18:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'P. Shrewsbury', with a stylized, cursive script.

Paul Shrewsbury

President



PDC Energy

1775 Sherman St. STE. 3000

Denver CO, 80203

Project: Mark 11,12,14-35

Project Number: [none]

Project Manager: Mark Longhurst

**Reported:**

11/09/18 06:15

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
GS03@8'	1811093-01	Soil	11/08/18 16:18	11/08/18 18:00



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.*

1811093

Page 1 of 1

Project Manager:	Mark Longhurst
E-Mail:	mark.longhurst@pdce.com
Project Name:	Mark 11, 12, 14-35
Project Number:	

				Preservative				Matrix			Analyze For:											
Sample Description	Date Sampled	Time Sampled	Number of Containers	HCl	HNO <sub>3</sub>	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)	BTEXN	TPH - GRO/DRO									Special Instructions
GS03 @8'	11/8/2018	16:18	1			X			X			X	X									
<b>Relinquished by:</b> 				<b>Date/Time:</b> 11/8/18    1815		<b>Received by:</b> 				<b>Date/Time:</b> 11-8-18 1815		<b>Turn Around Time (Check)</b> Same Day <input checked="" type="checkbox"/> 72 Hours <input type="checkbox"/> 24 Hours <input type="checkbox"/> Standard <input type="checkbox"/> 48 Hours <input type="checkbox"/>									Hold Sample SS02-SS06	
<b>Relinquished by:</b>				<b>Date/Time:</b>		<b>Received by:</b>				<b>Date/Time:</b>		<b>Sample Integrity:</b> Temperature Upon Receipt: 10.6 Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>										
<b>Relinquished by:</b>				<b>Date/Time:</b>		<b>Received in Lab by:</b>				<b>Date/Time:</b>												

# Sample Receipt Checklist

S2 Work Order 1811093

Client: PDC Client Project ID: Mark 11, 12, 14-35

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>10.6</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> ?				
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"/>			
Were all samples received intact <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
If custody seals are present, are they intact <sup>(1)</sup> ?			<input checked="" type="checkbox"/>	
Are samples with holding times due within 48 hours, sample due within 48 hours present?			<input checked="" type="checkbox"/>	
Is a chain-of-custody (COC) form present and filled out completely <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client w/ date and time recorded <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.			<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 checked="" type="checkbox"/>	
If samples are acid preserved for metals, is the pH ≤ 2 <sup>(1)</sup> ? Record the pH in Comments.			<input checked="" type="checkbox"/>	
If dissolved metals are requested, were samples field filtered?			<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.				

LP  
Custodian Printed Name or Initials

[Signature]  
Signature of Custodian

11.18.18 1815  
Date/Time



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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/09/18 06:15

**GS03@8'**  
**1811093-01 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/08/18 16:18**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>1.2</b>	0.20	mg/kg	100	1811124	11/08/18	11/09/18	EPA 8260B	
Toluene	ND	0.0050	"	1	"	"	"	"	
<b>Ethylbenzene</b>	<b>0.20</b>	0.0050	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>0.51</b>	0.010	"	"	"	"	"	"	
<b>Naphthalene</b>	<b>0.085</b>	0.010	"	"	"	"	"	"	
<b>Gasoline Range Hydrocarbons</b>	<b>790</b>	50	"	100	"	"	"	"	

Date Sampled: **11/08/18 16:18**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		128 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		104 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		148 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/08/18 16:18**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>C10-C28 (DRO)</b>	<b>75</b>	50	mg/kg	1	1811125	11/08/18	11/09/18	EPA 8015M	

Date Sampled: **11/08/18 16:18**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		105 %	30-150		"	"	"	"	

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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/09/18 06:15

## 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 1811124 - EPA 5030 Soil MS

##### Blank (1811124-BLK1)

Prepared: 11/08/18 Analyzed: 11/09/18

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	0.0439		"	0.0396		111	23-173			
Surrogate: Toluene-d8	0.0412		"	0.0400		103	20-170			
Surrogate: 4-Bromofluorobenzene	0.0380		"	0.0400		95.0	21-167			

##### LCS (1811124-BS1)

Prepared: 11/08/18 Analyzed: 11/09/18

Benzene	0.0933	0.0020	mg/kg	0.100		93.3	70-130			
Toluene	0.110	0.0050	"	0.100		110	70-130			
Ethylbenzene	0.117	0.0050	"	0.100		117	70-130			
m,p-Xylene	0.229	0.010	"	0.200		115	70-130			
o-Xylene	0.113	0.0050	"	0.100		113	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0416		"	0.0396		105	23-173			
Surrogate: Toluene-d8	0.0404		"	0.0400		101	20-170			
Surrogate: 4-Bromofluorobenzene	0.0382		"	0.0400		95.5	21-167			

##### Matrix Spike (1811124-MS1)

Source: 1811092-01

Prepared: 11/08/18 Analyzed: 11/09/18

Benzene	0.0913	0.0020	mg/kg	0.100	ND	91.3	70-130			
Toluene	0.105	0.0050	"	0.100	ND	105	70-130			
Ethylbenzene	0.179	0.0050	"	0.100	0.0360	143	70-130			QM-07
m,p-Xylene	1.50	0.010	"	0.200	0.671	415	70-130			QM-07
o-Xylene	0.243	0.0050	"	0.100	0.0703	173	70-130			QM-07
Surrogate: 1,2-Dichloroethane-d4	0.0418		"	0.0396		106	23-173			
Surrogate: Toluene-d8	0.0488		"	0.0400		122	20-170			
Surrogate: 4-Bromofluorobenzene	0.0453		"	0.0400		113	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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/09/18 06:15

**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 1811124 - EPA 5030 Soil MS**

Matrix Spike Dup (1811124-MSD1)		Source: 1811092-01			Prepared: 11/08/18 Analyzed: 11/09/18					
Benzene	0.0920	0.0020	mg/kg	0.100	ND	92.0	70-130	0.786	30	
Toluene	0.105	0.0050	"	0.100	ND	105	70-130	0.115	30	
Ethylbenzene	0.168	0.0050	"	0.100	0.0360	132	70-130	6.41	30	QM-07
m,p-Xylene	1.18	0.010	"	0.200	0.671	252	70-130	24.3	30	QM-07
o-Xylene	0.241	0.0050	"	0.100	0.0703	171	70-130	0.806	30	QM-07
Surrogate: 1,2-Dichloroethane-d4	0.0428		"	0.0396		108	23-173			
Surrogate: Toluene-d8	0.0481		"	0.0400		120	20-170			
Surrogate: 4-Bromofluorobenzene	0.0423		"	0.0400		106	21-167			

Summit Scientific

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/09/18 06:15

**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 1811125 - EPA 3550A**

**Blank (1811125-BLK1)**

Prepared: 11/08/18 Analyzed: 11/09/18

C10-C28 (DRO) ND 50 mg/kg

**LCS (1811125-BS1)**

Prepared: 11/08/18 Analyzed: 11/09/18

C10-C28 (DRO) 509 50 mg/kg 500 102 70-130

**Matrix Spike (1811125-MS1)**

**Source: 1811092-01**

Prepared: 11/08/18 Analyzed: 11/09/18

C10-C28 (DRO) 508 50 mg/kg 500 46.4 92.4 70-130

**Matrix Spike Dup (1811125-MSD1)**

**Source: 1811092-01**

Prepared: 11/08/18 Analyzed: 11/09/18

C10-C28 (DRO) 480 50 mg/kg 500 46.4 86.8 70-130 5.65 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: Mark 11,12,14-35

Project Number: [none]

Project Manager: Mark Longhurst

**Reported:**

11/09/18 06:15

### Notes and Definitions

QM-07      The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS/LCSD recovery.

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

# Summit Scientific

---

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

November 11, 2018

Mark Longhurst

PDC Energy

1775 Sherman St. STE. 3000

Denver, CO 80203

RE: Mark 11,12,14-35

Enclosed are the results of analyses for samples received by Summit Scientific on 11/09/18 17:45. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'P. Shrewsbury', with a stylized, cursive script.

Paul Shrewsbury

President



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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/11/18 13:23

#### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS02@ 6'	1811109-01	Soil	11/09/18 10:30	11/09/18 17:45
SS03 @ 8'	1811109-02	Soil	11/09/18 10:34	11/09/18 17:45
SS04 @ 6'	1811109-03	Soil	11/09/18 13:45	11/09/18 17:45
SS05 @ 8'	1811109-04	Soil	11/09/18 13:50	11/09/18 17:45

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

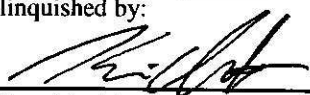
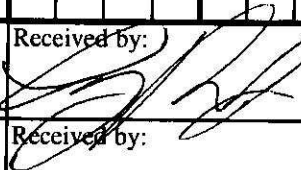
741 Corporate Circle Suite I ♦ Golden, Colorado 80401  
303-277-9310 ♦ 303-374-5933 Fax

1/8 11 10 9

Page 1 of 1

Client:	PDC
Address:	
City/State/Zip:	
Phone:	Fax:
Sampler Name:	Kevin Chritz

Project Manager:	Mark Longhurst
E-Mail:	mark.longhurst@pdce.com
Project Name:	Mark 11, 12, 14-35
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)	BTEXN	TPH - GRO/DRO										
SS02 @6'	11/9/2018	10:30	1			X			X				X	X									Hold Sample SS02-SS06
SS03 @8'	11/9/2018	10:34	1			X			X				X	X									
SS04 @6'	11/9/2018	13:45	1			X			X				X	X									
SS05 @8'	11/9/2018	13:50	1			X			X				X	X									
Relinquished by:  Date/Time: 11/9/18 1820				Received by:  Date/Time: 11-9-18 1820				Turn Around Time (Check) Same Day <input checked="" type="checkbox"/> 72 Hours <input type="checkbox"/> 24 Hours <input type="checkbox"/> Standard <input type="checkbox"/> 48 Hours <input type="checkbox"/>															
Relinquished by: _____ Date/Time: _____				Received by: _____ Date/Time: _____				Sample Integrity: Temperature Upon Receipt: 8.1 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 181109

Client: PDC Client Project ID: Mark 11, 12, 14-35

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>8.1</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

11.9.18 1825  
Date/Time





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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/11/18 13:23

**SS02@ 6'**  
**1811109-01 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/09/18 10:30**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Benzene	ND	0.0020	mg/kg	1	1811145	11/09/18	11/10/18	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: **11/09/18 10:30**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		88.2 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		97.1 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		100 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/09/18 10:30**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
C10-C28 (DRO)	ND	50	mg/kg	1	1811144	11/09/18	11/10/18	EPA 8015M	

Date Sampled: **11/09/18 10:30**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: o-Terphenyl		95.7 %	30-150		"	"	"	"	

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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/11/18 13:23

**SS03 @ 8'**  
**1811109-02 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/09/18 10:34**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1811145	11/09/18	11/10/18	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>0.013</b>	0.010	"	"	"	"	"	"	
Naphthalene	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **11/09/18 10:34**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		87.0 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		97.6 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		101 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/09/18 10:34**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1811144	11/09/18	11/10/18	EPA 8015M	

Date Sampled: **11/09/18 10:34**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		88.9 %	30-150		"	"	"	"	

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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/11/18 13:23

**SS04 @ 6'**  
**1811109-03 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/09/18 13:45**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811145	11/09/18	11/10/18	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: **11/09/18 13:45**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		91.0 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.4 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		103 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/09/18 13:45**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811144	11/09/18	11/10/18	EPA 8015M	

Date Sampled: **11/09/18 13:45**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		88.3 %	30-150		"	"	"	"	

Summit Scientific

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/11/18 13:23

**SS05 @ 8'**  
**1811109-04 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/09/18 13:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1811145	11/09/18	11/10/18	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
<b>Naphthalene</b>	<b>0.010</b>	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **11/09/18 13:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		86.1 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.2 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		100 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/09/18 13:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1811144	11/09/18	11/10/18	EPA 8015M	

Date Sampled: **11/09/18 13:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		89.3 %	30-150		"	"	"	"	

Summit Scientific

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/11/18 13:23

## 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 1811145 - EPA 5030 Soil MS

##### Blank (1811145-BLK1)

Prepared: 11/09/18 Analyzed: 11/10/18

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	0.0338		"	0.0396		85.4	23-173			
Surrogate: Toluene-d8	0.0389		"	0.0400		97.3	20-170			
Surrogate: 4-Bromofluorobenzene	0.0392		"	0.0400		98.0	21-167			

##### LCS (1811145-BS1)

Prepared: 11/09/18 Analyzed: 11/10/18

Benzene	0.0977	0.0020	mg/kg	0.100		97.7	70-130			
Toluene	0.0975	0.0050	"	0.100		97.5	70-130			
Ethylbenzene	0.104	0.0050	"	0.100		104	70-130			
m,p-Xylene	0.207	0.010	"	0.200		103	70-130			
o-Xylene	0.0998	0.0050	"	0.100		99.8	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0324		"	0.0396		81.7	23-173			
Surrogate: Toluene-d8	0.0392		"	0.0400		98.0	20-170			
Surrogate: 4-Bromofluorobenzene	0.0388		"	0.0400		96.9	21-167			

##### Matrix Spike (1811145-MS1)

Source: 1811106-01

Prepared: 11/09/18 Analyzed: 11/10/18

Benzene	0.102	0.0020	mg/kg	0.100	0.0128	88.8	70-130			
Toluene	0.0848	0.0050	"	0.100	ND	84.8	70-130			
Ethylbenzene	0.337	0.0050	"	0.100	0.301	35.3	70-130			QM-07
m,p-Xylene	3.22	0.010	"	0.200	17.2	NR	70-130			QM-07
o-Xylene	0.0798	0.0050	"	0.100	ND	79.8	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0418		"	0.0396		106	23-173			
Surrogate: Toluene-d8	0.0395		"	0.0400		98.8	20-170			
Surrogate: 4-Bromofluorobenzene	0.112		"	0.0400		280	21-167			S-02

Summit Scientific

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/11/18 13:23

**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 1811145 - EPA 5030 Soil MS**

Matrix Spike Dup (1811145-MSD1)		Source: 1811106-01			Prepared: 11/09/18 Analyzed: 11/10/18					
Benzene	0.102	0.0020	mg/kg	0.100	0.0128	88.8	70-130	0.0295	30	
Toluene	0.0872	0.0050	"	0.100	ND	87.2	70-130	2.69	30	
Ethylbenzene	0.296	0.0050	"	0.100	0.301	NR	70-130	12.8	30	QM-07
m,p-Xylene	1.86	0.010	"	0.200	17.2	NR	70-130	53.7	30	QM-07
o-Xylene	0.0865	0.0050	"	0.100	ND	86.5	70-130	8.01	30	
<hr/>										
Surrogate: 1,2-Dichloroethane-d4	0.0383		"	0.0396		96.7	23-173			
Surrogate: Toluene-d8	0.0386		"	0.0400		96.4	20-170			
Surrogate: 4-Bromofluorobenzene	0.0944		"	0.0400		236	21-167			S-02

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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/11/18 13:23

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

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

**Batch 1811144 - EPA 3550A**

**Blank (1811144-BLK1)**

Prepared & Analyzed: 11/09/18

C10-C28 (DRO) ND 50 mg/kg

**LCS (1811144-BS1)**

Prepared & Analyzed: 11/09/18

C10-C28 (DRO) 638 50 mg/kg 500 128 70-130

**Matrix Spike (1811144-MS1)**

**Source: 1811106-01**

Prepared & Analyzed: 11/09/18

C10-C28 (DRO) 1490 50 mg/kg 500 1390 20.3 70-130 QM-07

**Matrix Spike Dup (1811144-MSD1)**

**Source: 1811106-01**

Prepared & Analyzed: 11/09/18

C10-C28 (DRO) 1670 50 mg/kg 500 1390 54.6 70-130 10.8 20 QM-07

Summit Scientific

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/11/18 13:23

### Notes and Definitions

S-02	The surrogate recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample extract.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS/LCSD recovery.
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



# Summit Scientific

---

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

November 14, 2018

Mark Longhurst

PDC Energy

1775 Sherman St. STE. 3000

Denver, CO 80203

RE: Mark 11,12,14-35

Enclosed are the results of analyses for samples received by Summit Scientific on 11/13/18 18:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'P. Shrewsbury', with a stylized, cursive script.

Paul Shrewsbury

President



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

Project: Mark 11,12,14-35

Project Number: [none]

Project Manager: Mark Longhurst

**Reported:**

11/14/18 06:23

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS06@6'	1811151-01	Soil	11/13/18 10:30	11/13/18 18:00
SS07@8'	1811151-02	Soil	11/13/18 10:34	11/13/18 18:00

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.*

1811151

Page 1 of 1

Project Manager:	Mark Longhurst
E-Mail:	mark.longhurst@pdce.com
Project Name:	Mark 11, 12, 14-35
Project Number:	

[illegible]

# Sample Receipt Checklist

S2 Work Order 1811151

Client: PDC Client Project ID: Mark 11, 12, 14-35

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>7.8</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> ?	<u>  /  </u>			
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> ?	<u>  /  </u>			
Was adequate sample volume provided <sup>(1)</sup> ?	<u>  /  </u>			
If custody seals are present, are they intact <sup>(1)</sup> ?			<u>  /  </u>	
Are samples with holding times due within 48 hours sample due within 48 hours present?			<u>  /  </u>	
Is a chain-of-custody (COC) form present and filled out completely <sup>(1)</sup> ?	<u>  /  </u>			
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	<u>  /  </u>			
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	<u>  /  </u>			
Is the COC properly relinquished by the client w/ date and time recorded <sup>(1)</sup> ?	<u>  /  </u>			
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.			<u>  /  </u>	
Are samples preserved that require preservation (excluding cooling) <sup>(1)</sup> ?			<u>  /  </u>	
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> ?			<u>  /  </u>	
Record the pH in Comments.				
If dissolved metals are requested, were samples field filtered?			<u>  /  </u>	
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

11.13.18 1830  
Date/Time



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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/14/18 06:23

**SS06@6'**  
**1811151-01 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/13/18 10:30**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Benzene	ND	0.0020	mg/kg	1	1811171	11/13/18	11/13/18	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: **11/13/18 10:30**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		104 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		97.3 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		94.5 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/13/18 10:30**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
C10-C28 (DRO)	ND	50	mg/kg	1	1811172	"	11/14/18	EPA 8015M	

Date Sampled: **11/13/18 10:30**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: o-Terphenyl		89.4 %	30-150		"	"	"	"	

Summit Scientific

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/14/18 06:23

**SS07@8'**  
**1811151-02 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/13/18 10:34**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811171	11/13/18	11/13/18	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: **11/13/18 10:34**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		107 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		97.9 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.4 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/13/18 10:34**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811172	"	11/14/18	EPA 8015M	

Date Sampled: **11/13/18 10:34**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		90.9 %	30-150		"	"	"	"	

Summit Scientific

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/14/18 06:23

## 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 1811171 - EPA 5030 Soil MS

##### Blank (1811171-BLK1)

Prepared & Analyzed: 11/13/18

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	0.0380		"	0.0396	96.0	23-173				
Surrogate: Toluene-d8	0.0371		"	0.0400	92.7	20-170				
Surrogate: 4-Bromofluorobenzene	0.0380		"	0.0400	95.0	21-167				

##### LCS (1811171-BS1)

Prepared & Analyzed: 11/13/18

Benzene	0.0764	0.0020	mg/kg	0.100	76.4	70-130				
Toluene	0.0900	0.0050	"	0.100	90.0	70-130				
Ethylbenzene	0.106	0.0050	"	0.100	106	70-130				
m,p-Xylene	0.207	0.010	"	0.200	104	70-130				
o-Xylene	0.0977	0.0050	"	0.100	97.7	70-130				
Surrogate: 1,2-Dichloroethane-d4	0.0405		"	0.0396	102	23-173				
Surrogate: Toluene-d8	0.0391		"	0.0400	97.8	20-170				
Surrogate: 4-Bromofluorobenzene	0.0380		"	0.0400	94.9	21-167				

##### Matrix Spike (1811171-MS1)

Source: 1811139-01

Prepared & Analyzed: 11/13/18

Benzene	0.0758	0.0020	mg/kg	0.100	75.8	70-130				
Toluene	0.0907	0.0050	"	0.100	90.7	70-130				
Ethylbenzene	0.108	0.0050	"	0.100	108	70-130				
m,p-Xylene	0.210	0.010	"	0.200	105	70-130				
o-Xylene	0.102	0.0050	"	0.100	102	70-130				
Surrogate: 1,2-Dichloroethane-d4	0.0420		"	0.0396	106	23-173				
Surrogate: Toluene-d8	0.0391		"	0.0400	97.6	20-170				
Surrogate: 4-Bromofluorobenzene	0.0385		"	0.0400	96.3	21-167				

Summit Scientific

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/14/18 06:23

**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 1811171 - EPA 5030 Soil MS**

Matrix Spike Dup (1811171-MSD1)		Source: 1811139-01			Prepared & Analyzed: 11/13/18					
Benzene	0.0778	0.0020	mg/kg	0.100	77.8	70-130	2.62	30		
Toluene	0.0918	0.0050	"	0.100	91.8	70-130	1.18	30		
Ethylbenzene	0.108	0.0050	"	0.100	108	70-130	0.417	30		
m,p-Xylene	0.211	0.010	"	0.200	106	70-130	0.327	30		
o-Xylene	0.101	0.0050	"	0.100	101	70-130	0.622	30		
Surrogate: 1,2-Dichloroethane-d4	0.0422		"	0.0396	107	23-173				
Surrogate: Toluene-d8	0.0394		"	0.0400	98.4	20-170				
Surrogate: 4-Bromofluorobenzene	0.0380		"	0.0400	95.0	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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/14/18 06:23

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

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

**Batch 1811172 - EPA 3550A**

**Blank (1811172-BLK1)**

Prepared: 11/13/18 Analyzed: 11/14/18

C10-C28 (DRO) ND 50 mg/kg

**LCS (1811172-BS1)**

Prepared: 11/13/18 Analyzed: 11/14/18

C10-C28 (DRO) 459 50 mg/kg 500 91.8 70-130

**Matrix Spike (1811172-MS1)**

**Source: 1811137-01**

Prepared: 11/13/18 Analyzed: 11/14/18

C10-C28 (DRO) 848 50 mg/kg 500 124 145 70-130 QM-07

**Matrix Spike Dup (1811172-MSD1)**

**Source: 1811137-01**

Prepared: 11/13/18 Analyzed: 11/14/18

C10-C28 (DRO) 778 50 mg/kg 500 124 131 70-130 8.53 20 QM-07

Summit Scientific

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PDC Energy

1775 Sherman St. STE. 3000

Denver CO, 80203

Project: Mark 11,12,14-35

Project Number: [none]

Project Manager: Mark Longhurst

**Reported:**

11/14/18 06:23

### Notes and Definitions

QM-07      The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS/LCSD recovery.

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

# Summit Scientific

---

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

November 15, 2018

Mark Longhurst

PDC Energy

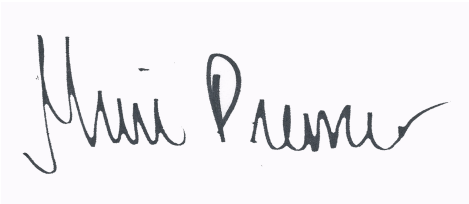
1775 Sherman St. STE. 3000

Denver, CO 80203

RE: Mark 11,12,14-35

Enclosed are the results of analyses for samples received by Summit Scientific on 11/14/18 18:25. 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: Mark 11,12,14-35

Project Number: [none]

Project Manager: Mark Longhurst

**Reported:**  
11/15/18 13:08

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS08@6'	1811159-01	Soil	11/14/18 08:30	11/14/18 18:25
SS09@8'	1811159-02	Soil	11/14/18 08:37	11/14/18 18:25
SS10@10'	1811159-03	Soil	11/14/18 08:50	11/14/18 18:25
SS11@6'	1811159-04	Soil	11/14/18 09:00	11/14/18 18:25
SS12@8'	1811159-05	Soil	11/14/18 09:05	11/14/18 18:25
SS13@6'	1811159-06	Soil	11/14/18 10:00	11/14/18 18:25
SS14@8'	1811159-07	Soil	11/14/18 10:07	11/14/18 18:25

Summit Scientific


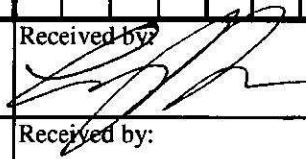
*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

181159

Page 1 of 1

Project Manager:	Mark Longhurst
E-Mail:	mark.longhurst@pdce.com
Project Name:	Mark 11, 12, 14-35
Project Number:	

				Preservative				Matrix				Analyze For:										Special Instructions
Sample Description	Date Sampled	Time Sampled	Number of Containers	HCl	HNO <sub>3</sub>	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)	BTEXN	TPH - GRO/DRO									
SS08@6'	11/14/2018	8:30	1			X			X			X	X									
SS09@8'	11/14/2018	8:37	1			X			X			X	X									
SS10@10'	11/14/2018	8:50	1			X			X			X	X									
SS11@6'	11/14/2018	9:00	1			X			X			X	X									
SS12@8'	11/14/2018	9:05	1			X			X			X	X									
SS13@6'	11/14/2018	10:00	1			X			X			X	X									
SS14@8'	11/14/2018	10:07	1			X			X			X	X									

Relinquished by:	Date/Time:	Received by:	Date/Time:	Turn Around Time (Check)
	11/14/18 1830		11.14.18 1830	Same Day <input checked="" type="checkbox"/> 72 Hours <input type="checkbox"/>
Relinquished by:	Date/Time:	Received by:	Date/Time:	24 Hours <input type="checkbox"/> Standard <input type="checkbox"/>
				48 Hours <input type="checkbox"/>
Relinquished by:	Date/Time:	Received in Lab by:	Date/Time:	Sample Integrity:
				Temperature Upon Receipt: 7.9
				Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

# Sample Receipt Checklist

S2 Work Order 1811159

Client: PDC Client Project ID: Mack 11, 12, 14-35

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>7.9</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

11.14.18 1830  
Date/Time



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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/15/18 13:08

**SS08@6'**  
**1811159-01 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/14/18 08:30**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Benzene	ND	0.0020	mg/kg	1	1811191	11/14/18	11/14/18	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: **11/14/18 08:30**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		103 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		101 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.6 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/14/18 08:30**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
C10-C28 (DRO)	ND	50	mg/kg	1	1811192	11/14/18	11/15/18	EPA 8015M	

Date Sampled: **11/14/18 08:30**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: o-Terphenyl		91.1 %	30-150		"	"	"	"	

Summit Scientific

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/15/18 13:08

**SS09@8'**  
**1811159-02 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/14/18 08:37**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
<b>Benzene</b>	<b>0.058</b>	0.0020	mg/kg	1	1811191	11/14/18	11/14/18	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>0.016</b>	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
Naphthalene	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **11/14/18 08:37**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		105 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		100 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		102 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/14/18 08:37**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811192	11/14/18	11/15/18	EPA 8015M	

Date Sampled: **11/14/18 08:37**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		86.4 %	30-150		"	"	"	"	

Summit Scientific

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/15/18 13:08

**SS10@10'**  
**1811159-03 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/14/18 08:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>0.10</b>	0.0020	mg/kg	1	1811191	11/14/18	11/14/18	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>0.031</b>	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
Naphthalene	ND	0.010	"	"	"	"	"	"	
<b>Gasoline Range Hydrocarbons</b>	<b>4.4</b>	0.50	"	"	"	"	"	"	

Date Sampled: **11/14/18 08:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		105 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		101 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		105 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/14/18 08:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1811192	11/14/18	11/15/18	EPA 8015M	

Date Sampled: **11/14/18 08:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		98.2 %	30-150		"	"	"	"	

Summit Scientific

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/15/18 13:08

**SS11@6'**  
**1811159-04 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/14/18 09:00**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811191	11/14/18	11/14/18	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: **11/14/18 09:00**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		103 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		100 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.1 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/14/18 09:00**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811192	11/14/18	11/15/18	EPA 8015M	

Date Sampled: **11/14/18 09:00**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		97.1 %	30-150		"	"	"	"	

Summit Scientific

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/15/18 13:08

**SS12@8'**  
**1811159-05 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/14/18 09:05**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811191	11/14/18	11/14/18	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: **11/14/18 09:05**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		106 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		101 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		96.8 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/14/18 09:05**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811192	11/14/18	11/15/18	EPA 8015M	

Date Sampled: **11/14/18 09:05**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		97.6 %	30-150		"	"	"	"	

Summit Scientific

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/15/18 13:08

**SS13@6'**  
**1811159-06 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/14/18 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1811191	11/14/18	11/14/18	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: **11/14/18 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		103 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		97.6 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.7 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/14/18 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1811192	11/14/18	11/15/18	EPA 8015M	

Date Sampled: **11/14/18 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		97.2 %	30-150		"	"	"	"	

Summit Scientific

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/15/18 13:08

**SS14@8'**  
**1811159-07 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/14/18 10:07**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811191	11/14/18	11/14/18	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: **11/14/18 10:07**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		111 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.4 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.6 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/14/18 10:07**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811192	11/14/18	11/15/18	EPA 8015M	

Date Sampled: **11/14/18 10:07**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		94.3 %	30-150		"	"	"	"	

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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/15/18 13:08

## 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 1811191 - EPA 5030 Soil MS

##### Blank (1811191-BLK1)

Prepared: 11/14/18 Analyzed: 11/15/18

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	0.0415		"	0.0396		105	23-173			
Surrogate: Toluene-d8	0.0392		"	0.0400		98.0	20-170			
Surrogate: 4-Bromofluorobenzene	0.0399		"	0.0400		99.7	21-167			

##### LCS (1811191-BS1)

Prepared: 11/14/18 Analyzed: 11/15/18

Benzene	0.0748	0.0020	mg/kg	0.100		74.8	70-130			
Toluene	0.0895	0.0050	"	0.100		89.5	70-130			
Ethylbenzene	0.104	0.0050	"	0.100		104	70-130			
m,p-Xylene	0.204	0.010	"	0.200		102	70-130			
o-Xylene	0.0974	0.0050	"	0.100		97.4	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0418		"	0.0396		105	23-173			
Surrogate: Toluene-d8	0.0394		"	0.0400		98.6	20-170			
Surrogate: 4-Bromofluorobenzene	0.0388		"	0.0400		97.0	21-167			

##### Matrix Spike (1811191-MS1)

Source: 1811158-01

Prepared: 11/14/18 Analyzed: 11/15/18

Benzene	0.0763	0.0020	mg/kg	0.100	ND	76.3	70-130			
Toluene	0.0887	0.0050	"	0.100	ND	88.7	70-130			
Ethylbenzene	0.124	0.0050	"	0.100	0.00852	116	70-130			
m,p-Xylene	0.603	0.010	"	0.200	0.147	228	70-130			QM-07
o-Xylene	0.100	0.0050	"	0.100	ND	100	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0435		"	0.0396		110	23-173			
Surrogate: Toluene-d8	0.0378		"	0.0400		94.5	20-170			
Surrogate: 4-Bromofluorobenzene	0.0421		"	0.0400		105	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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/15/18 13:08

**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 1811191 - EPA 5030 Soil MS**

**Matrix Spike Dup (1811191-MSD1)**

**Source: 1811158-01**

Prepared: 11/14/18 Analyzed: 11/15/18

Benzene	0.0767	0.0020	mg/kg	0.100	ND	76.7	70-130	0.471	30	
Toluene	0.0890	0.0050	"	0.100	ND	89.0	70-130	0.405	30	
Ethylbenzene	0.125	0.0050	"	0.100	0.00852	117	70-130	1.18	30	
m,p-Xylene	0.584	0.010	"	0.200	0.147	218	70-130	3.20	30	QM-07
o-Xylene	0.105	0.0050	"	0.100	ND	105	70-130	4.18	30	
Surrogate: 1,2-Dichloroethane-d4	0.0437		"	0.0396		110	23-173			
Surrogate: Toluene-d8	0.0386		"	0.0400		96.5	20-170			
Surrogate: 4-Bromofluorobenzene	0.0440		"	0.0400		110	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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/15/18 13:08

**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 1811192 - EPA 3550A**

**Blank (1811192-BLK1)**

Prepared: 11/14/18 Analyzed: 11/15/18

C10-C28 (DRO) ND 50 mg/kg

**LCS (1811192-BS1)**

Prepared: 11/14/18 Analyzed: 11/15/18

C10-C28 (DRO) 555 50 mg/kg 500 111 70-130

**Matrix Spike (1811192-MS1)**

**Source: 1811158-01**

Prepared: 11/14/18 Analyzed: 11/15/18

C10-C28 (DRO) 591 50 mg/kg 500 26.2 113 70-130

**Matrix Spike Dup (1811192-MSD1)**

**Source: 1811158-01**

Prepared: 11/14/18 Analyzed: 11/15/18

C10-C28 (DRO) 581 50 mg/kg 500 26.2 111 70-130 1.74 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: Mark 11,12,14-35

Project Number: [none]

Project Manager: Mark Longhurst

**Reported:**

11/15/18 13:08

### Notes and Definitions

QM-07      The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS/LCSD recovery.

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

# Summit Scientific

---

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

November 16, 2018

Mark Longhurst

PDC Energy

1775 Sherman St. STE. 3000

Denver, CO 80203

RE: Mark 11,12,14-35

Enclosed are the results of analyses for samples received by Summit Scientific on 11/15/18 18:25. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

DRAFT REPORT

DATA SUBJECT TO CHANGE



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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/16/18 05:40

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS15@10'	1811180-01	Soil	11/15/18 08:50	11/15/18 18:25
SS16@6'	1811180-02	Soil	11/15/18 09:00	11/15/18 18:25
SS17@8'	1811180-03	Soil	11/15/18 09:04	11/15/18 18:25
SS18@6'	1811180-04	Soil	11/15/18 09:20	11/15/18 18:25
SS19@8'	1811180-05	Soil	11/15/18 09:27	11/15/18 18:25
SS20@6'	1811180-06	Soil	11/15/18 10:00	11/15/18 18:25
SS21@8'	1811180-07	Soil	11/15/18 10:05	11/15/18 18:25
SS22@6'	1811180-08	Soil	11/15/18 10:30	11/15/18 18:25
SS23@8'	1811180-09	Soil	11/15/18 10:35	11/15/18 18:25
WSS01@10'	1811180-10	Soil	11/15/18 11:50	11/15/18 18:25

DRAFT REPORT

*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

1811180

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


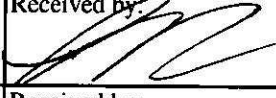
Page 1 of 1

Client: PDC  
Address: \_\_\_\_\_  
City/State/Zip: \_\_\_\_\_  
Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
Sampler Name: Kevin Chritz

Project Manager: Mark Longhurst  
E-Mail: mark.longhurst@pdce.com  
Project Name: Mark 11, 12, 14-35  
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)	BTEXN	TPH - GRO/DRO												
SS15@10'	11/15/2018	8:50	1			X			X			X	X												
SS16@6'	11/15/2018	9:00	1			X			X			X	X												
SS17@8'	11/15/2018	9:04	1			X			X			X	X												
SS18@6'	11/15/2018	9:20	1			X			X			X	X												
SS19@8'	11/15/2018	9:27	1			X			X			X	X												
SS20@6'	11/15/2018	10:00	1			X			X			X	X												
SS21@8'	11/15/2018	10:05	1			X			X			X	X												
SS22@6'	11/15/2018	10:30	1			X			X			X	X												
SS23@8'	11/15/2018	10:35	1			X			X			X	X												
WSS01@10'	11/15/2018	11:50	1			X			X			X	X												

Relinquished by:  11/15/18	Date/Time: <u>9:05</u>	Received by:  11.15.18	Date/Time: <u>1905</u>	<b>Turn Around Time (Check)</b> Same Day <input checked="" type="checkbox"/> 72 Hours <input type="checkbox"/> 24 Hours <input type="checkbox"/> Standard <input type="checkbox"/> 48 Hours <input type="checkbox"/>  <b>Sample Integrity:</b> Temperature Upon Receipt: <u>7.2</u> Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Relinquished by:	Date/Time:	Received by:	Date/Time:	
Relinquished by:	Date/Time:	Received in Lab by:	Date/Time:	

# Sample Receipt Checklist

S2 Work Order 1811180

Client: PDC Client Project ID: Mark 11, 12, 14-35

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>7.2</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

11-18-18 1905  
Date/Time



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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/16/18 05:40

**SS15@10'**  
**1811180-01 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/15/18 08:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1811211	11/15/18	11/15/18	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>0.057</b>	0.010	"	"	"	"	"	"	
Naphthalene	ND	0.010	"	"	"	"	"	"	
<b>Gasoline Range Hydrocarbons</b>	<b>4.0</b>	0.50	"	"	"	"	"	"	

Date Sampled: **11/15/18 08:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		89.1 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		91.4 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.0 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/15/18 08:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1811212	11/15/18	11/15/18	EPA 8015M	

Date Sampled: **11/15/18 08:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		90.1 %	30-150		"	"	"	"	

DRAFT REPORT

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/16/18 05:40

**SS16@6'**  
**1811180-02 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/15/18 09:00**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811211	11/15/18	11/15/18	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: **11/15/18 09:00**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		102 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		96.6 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		91.1 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/15/18 09:00**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811212	11/15/18	11/16/18	EPA 8015M	

Date Sampled: **11/15/18 09:00**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		94.6 %	30-150		"	"	"	"	

DRAFT REPORT

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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/16/18 05:40

**SS17@8'**  
**1811180-03 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/15/18 09:04**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811211	11/15/18	11/15/18	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: **11/15/18 09:04**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		101 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		97.6 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		93.6 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/15/18 09:04**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811212	11/15/18	11/16/18	EPA 8015M	

Date Sampled: **11/15/18 09:04**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		91.0 %	30-150		"	"	"	"	

DRAFT REPORT

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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/16/18 05:40

**SS18@6'**  
**1811180-04 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/15/18 09:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1811211	11/15/18	11/15/18	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
Naphthalene	ND	0.010	"	"	"	"	"	"	
<b>Gasoline Range Hydrocarbons</b>	<b>9.6</b>	0.50	"	"	"	"	"	"	

Date Sampled: **11/15/18 09:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		107 %	23-173		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		103 %	20-170		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		108 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/15/18 09:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1811212	11/15/18	11/16/18	EPA 8015M	

Date Sampled: **11/15/18 09:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: o-Terphenyl</i>		91.0 %	30-150		"	"	"	"	

DRAFT REPORT

*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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/16/18 05:40

**SS19@8'**  
**1811180-05 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/15/18 09:27**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811211	11/15/18	11/15/18	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: **11/15/18 09:27**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		103 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		100 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		95.8 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/15/18 09:27**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811212	11/15/18	11/16/18	EPA 8015M	

Date Sampled: **11/15/18 09:27**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		88.6 %	30-150		"	"	"	"	

DRAFT REPORT

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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/16/18 05:40

**SS20@6'**  
**1811180-06 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/15/18 10:00**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811211	11/15/18	11/15/18	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: **11/15/18 10:00**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		103 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		97.7 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		92.9 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/15/18 10:00**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811212	11/15/18	11/16/18	EPA 8015M	

Date Sampled: **11/15/18 10:00**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		89.3 %	30-150		"	"	"	"	

DRAFT REPORT

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/16/18 05:40

**SS21@8'**  
**1811180-07 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/15/18 10:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1811211	11/15/18	11/15/18	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>0.024</b>	0.010	"	"	"	"	"	"	
Naphthalene	ND	0.010	"	"	"	"	"	"	
<b>Gasoline Range Hydrocarbons</b>	<b>2.8</b>	0.50	"	"	"	"	"	"	

Date Sampled: **11/15/18 10:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		103 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		94.9 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.6 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/15/18 10:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1811212	11/15/18	11/16/18	EPA 8015M	

Date Sampled: **11/15/18 10:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		89.1 %	30-150		"	"	"	"	

DRAFT REPORT

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/16/18 05:40

**SS22@6'**  
**1811180-08 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/15/18 10:30**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811211	11/15/18	11/16/18	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: **11/15/18 10:30**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		102 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.8 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		90.5 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/15/18 10:30**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811212	11/15/18	11/16/18	EPA 8015M	

Date Sampled: **11/15/18 10:30**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		87.8 %	30-150		"	"	"	"	

DRAFT REPORT

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/16/18 05:40

**SS23@8'**  
**1811180-09 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/15/18 10:35**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811211	11/15/18	11/16/18	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: **11/15/18 10:35**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		104 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		101 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		95.8 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/15/18 10:35**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811212	11/15/18	11/16/18	EPA 8015M	

Date Sampled: **11/15/18 10:35**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		93.5 %	30-150		"	"	"	"	

DRAFT REPORT

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/16/18 05:40

**WSS01@10'**  
**1811180-10 (Soil)**

**Summit Scientific**

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

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

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811211	11/15/18	11/16/18	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: **11/15/18 11:50**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		107 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		97.4 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		92.7 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

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

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811212	11/15/18	11/16/18	EPA 8015M	

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

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		91.8 %	30-150		"	"	"	"	

DRAFT REPORT

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/16/18 05:40

## 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 1811211 - EPA 5030 Soil MS

##### Blank (1811211-BLK1)

Prepared: 11/15/18 Analyzed: 11/16/18

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	0.0411		"	0.0396	104	23-173				
Surrogate: Toluene-d8	0.0401		"	0.0400	100	20-170				
Surrogate: 4-Bromofluorobenzene	0.0375		"	0.0400	93.8	21-167				

##### LCS (1811211-BS1)

Prepared: 11/15/18 Analyzed: 11/16/18

Benzene	0.103	0.0020	mg/kg	0.100	103	70-130				
Toluene	0.115	0.0050	"	0.100	115	70-130				
Ethylbenzene	0.129	0.0050	"	0.100	129	70-130				
m,p-Xylene	0.251	0.010	"	0.200	125	70-130				
o-Xylene	0.114	0.0050	"	0.100	114	70-130				
Surrogate: 1,2-Dichloroethane-d4	0.0439		"	0.0396	111	23-173				
Surrogate: Toluene-d8	0.0404		"	0.0400	101	20-170				
Surrogate: 4-Bromofluorobenzene	0.0368		"	0.0400	91.9	21-167				

##### Matrix Spike (1811211-MS1)

Source: 1811180-01

Prepared: 11/15/18 Analyzed: 11/16/18

Benzene	0.107	0.0020	mg/kg	0.100	ND	107	70-130			
Toluene	0.122	0.0050	"	0.100	ND	122	70-130			
Ethylbenzene	0.166	0.0050	"	0.100	0.00339	163	70-130			QM-07
m,p-Xylene	0.767	0.010	"	0.200	0.0566	355	70-130			QM-07
o-Xylene	0.137	0.0050	"	0.100	ND	137	70-130			QM-07
Surrogate: 1,2-Dichloroethane-d4	0.0420		"	0.0396	106	23-173				
Surrogate: Toluene-d8	0.0394		"	0.0400	98.6	20-170				
Surrogate: 4-Bromofluorobenzene	0.0499		"	0.0400	125	21-167				

DRAFT REPORT

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/16/18 05:40

**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 1811211 - EPA 5030 Soil MS**

Matrix Spike Dup (1811211-MSD1)	Source: 1811180-01			Prepared: 11/15/18 Analyzed: 11/16/18						
Benzene	0.105	0.0020	mg/kg	0.100	ND	105	70-130	2.58	30	
Toluene	0.120	0.0050	"	0.100	ND	120	70-130	1.81	30	
Ethylbenzene	0.152	0.0050	"	0.100	0.00339	148	70-130	9.04	30	QM-07
m,p-Xylene	0.541	0.010	"	0.200	0.0566	242	70-130	34.6	30	QM-07
o-Xylene	0.129	0.0050	"	0.100	ND	129	70-130	5.51	30	
Surrogate: 1,2-Dichloroethane-d4	0.0426		"	0.0396		108	23-173			
Surrogate: Toluene-d8	0.0394		"	0.0400		98.4	20-170			
Surrogate: 4-Bromofluorobenzene	0.0435		"	0.0400		109	21-167			

DRAFT REPORT

*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: Mark 11,12,14-35

Project Number: [none]

Project Manager: Mark Longhurst

**Reported:**

11/16/18 05:40

### Notes and Definitions

QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS/LCSD recovery.
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

---

DRAFT REPORT

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# Summit Scientific

---

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

November 19, 2018

Mark Longhurst

PDC Energy

1775 Sherman St. STE. 3000

Denver, CO 80203

RE: Mark 11,12,14-35

Enclosed are the results of analyses for samples received by Summit Scientific on 11/16/18 16:45. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'P. Shrewsbury', with a stylized, cursive script.

Paul Shrewsbury

President



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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/19/18 06:02

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
WSS02@10'	1811202-01	Soil	11/16/18 09:50	11/16/18 16:45
WSS03@6'	1811202-02	Soil	11/16/18 09:52	11/16/18 16:45
WSS04@8'	1811202-03	Soil	11/16/18 09:55	11/16/18 16:45
WSS05@6'	1811202-04	Soil	11/16/18 10:20	11/16/18 16:45
WSS06@8'	1811202-05	Soil	11/16/18 10:25	11/16/18 16:45
WSS07@10'	1811202-06	Soil	11/16/18 11:50	11/16/18 16:45
WSS08@6'	1811202-07	Soil	11/16/18 12:45	11/16/18 16:45
WSS09@8'	1811202-08	Soil	11/16/18 12:48	11/16/18 16:45
WSS10@6'	1811202-09	Soil	11/16/18 13:00	11/16/18 16:45
WSS11@8'	1811202-10	Soil	11/16/18 13:05	11/16/18 16:45
WSS12@10'	1811202-11	Soil	11/16/18 13:34	11/16/18 16:45
WSS13@6'	1811202-12	Soil	11/16/18 14:00	11/16/18 16:45
WSS14@8'	1811202-13	Soil	11/16/18 14:10	11/16/18 16:45

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

1811202.1

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



Client: PDC  
Address: \_\_\_\_\_  
City/State/Zip: \_\_\_\_\_  
Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
Sampler Name: Kevin Chritz

Page 1 of 2

Project Manager: Mark Longhurst  
E-Mail: mark.longhurst@pdce.com  
Project Name: Mark 11, 12, 14-35  
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)	BTEXN	TPH - GRO/DRO									
WSS02@10'	11/16/2018	9:50	1			X		X			X	X										
WSS03@6'	11/16/2018	9:52	1			X		X			X	X										
WSS04@8'	11/16/2018	9:55	1			X		X			X	X										
WSS05@6'	11/16/2018	10:20	1			X		X			X	X										
WSS06@8'	11/16/2018	10:25	1			X		X			X	X										
WSS07@10'	11/16/2018	11:50	1			X		X			X	X										
WSS08@6'	11/16/2018	12:45	1			X		X			X	X										
WSS09@8'	11/16/2018	12:48	1			X		X			X	X										
WSS10@6'	11/16/2018	13:00	1			X		X			X	X										
WSS11@8'	11/16/2018	13:05	1			X		X			X	X										

Relinquished by: 	Date/Time: <u>11/16/18 16:45</u>	Received by: 	Date/Time: <u>11-16-18 16:45</u>	<b>Turn Around Time (Check)</b> Same Day <input checked="" type="checkbox"/> 72 Hours <input type="checkbox"/> 24 Hours <input type="checkbox"/> Standard <input type="checkbox"/> 48 Hours <input type="checkbox"/>
Relinquished by:	Date/Time:	Received by:	Date/Time:	
Relinquished by:	Date/Time:	Received in Lab by:	Date/Time:	

<b>Sample Integrity:</b> Temperature Upon Receipt: <u>  </u> Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
--	--

220211

Page 2 of 2

Project Manager:	Mark Longhurst
E-Mail:	mark.longhurst@pdce.com
Project Name:	Mark 11, 12, 14-35
Project Number:	

[www.s2scientific.com](http://www.s2scientific.com)

# Sample Receipt Checklist

S2 Work Order: 1811202

Client: PDC Client Project ID: MARK 11, 12, 14-35

Shipped Via: \_\_\_\_\_ Airbill #: \_\_\_\_\_  
(UPS, FedEx, Hand Delivered, Pick-up, etc.)

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

Temp (°C)	<u>.1</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> ?				
NOTE: If samples are delivered the same day of sampling, this requirement is met provided that there is evidence that cooling has begun.	<u>X</u>			
Were all samples received intact <sup>(1)</sup> ?	<u>X</u>			
Was adequate sample volume provided <sup>(1)</sup> ?	<u>X</u>			
If custody seals are present, are they intact <sup>(1)</sup> ?			<u>X</u>	
Are samples with holding times due within 48 hours sample due within 48 hours present?	<u>X</u>			
Is a chain-of-custody (COC) form present and filled out completely <sup>(1)</sup> ?	<u>X</u>			
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	<u>X</u>			
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	<u>X</u>			
Is the COC properly relinquished by the client w/ date and time recorded <sup>(1)</sup> ?	<u>X</u>			
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.			<u>X</u>	
Are samples preserved that require preservation (excluding cooling) <sup>(1)</sup> ?			<u>X</u>	
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> ?			<u>X</u>	
Record the pH in Comments.				
If dissolved metals are requested, were samples field filtered?			<u>X</u>	

Additional Comments (if any):

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

Muri  
Custodian Printed Name or Initials

11-16-18  
Signature or Initials of Custodian

17:00  
Date/Time



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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/19/18 06:02

**WSS02@10'**  
**1811202-01 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/16/18 09:50**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Benzene	ND	0.0020	mg/kg	1	1811229	11/16/18	11/16/18	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: **11/16/18 09:50**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		111 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		100 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.7 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/16/18 09:50**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
C10-C28 (DRO)	ND	50	mg/kg	1	1811230	11/16/18	11/16/18	EPA 8015M	

Date Sampled: **11/16/18 09:50**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: o-Terphenyl		82.0 %	30-150		"	"	"	"	

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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/19/18 06:02

**WSS03@6'**  
**1811202-02 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/16/18 09:52**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811229	11/16/18	11/16/18	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: **11/16/18 09:52**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		104 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.7 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.4 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/16/18 09:52**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811230	11/16/18	11/16/18	EPA 8015M	

Date Sampled: **11/16/18 09:52**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		77.7 %	30-150		"	"	"	"	

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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/19/18 06:02

**WSS04@8'**  
**1811202-03 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/16/18 09:55**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811229	11/16/18	11/16/18	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: **11/16/18 09:55**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		107 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		101 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		102 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/16/18 09:55**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811230	11/16/18	11/16/18	EPA 8015M	

Date Sampled: **11/16/18 09:55**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		81.4 %	30-150		"	"	"	"	

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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/19/18 06:02

**WSS05@6'**  
**1811202-04 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/16/18 10:20**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811229	11/16/18	11/16/18	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: **11/16/18 10:20**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		106 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		102 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		103 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/16/18 10:20**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811230	11/16/18	11/16/18	EPA 8015M	

Date Sampled: **11/16/18 10:20**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		80.6 %	30-150		"	"	"	"	

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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/19/18 06:02

**WSS06@8'**  
**1811202-05 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/16/18 10:25**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811229	11/16/18	11/17/18	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: **11/16/18 10:25**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		108 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		101 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		102 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/16/18 10:25**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811230	11/16/18	11/16/18	EPA 8015M	

Date Sampled: **11/16/18 10:25**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		81.4 %	30-150		"	"	"	"	

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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/19/18 06:02

**WSS07@10'**  
**1811202-06 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/16/18 11:50**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811229	11/16/18	11/17/18	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: **11/16/18 11:50**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		112 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		102 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		102 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/16/18 11:50**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811230	11/16/18	11/17/18	EPA 8015M	

Date Sampled: **11/16/18 11:50**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		81.2 %	30-150		"	"	"	"	

Summit Scientific

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/19/18 06:02

**WSS08@6'**  
**1811202-07 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/16/18 12:45**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811229	11/16/18	11/17/18	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: **11/16/18 12:45**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		103 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.2 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/16/18 12:45**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811230	11/16/18	11/17/18	EPA 8015M	

Date Sampled: **11/16/18 12:45**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		85.0 %	30-150		"	"	"	"	

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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/19/18 06:02

**WSS09@8'**  
**1811202-08 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/16/18 12:48**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811229	11/16/18	11/17/18	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: **11/16/18 12:48**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		103 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.6 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		101 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/16/18 12:48**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811230	11/16/18	11/17/18	EPA 8015M	

Date Sampled: **11/16/18 12:48**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		84.2 %	30-150		"	"	"	"	

Summit Scientific

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/19/18 06:02

**WSS10@6'**  
**1811202-09 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/16/18 13:00**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811229	11/16/18	11/17/18	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: **11/16/18 13:00**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		111 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.2 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.4 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/16/18 13:00**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811230	11/16/18	11/17/18	EPA 8015M	

Date Sampled: **11/16/18 13:00**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		84.2 %	30-150		"	"	"	"	

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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/19/18 06:02

**WSS11@8'**  
**1811202-10 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/16/18 13:05**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811229	11/16/18	11/17/18	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: **11/16/18 13:05**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		102 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		97.6 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.1 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/16/18 13:05**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811230	11/16/18	11/17/18	EPA 8015M	

Date Sampled: **11/16/18 13:05**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		81.1 %	30-150		"	"	"	"	

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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/19/18 06:02

**WSS12@10'**  
**1811202-11 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/16/18 13:34**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811229	11/16/18	11/17/18	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: **11/16/18 13:34**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		106 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.2 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		101 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/16/18 13:34**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811230	11/16/18	11/17/18	EPA 8015M	

Date Sampled: **11/16/18 13:34**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		84.6 %	30-150		"	"	"	"	

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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/19/18 06:02

**WSS13@6'**  
**1811202-12 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/16/18 14:00**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811229	11/16/18	11/17/18	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: **11/16/18 14:00**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		104 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		100 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		102 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/16/18 14:00**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811230	11/16/18	11/17/18	EPA 8015M	

Date Sampled: **11/16/18 14:00**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		84.8 %	30-150		"	"	"	"	

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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/19/18 06:02

**WSS14@8'**  
**1811202-13 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/16/18 14:10**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811229	11/16/18	11/17/18	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: **11/16/18 14:10**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		107 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.9 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.4 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/16/18 14:10**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811230	11/16/18	11/17/18	EPA 8015M	

Date Sampled: **11/16/18 14:10**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		83.1 %	30-150		"	"	"	"	

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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/19/18 06:02

## 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 1811229 - EPA 5030 Soil MS

##### Blank (1811229-BLK1)

Prepared & Analyzed: 11/16/18

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	0.0391		"	0.0396		98.7	23-173			
Surrogate: Toluene-d8	0.0396		"	0.0400		99.1	20-170			
Surrogate: 4-Bromofluorobenzene	0.0404		"	0.0400		101	21-167			

##### LCS (1811229-BS1)

Prepared & Analyzed: 11/16/18

Benzene	0.0770	0.0020	mg/kg	0.100		77.0	70-130			
Toluene	0.0899	0.0050	"	0.100		89.9	70-130			
Ethylbenzene	0.107	0.0050	"	0.100		107	70-130			
m,p-Xylene	0.205	0.010	"	0.200		103	70-130			
o-Xylene	0.100	0.0050	"	0.100		100	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0410		"	0.0396		103	23-173			
Surrogate: Toluene-d8	0.0397		"	0.0400		99.2	20-170			
Surrogate: 4-Bromofluorobenzene	0.0411		"	0.0400		103	21-167			

##### Matrix Spike (1811229-MS1)

Source: 1811202-01

Prepared & Analyzed: 11/16/18

Benzene	0.0763	0.0020	mg/kg	0.100	ND	76.3	70-130			
Toluene	0.0893	0.0050	"	0.100	ND	89.3	70-130			
Ethylbenzene	0.107	0.0050	"	0.100	ND	107	70-130			
m,p-Xylene	0.207	0.010	"	0.200	ND	104	70-130			
o-Xylene	0.100	0.0050	"	0.100	ND	100	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0421		"	0.0396		106	23-173			
Surrogate: Toluene-d8	0.0394		"	0.0400		98.4	20-170			
Surrogate: 4-Bromofluorobenzene	0.0403		"	0.0400		101	21-167			

Summit Scientific

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/19/18 06:02

**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 1811229 - EPA 5030 Soil MS**

Matrix Spike Dup (1811229-MSD1)		Source: 1811202-01			Prepared & Analyzed: 11/16/18					
Benzene	0.0766	0.0020	mg/kg	0.100	ND	76.6	70-130	0.314	30	
Toluene	0.0893	0.0050	"	0.100	ND	89.3	70-130	0.00	30	
Ethylbenzene	0.106	0.0050	"	0.100	ND	106	70-130	0.113	30	
m,p-Xylene	0.209	0.010	"	0.200	ND	105	70-130	0.836	30	
o-Xylene	0.100	0.0050	"	0.100	ND	100	70-130	0.449	30	
Surrogate: 1,2-Dichloroethane-d4	0.0421		"	0.0396		106	23-173			
Surrogate: Toluene-d8	0.0385		"	0.0400		96.3	20-170			
Surrogate: 4-Bromofluorobenzene	0.0393		"	0.0400		98.3	21-167			

Summit Scientific

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/19/18 06:02

**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 1811230 - EPA 3550A**

**Blank (1811230-BLK1)**

Prepared & Analyzed: 11/16/18

C10-C28 (DRO) ND 50 mg/kg

**LCS (1811230-BS1)**

Prepared & Analyzed: 11/16/18

C10-C28 (DRO) 541 50 mg/kg 500 108 70-130

**Matrix Spike (1811230-MS1)**

**Source: 1811202-01**

Prepared & Analyzed: 11/16/18

C10-C28 (DRO) 542 50 mg/kg 500 18.5 105 70-130

**Matrix Spike Dup (1811230-MSD1)**

**Source: 1811202-01**

Prepared & Analyzed: 11/16/18

C10-C28 (DRO) 550 50 mg/kg 500 18.5 106 70-130 1.36 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: Mark 11,12,14-35

Project Number: [none]

Project Manager: Mark Longhurst

**Reported:**

11/19/18 06:02

### 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



# Summit Scientific

---

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

November 20, 2018

Mark Longhurst

PDC Energy

1775 Sherman St. STE. 3000

Denver, CO 80203

RE: Mark 11,12,14-35

Enclosed are the results of analyses for samples received by Summit Scientific on 11/19/18 18:28. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink on a light blue background. The signature is cursive and reads "Muri Premier".

Muri Premier For Paul Shrewsbury

President



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

Project: Mark 11,12,14-35

Project Number: [none]

Project Manager: Mark Longhurst

**Reported:**  
11/20/18 15:39

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
WSS15@10'	1811219-01	Soil	11/19/18 09:00	11/19/18 18:28
WSS16@6'	1811219-02	Soil	11/19/18 09:15	11/19/18 18:28
WSS17@8'	1811219-03	Soil	11/19/18 09:20	11/19/18 18:28
WSS18@6'	1811219-04	Soil	11/19/18 09:22	11/19/18 18:28
WSS19@8'	1811219-05	Soil	11/19/18 09:25	11/19/18 18:28
WSS20@6'	1811219-06	Soil	11/19/18 12:15	11/19/18 18:28
WSS21@8'	1811219-07	Soil	11/19/18 12:20	11/19/18 18:28
WSS22@10'	1811219-08	Soil	11/19/18 13:20	11/19/18 18:28

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

1811219

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

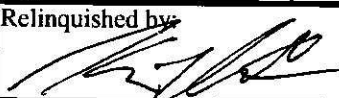
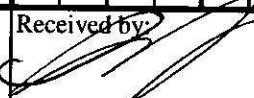
Page 1 of 1

Client: PDC  
Address: \_\_\_\_\_  
City/State/Zip: \_\_\_\_\_  
Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
Sampler Name: Kevin Chritz

Project Manager: Mark Longhurst  
E-Mail: mark.longhurst@pdce.com  
Project Name: Mark 11, 12, 14-35  
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)	BTEXN	TPH - GRO/DRO											
WSS15@10'	11/19/2018	9:00	1			X			X			X	X											
WSS16@6'	11/19/2018	9:15	1			X			X			X	X											
WSS17@8'	11/19/2018	9:20	1			X			X			X	X											
WSS18@6'	11/19/2018	9:22	1			X			X			X	X											
WSS19@8'	11/19/2018	9:25	1			X			X			X	X											
WSS20@6'	11/19/2018	12:15	1			X			X			X	X											
WSS21@8'	11/19/2018	12:20	1			X			X			X	X											
WSS22@10'	11/19/2018	13:20	1			X			X			X	X											

Relinquished by: 	Date/Time: <u>11/19/18 1840</u>	Received by: 	Date/Time: <u>11.19.18 1840</u>	<b>Turn Around Time (Check)</b> Same Day <input checked="" type="checkbox"/> 72 Hours <input type="checkbox"/> 24 Hours <input type="checkbox"/> Standard <input type="checkbox"/> 48 Hours <input type="checkbox"/>  <b>Sample Integrity:</b> Temperature Upon Receipt: <u>43</u> Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Relinquished by:	Date/Time:	Received by:	Date/Time:	
Relinquished by:	Date/Time:	Received in Lab by:	Date/Time:	

# Sample Receipt Checklist

S2 Work Order: 1811219

Client: PDC Client Project ID: Modc 11, 12, 14-35

Shipped Via: P. clasp Airbill #: \_\_\_\_\_  
(UPS, FedEx, Hand Delivered, Pick-up, etc.)

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

Temp (°C)	<u>4.3</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? <b>If yes, contact client and note in narrative.</b>	<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.

Custodian Printed Name or Initials

Signature or Initials of Custodian

11.15.18 1840  
Date/Time



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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/20/18 15:39

**WSS15@10'**  
**1811219-01 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/19/18 09:00**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Benzene	ND	0.0020	mg/kg	1	1811249	11/19/18	11/19/18	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: **11/19/18 09:00**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		107 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		100 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.2 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/19/18 09:00**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
C10-C28 (DRO)	ND	50	mg/kg	1	1811251	11/19/18	11/20/18	EPA 8015M	

Date Sampled: **11/19/18 09:00**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: o-Terphenyl		82.4 %	30-150		"	"	"	"	

Summit Scientific

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/20/18 15:39

**WSS16@6'**  
**1811219-02 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/19/18 09:15**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811249	11/19/18	11/20/18	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: **11/19/18 09:15**

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		100 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/19/18 09:15**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811251	11/19/18	11/20/18	EPA 8015M	

Date Sampled: **11/19/18 09:15**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		82.2 %	30-150		"	"	"	"	

Summit Scientific

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/20/18 15:39

**WSS17@8'**  
**1811219-03 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/19/18 09:20**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811249	11/19/18	11/20/18	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: **11/19/18 09:20**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		108 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		100 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		100 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/19/18 09:20**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811251	11/19/18	11/20/18	EPA 8015M	

Date Sampled: **11/19/18 09:20**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		81.7 %	30-150		"	"	"	"	

Summit Scientific

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/20/18 15:39

**WSS18@6'**  
**1811219-04 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/19/18 09:22**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811249	11/19/18	11/20/18	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: **11/19/18 09:22**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		105 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		104 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		103 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/19/18 09:22**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811251	11/19/18	11/19/18	EPA 8015M	

Date Sampled: **11/19/18 09:22**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		91.7 %	30-150		"	"	"	"	

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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/20/18 15:39

**WSS19@8'**  
**1811219-05 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/19/18 09:25**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811249	11/19/18	11/20/18	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: **11/19/18 09:25**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		104 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.2 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		101 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/19/18 09:25**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811251	11/19/18	11/20/18	EPA 8015M	

Date Sampled: **11/19/18 09:25**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		89.2 %	30-150		"	"	"	"	

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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/20/18 15:39

**WSS20@6'**  
**1811219-06 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/19/18 12:15**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811249	11/19/18	11/20/18	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: **11/19/18 12:15**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		101 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.5 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		109 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/19/18 12:15**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811251	11/19/18	11/20/18	EPA 8015M	

Date Sampled: **11/19/18 12:15**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		86.9 %	30-150		"	"	"	"	

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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/20/18 15:39

**WSS21@8'**  
**1811219-07 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/19/18 12:20**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811249	11/19/18	11/20/18	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: **11/19/18 12:20**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		106 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		101 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		101 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/19/18 12:20**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811251	11/19/18	11/20/18	EPA 8015M	

Date Sampled: **11/19/18 12:20**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		90.0 %	30-150		"	"	"	"	

Summit Scientific

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/20/18 15:39

**WSS22@10'**  
**1811219-08 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/19/18 13:20**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811249	11/19/18	11/20/18	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: **11/19/18 13:20**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		103 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.1 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		101 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/19/18 13:20**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811251	11/19/18	11/20/18	EPA 8015M	

Date Sampled: **11/19/18 13:20**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		87.2 %	30-150		"	"	"	"	

Summit Scientific

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/20/18 15:39

## 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 1811249 - EPA 5030 Soil MS

##### Blank (1811249-BLK1)

Prepared: 11/19/18 Analyzed: 11/20/18

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	0.0358		"	0.0396		90.5	23-173			
Surrogate: Toluene-d8	0.0394		"	0.0400		98.6	20-170			
Surrogate: 4-Bromofluorobenzene	0.0413		"	0.0400		103	21-167			

##### LCS (1811249-BS1)

Prepared: 11/19/18 Analyzed: 11/20/18

Benzene	0.0980	0.0020	mg/kg	0.100		98.0	70-130			
Toluene	0.101	0.0050	"	0.100		101	70-130			
Ethylbenzene	0.115	0.0050	"	0.100		115	70-130			
m,p-Xylene	0.211	0.010	"	0.200		106	70-130			
o-Xylene	0.0978	0.0050	"	0.100		97.8	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0351		"	0.0396		88.6	23-173			
Surrogate: Toluene-d8	0.0392		"	0.0400		98.0	20-170			
Surrogate: 4-Bromofluorobenzene	0.0401		"	0.0400		100	21-167			

##### Matrix Spike (1811249-MS1)

Source: 1811217-01

Prepared: 11/19/18 Analyzed: 11/20/18

Benzene	0.0903	0.0020	mg/kg	0.100	ND	90.3	70-130			
Toluene	0.0958	0.0050	"	0.100	ND	95.8	70-130			
Ethylbenzene	0.106	0.0050	"	0.100	ND	106	70-130			
m,p-Xylene	0.227	0.010	"	0.200	0.0168	105	70-130			
o-Xylene	0.0897	0.0050	"	0.100	0.00309	86.6	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0360		"	0.0396		91.0	23-173			
Surrogate: Toluene-d8	0.0392		"	0.0400		97.9	20-170			
Surrogate: 4-Bromofluorobenzene	0.0402		"	0.0400		100	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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/20/18 15:39

**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 1811249 - EPA 5030 Soil MS**

Matrix Spike Dup (1811249-MSD1)		Source: 1811217-01			Prepared: 11/19/18 Analyzed: 11/20/18					
Benzene	0.0954	0.0020	mg/kg	0.100	ND	95.4	70-130	5.53	30	
Toluene	0.100	0.0050	"	0.100	ND	100	70-130	4.53	30	
Ethylbenzene	0.112	0.0050	"	0.100	ND	112	70-130	5.73	30	
m,p-Xylene	0.229	0.010	"	0.200	0.0168	106	70-130	0.763	30	
o-Xylene	0.0952	0.0050	"	0.100	0.00309	92.1	70-130	5.91	30	
<hr/>										
Surrogate: 1,2-Dichloroethane-d4	0.0366		"	0.0396		92.5	23-173			
Surrogate: Toluene-d8	0.0393		"	0.0400		98.3	20-170			
Surrogate: 4-Bromofluorobenzene	0.0405		"	0.0400		101	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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/20/18 15:39

**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 1811251 - EPA 3550A**

**Blank (1811251-BLK1)**

Prepared: 11/19/18 Analyzed: 11/20/18

C10-C28 (DRO) ND 50 mg/kg

**LCS (1811251-BS1)**

Prepared: 11/19/18 Analyzed: 11/20/18

C10-C28 (DRO) 511 50 mg/kg 500 102 70-130

**Matrix Spike (1811251-MS1)**

**Source: 1811217-01**

Prepared: 11/19/18 Analyzed: 11/20/18

C10-C28 (DRO) 485 50 mg/kg 500 47.2 87.6 70-130

**Matrix Spike Dup (1811251-MSD1)**

**Source: 1811217-01**

Prepared: 11/19/18 Analyzed: 11/20/18

C10-C28 (DRO) 493 50 mg/kg 500 47.2 89.3 70-130 1.66 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: Mark 11,12,14-35

Project Number: [none]

Project Manager: Mark Longhurst

**Reported:**

11/20/18 15:39

### 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



# Summit Scientific

---

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

November 21, 2018

Mark Longhurst

PDC Energy

1775 Sherman St. STE. 3000

Denver, CO 80203

RE: Mark 11,12,14-35

Enclosed are the results of analyses for samples received by Summit Scientific on 11/20/18 18:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'P. Shrewsbury', with a stylized, cursive script.

Paul Shrewsbury

President



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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/21/18 06:16

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
WSS23@10'	1811237-01	Soil	11/20/18 09:00	11/20/18 18:30
WSS24@6'	1811237-02	Soil	11/20/18 10:20	11/20/18 18:30
WSS25@8'	1811237-03	Soil	11/20/18 10:30	11/20/18 18:30
WSS26@6'	1811237-04	Soil	11/20/18 11:25	11/20/18 18:30
WSS27@8'	1811237-05	Soil	11/20/18 11:30	11/20/18 18:30
WSS28@6'	1811237-06	Soil	11/20/18 12:40	11/20/18 18:30
WSS29@8'	1811237-07	Soil	11/20/18 12:45	11/20/18 18:30
WSS30@10'	1811237-08	Soil	11/20/18 13:00	11/20/18 18:30
WSS31@6'	1811237-09	Soil	11/20/18 13:05	11/20/18 18:30
WSS32@8'	1811237-10	Soil	11/20/18 13:10	11/20/18 18:30

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

1811237

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

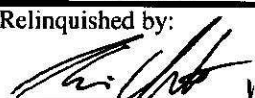
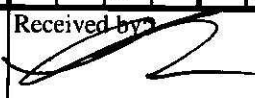
Page 1 of 1

Client: PDC  
Address: \_\_\_\_\_  
City/State/Zip: \_\_\_\_\_  
Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
Sampler Name: Kevin Chritz

Project Manager: Mark Longhurst  
E-Mail: mark.longhurst@pdce.com  
Project Name: Mark 11, 12, 14-35  
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)	BTEXN	TPH - GRO/DRO														
WSS23@10'	11/20/2018	9:00	1			X			X			X	X														
WSS24@6'	11/20/2018	10:20	1			X			X			X	X														
WSS25@8'	11/20/2018	10:30	1			X			X			X	X														
WSS26@6'	11/20/2018	11:25	1			X			X			X	X														
WSS27@8'	11/20/2018	11:30	1			X			X			X	X														
WSS28@6'	11/20/2018	12:40	1			X			X			X	X														
WSS29@8'	11/20/2018	12:45	1			X			X			X	X														
WSS30@10'	11/20/2018	13:00	1			X			X			X	X														
WSS31@6'	11/20/2018	13:05	1			X			X			X	X														
WSS32@8'	11/20/2018	13:10	1			X			X			X	X														

Relinquished by:  11/20/18	Date/Time: 1:45	Received by:  11-20-18	Date/Time: 1:45	<b>Turn Around Time (Check)</b> Same Day <input checked="" type="checkbox"/> 72 Hours <input type="checkbox"/> 24 Hours <input type="checkbox"/> Standard <input type="checkbox"/> 48 Hours <input type="checkbox"/>  <b>Sample Integrity:</b> Temperature Upon Receipt: 4.5 Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Relinquished by:	Date/Time:	Received by:	Date/Time:	
Relinquished by:	Date/Time:	Received in Lab by:	Date/Time:	

# Sample Receipt Checklist

S2 Work Order 1811237

Client: PDC Client Project ID: Mark 11, 12, 14-35

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>4.5</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

11.20.18 1845  
Date/Time



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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/21/18 06:16

**WSS23@10'**  
**1811237-01 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/20/18 09:00**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Benzene	ND	0.0020	mg/kg	1	1811267	11/20/18	11/20/18	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: **11/20/18 09:00**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		107 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		95.9 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		101 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/20/18 09:00**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
C10-C28 (DRO)	ND	50	mg/kg	1	1811268	11/20/18	11/21/18	EPA 8015M	

Date Sampled: **11/20/18 09:00**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: o-Terphenyl		89.5 %	30-150		"	"	"	"	

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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/21/18 06:16

**WSS24@6'**  
**1811237-02 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/20/18 10:20**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811267	11/20/18	11/20/18	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: **11/20/18 10:20**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		104 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.8 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/20/18 10:20**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811268	11/20/18	11/21/18	EPA 8015M	

Date Sampled: **11/20/18 10:20**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		87.7 %	30-150		"	"	"	"	

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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/21/18 06:16

**WSS25@8'**  
**1811237-03 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/20/18 10:30**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811267	11/20/18	11/20/18	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: **11/20/18 10:30**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		108 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		103 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		107 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/20/18 10:30**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811268	11/20/18	11/21/18	EPA 8015M	

Date Sampled: **11/20/18 10:30**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		84.7 %	30-150		"	"	"	"	

Summit Scientific

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/21/18 06:16

**WSS26@6'**  
**1811237-04 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/20/18 11:25**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811267	11/20/18	11/20/18	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: **11/20/18 11:25**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		105 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		100 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		101 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/20/18 11:25**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811268	11/20/18	11/21/18	EPA 8015M	

Date Sampled: **11/20/18 11:25**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		92.3 %	30-150		"	"	"	"	

Summit Scientific

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/21/18 06:16

**WSS27@8'**  
**1811237-05 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/20/18 11:30**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811267	11/20/18	11/20/18	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: **11/20/18 11:30**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		107 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.0 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		106 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/20/18 11:30**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811268	11/20/18	11/21/18	EPA 8015M	

Date Sampled: **11/20/18 11:30**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		98.3 %	30-150		"	"	"	"	

Summit Scientific

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/21/18 06:16

**WSS28@6'**  
**1811237-06 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/20/18 12:40**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811267	11/20/18	11/20/18	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: **11/20/18 12:40**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		105 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		101 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		103 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/20/18 12:40**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811268	11/20/18	11/21/18	EPA 8015M	

Date Sampled: **11/20/18 12:40**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		95.4 %	30-150		"	"	"	"	

Summit Scientific

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/21/18 06:16

**WSS29@8'**  
**1811237-07 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/20/18 12:45**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811267	11/20/18	11/20/18	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: **11/20/18 12:45**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		105 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.2 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		102 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/20/18 12:45**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811268	11/20/18	11/21/18	EPA 8015M	

Date Sampled: **11/20/18 12:45**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		92.6 %	30-150		"	"	"	"	

Summit Scientific

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/21/18 06:16

**WSS30@10'**  
**1811237-08 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/20/18 13:00**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811267	11/20/18	11/20/18	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: **11/20/18 13:00**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		107 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		100 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		102 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/20/18 13:00**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811268	11/20/18	11/21/18	EPA 8015M	

Date Sampled: **11/20/18 13:00**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		84.5 %	30-150		"	"	"	"	

Summit Scientific

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/21/18 06:16

**WSS31@6'**  
**1811237-09 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/20/18 13:05**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	1811267	11/20/18	11/20/18	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: **11/20/18 13:05**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		104 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		101 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/20/18 13:05**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	1811268	11/20/18	11/21/18	EPA 8015M	

Date Sampled: **11/20/18 13:05**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		93.0 %	30-150		"	"	"	"	

Summit Scientific

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/21/18 06:16

**WSS32@8'**  
**1811237-10 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/20/18 13:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>0.095</b>	0.0020	mg/kg	1	1811267	11/20/18	11/21/18	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>0.020</b>	0.0050	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>0.048</b>	0.010	"	"	"	"	"	"	
Naphthalene	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **11/20/18 13:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		105 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		102 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		107 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/20/18 13:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1811268	11/20/18	11/21/18	EPA 8015M	

Date Sampled: **11/20/18 13:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		98.7 %	30-150		"	"	"	"	

Summit Scientific

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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/21/18 06:16

## 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 1811267 - EPA 5030 Soil MS

##### Blank (1811267-BLK1)

Prepared: 11/20/18 Analyzed: 11/21/18

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	0.0332		"	0.0396		83.8	23-173			
Surrogate: Toluene-d8	0.0312		"	0.0400		77.9	20-170			
Surrogate: 4-Bromofluorobenzene	0.0383		"	0.0400		95.8	21-167			

##### LCS (1811267-BS1)

Prepared: 11/20/18 Analyzed: 11/21/18

Benzene	0.106	0.0020	mg/kg	0.100		106	70-130			
Toluene	0.0972	0.0050	"	0.100		97.2	70-130			
Ethylbenzene	0.0993	0.0050	"	0.100		99.3	70-130			
m,p-Xylene	0.206	0.010	"	0.200		103	70-130			
o-Xylene	0.100	0.0050	"	0.100		100	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0377		"	0.0396		95.3	23-173			
Surrogate: Toluene-d8	0.0393		"	0.0400		98.2	20-170			
Surrogate: 4-Bromofluorobenzene	0.0382		"	0.0400		95.6	21-167			

##### Matrix Spike (1811267-MS1)

Source: 1811237-01

Prepared: 11/20/18 Analyzed: 11/21/18

Benzene	0.0832	0.0020	mg/kg	0.100	ND	83.2	70-130			
Toluene	0.0765	0.0050	"	0.100	ND	76.5	70-130			
Ethylbenzene	0.0806	0.0050	"	0.100	ND	80.6	70-130			
m,p-Xylene	0.168	0.010	"	0.200	ND	84.1	70-130			
o-Xylene	0.0947	0.0050	"	0.100	ND	94.7	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0390		"	0.0396		98.4	23-173			
Surrogate: Toluene-d8	0.0420		"	0.0400		105	20-170			
Surrogate: 4-Bromofluorobenzene	0.0466		"	0.0400		116	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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/21/18 06:16

**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 1811267 - EPA 5030 Soil MS**

Matrix Spike Dup (1811267-MSD1)		Source: 1811237-01			Prepared: 11/20/18 Analyzed: 11/21/18					
Benzene	0.0778	0.0020	mg/kg	0.100	ND	77.8	70-130	6.60	30	
Toluene	0.0756	0.0050	"	0.100	ND	75.6	70-130	1.10	30	
Ethylbenzene	0.0808	0.0050	"	0.100	ND	80.8	70-130	0.149	30	
m,p-Xylene	0.167	0.010	"	0.200	ND	83.7	70-130	0.536	30	
o-Xylene	0.0808	0.0050	"	0.100	ND	80.8	70-130	15.9	30	
Surrogate: 1,2-Dichloroethane-d4	0.0353		"	0.0396		89.2	23-173			
Surrogate: Toluene-d8	0.0320		"	0.0400		80.1	20-170			
Surrogate: 4-Bromofluorobenzene	0.0383		"	0.0400		95.8	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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/21/18 06:16

**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 1811268 - EPA 3550A**

**Blank (1811268-BLK1)**

Prepared & Analyzed: 11/20/18

C10-C28 (DRO) ND 50 mg/kg

**LCS (1811268-BS1)**

Prepared: 11/20/18 Analyzed: 11/21/18

C10-C28 (DRO) 470 50 mg/kg 500 94.0 70-130

**Matrix Spike (1811268-MS1)**

**Source: 1811235-01**

Prepared: 11/20/18 Analyzed: 11/21/18

C10-C28 (DRO) 1400 50 mg/kg 500 942 90.6 70-130

**Matrix Spike Dup (1811268-MSD1)**

**Source: 1811235-01**

Prepared: 11/20/18 Analyzed: 11/21/18

C10-C28 (DRO) 1330 50 mg/kg 500 942 78.0 70-130 4.60 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: Mark 11,12,14-35

Project Number: [none]

Project Manager: Mark Longhurst

**Reported:**

11/21/18 06:16

### 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

# Summit Scientific

---

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

November 20, 2018

Mark Longhurst

PDC Energy

1775 Sherman St. STE. 3000

Denver, CO 80203

RE: Mark 11,12,14-35

Enclosed are the results of analyses for samples received by Summit Scientific on 11/19/18 18:33. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'P. Shrewsbury', with a stylized, cursive script.

Paul Shrewsbury

President



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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/20/18 06:19

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
GW01	1811221-01	Water	11/19/18 14:00	11/19/18 18:33

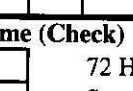
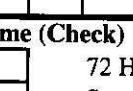
Summit Scientific

*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.*

1811221

Page 1 of 1

Project Manager:	Mark Longhurst
E-Mail:	mark.longhurst@pdce.com
Project Name:	Mark 11, 12, 14-35
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)	BTEX								
GW01	11/19/2018	14:00	3			X		X				X								
Relinquished by:  Date/Time: 11/19/18 1840				Received by:  Date/Time: 11-19-18 1840				Turn Around Time (Check) Same Day <input checked="" type="checkbox"/> 72 Hours <input type="checkbox"/> 24 Hours <input type="checkbox"/> Standard <input type="checkbox"/> 48 Hours <input type="checkbox"/>												
Relinquished by: _____ Date/Time: _____				Received by: _____ Date/Time: _____				Sample Integrity: Temperature Upon Receipt: 4.3 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: 181122F

Client: PDC Client Project ID: Mock 11, 12, 14 - 35

Shipped Via: Pickup Airbill #: \_\_\_\_\_  
(UPS, FedEx, Hand Delivered, Pick-up, etc.)

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

Temp (°C)	<u>4.3</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? <b>If yes, contact client and note in narrative.</b>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input 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.

Custodian Printed Name or Initials

Signature or Initials of Custodian

11.19.18 1845  
Date/Time



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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/20/18 06:19

**GW01**  
**1811221-01 (Water)**

**Summit Scientific**

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

Date Sampled: **11/19/18 14:00**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
<b>Benzene</b>	<b>21</b>	1.0	ug/l	1	1811248	11/19/18	11/19/18	EPA 8260B	
<b>Toluene</b>	<b>4.5</b>	1.0	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>3.6</b>	1.0	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>710</b>	200	"	100	"	"	"	"	

Date Sampled: **11/19/18 14:00**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		93.1 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		97.6 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.7 %	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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/20/18 06:19

## 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 1811248 - EPA 5030 Water MS

##### Blank (1811248-BLK1)

Prepared & 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		92.3	23-173			
Surrogate: Toluene-d8	12.9		"	13.3		96.9	20-170			
Surrogate: 4-Bromofluorobenzene	11.5		"	13.3		86.1	21-167			

##### LCS (1811248-BS1)

Prepared & Analyzed: 11/19/18

Benzene	34.2	1.0	ug/l	33.3		103	70-130			
Toluene	33.1	1.0	"	33.3		99.3	70-130			
Ethylbenzene	36.2	1.0	"	33.3		109	70-130			
m,p-Xylene	70.9	2.0	"	66.7		106	70-130			
o-Xylene	40.7	1.0	"	33.3		122	70-130			
Surrogate: 1,2-Dichloroethane-d4	12.5		"	13.2		94.8	23-173			
Surrogate: Toluene-d8	12.6		"	13.3		94.5	20-170			
Surrogate: 4-Bromofluorobenzene	12.3		"	13.3		92.5	21-167			

##### Matrix Spike (1811248-MS1)

Source: 1811211-01

Prepared & Analyzed: 11/19/18

Benzene	34.1	1.0	ug/l	33.3	ND	102	70-130			
Toluene	32.8	1.0	"	33.3	ND	98.6	70-130			
Ethylbenzene	37.1	1.0	"	33.3	ND	111	70-130			
m,p-Xylene	70.4	2.0	"	66.7	ND	106	70-130			
o-Xylene	32.9	1.0	"	33.3	1.19	95.1	70-130			
Surrogate: 1,2-Dichloroethane-d4	12.7		"	13.2		96.4	23-173			
Surrogate: Toluene-d8	12.7		"	13.3		95.3	20-170			
Surrogate: 4-Bromofluorobenzene	12.8		"	13.3		95.8	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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/20/18 06:19

**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 1811248 - EPA 5030 Water MS**

Matrix Spike Dup (1811248-MSD1)		Source: 1811211-01			Prepared & Analyzed: 11/19/18					
Benzene	34.1	1.0	ug/l	33.3	ND	102	70-130	0.117	30	
Toluene	33.1	1.0	"	33.3	ND	99.4	70-130	0.819	30	
Ethylbenzene	37.7	1.0	"	33.3	ND	113	70-130	1.52	30	
m,p-Xylene	71.9	2.0	"	66.7	ND	108	70-130	2.12	30	
o-Xylene	32.6	1.0	"	33.3	1.19	94.3	70-130	0.855	30	
Surrogate: 1,2-Dichloroethane-d4	12.6		"	13.2		95.3	23-173			
Surrogate: Toluene-d8	12.4		"	13.3		93.3	20-170			
Surrogate: 4-Bromofluorobenzene	12.6		"	13.3		94.7	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: Mark 11,12,14-35

Project Number: [none]

Project Manager: Mark Longhurst

**Reported:**

11/20/18 06:19

### 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

# Summit Scientific

---

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

November 28, 2018

Mark Longhurst

PDC Energy

1775 Sherman St. STE. 3000

Denver, CO 80203

RE: Mark 11,12,14-35

Enclosed are the results of analyses for samples received by Summit Scientific on 11/27/18 18:15. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'P. Shrewsbury', with a stylized, cursive script.

Paul Shrewsbury

President



PDC Energy

1775 Sherman St. STE. 3000

Denver CO, 80203

Project: Mark 11,12,14-35

Project Number: [none]

Project Manager: Mark Longhurst

**Reported:**

11/28/18 07:06

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
W-GW01	1811308-01	Water	11/27/18 06:59	11/27/18 18:15

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.*

1811308

Page 1 of 1

Project Manager:	Mark Longhurst
E-Mail:	Mark.Longhurst@pdce.com
Project Name:	Mark 11, 12, 14-35
Project Number:	

[www.s2scientific.com](http://www.s2scientific.com)

# Sample Receipt Checklist

S2 Work Order: 1811308

Client: PDC Client Project ID: Mark 11, 12, 14-35

Shipped Via: Pickup  
(UPS, FedEx, Hand Delivered, Pick-up, etc.)

Airbill #: \_\_\_\_\_

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

Temp (°C)	<u>3.6</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> ?				
NOTE: If samples are delivered the same day of sampling, this requirement is met provided that there is evidence that cooling has begun.	<u>/</u>			
Were all samples received intact <sup>(1)</sup> ?	<u>/</u>			
Was adequate sample volume provided <sup>(1)</sup> ?	<u>/</u>			
If custody seals are present, are they intact <sup>(1)</sup> ?			<u>/</u>	
Are samples with holding times due within 48 hours sample due within 48 hours present?			<u>/</u>	
Is a chain-of-custody (COC) form present and filled out completely <sup>(1)</sup> ?	<u>/</u>			
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	<u>/</u>			
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	<u>/</u>			
Is the COC properly relinquished by the client w/ date and time recorded <sup>(1)</sup> ?	<u>/</u>			
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.		<u>/</u>		
Are samples preserved that require preservation (excluding cooling) <sup>(1)</sup> ?	<u>/</u>			<u>HCl</u>
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> ?			<u>/</u>	
Record the pH in Comments.				
If dissolved metals are requested, were samples field filtered?			<u>/</u>	
Additional Comments (if any):				

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

CP  
Custodian Printed Name or Initials

[Signature]  
Signature or Initials of Custodian

11.27.18 1830  
Date/Time



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

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/28/18 07:06

**W-GW01**  
**1811308-01 (Water)**

**Summit Scientific**

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

Date Sampled: **11/27/18 06:59**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
<b>Benzene</b>	<b>2.9</b>	1.0		ug/l	1	1811317	11/27/18	11/27/18	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>22</b>	2.0		"	"	"	"	"	"	

Date Sampled: **11/27/18 06:59**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		103 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		98.0 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		94.6 %		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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/28/18 07:06

## 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 1811317 - EPA 5030 Water MS

##### Blank (1811317-BLK1)

Prepared: 11/27/18 Analyzed: 11/28/18

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	2.0	"							
Surrogate: 1,2-Dichloroethane-d4	12.5		"	13.2		94.6	23-173			
Surrogate: Toluene-d8	13.0		"	13.3		97.9	20-170			
Surrogate: 4-Bromofluorobenzene	12.4		"	13.3		92.6	21-167			

##### LCS (1811317-BS1)

Prepared: 11/27/18 Analyzed: 11/28/18

Benzene	29.9	1.0	ug/l	33.3		89.8	70-130			
Toluene	29.1	1.0	"	33.3		87.2	70-130			
Ethylbenzene	30.3	1.0	"	33.3		90.8	70-130			
m,p-Xylene	59.1	2.0	"	66.7		88.6	70-130			
o-Xylene	29.9	1.0	"	33.3		89.7	70-130			
Surrogate: 1,2-Dichloroethane-d4	12.8		"	13.2		97.0	23-173			
Surrogate: Toluene-d8	13.0		"	13.3		97.1	20-170			
Surrogate: 4-Bromofluorobenzene	13.2		"	13.3		99.4	21-167			

##### Matrix Spike (1811317-MS1)

Source: 1811256-01

Prepared: 11/27/18 Analyzed: 11/28/18

Benzene	30.9	1.0	ug/l	33.3	ND	92.7	70-130			
Toluene	30.0	1.0	"	33.3	ND	89.9	70-130			
Ethylbenzene	30.8	1.0	"	33.3	ND	92.4	70-130			
m,p-Xylene	59.8	2.0	"	66.7	ND	89.8	70-130			
o-Xylene	30.0	1.0	"	33.3	ND	89.9	70-130			
Surrogate: 1,2-Dichloroethane-d4	12.5		"	13.2		94.5	23-173			
Surrogate: Toluene-d8	12.7		"	13.3		95.2	20-170			
Surrogate: 4-Bromofluorobenzene	12.8		"	13.3		96.2	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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/28/18 07:06

**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 1811317 - EPA 5030 Water MS**

**Matrix Spike Dup (1811317-MSD1)**

**Source: 1811256-01**

Prepared: 11/27/18 Analyzed: 11/28/18

Benzene	30.8	1.0	ug/l	33.3	ND	92.3	70-130	0.422	30	
Toluene	29.3	1.0	"	33.3	ND	87.9	70-130	2.16	30	
Ethylbenzene	30.8	1.0	"	33.3	ND	92.4	70-130	0.00	30	
m,p-Xylene	60.1	2.0	"	66.7	ND	90.1	70-130	0.434	30	
o-Xylene	30.6	1.0	"	33.3	ND	91.9	70-130	2.28	30	
Surrogate: 1,2-Dichloroethane-d4	12.7		"	13.2		96.4	23-173			
Surrogate: Toluene-d8	12.8		"	13.3		96.4	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: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
11/28/18 07:06

### 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