

**TABLE 1**  
**FORMER OLSON 29-12, 22 TANK BATTERY**  
**SOIL ANALYTICAL RESULTS SUMMARY TABLE**

Sample ID	Date Sampled	Depth (ft. bgs)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	Naphthalene (mg/kg)	TPH <sup>(2)</sup> (mg/kg)	pH (units)	EC (mmhos/cm)
<b>COGCC Table 910-1 Soil Standard (mg/kg) <sup>(1)</sup></b>			<b>0.17</b>	<b>85</b>	<b>100</b>	<b>175</b>	<b>23</b>	<b>500</b>	<b>6-9</b>	<b>&lt;4</b>
SS01 @ 5'	12/6/2019	5	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	8.86	0.780

**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

ft. = Feet

bgs = Below ground surface

EC = Electrical conductivity

mmhos/cm = millimhos per centimeter

**TABLE 2**  
**FORMER OLSON 29-12, 22 TANK BATTERY**  
**VOC CONCENTRATIONS SUMMARY TABLE**

Sample ID	Date Sampled	Depth (ft. bgs)	Sample Location <sup>(1)</sup>	Field Measured VOC Concentration <sup>(2)</sup> (ppm)
SS01 @ 5'	12/6/2019	5	Base	0.0
SS02 @ 3'	12/6/2019	3	North Sidewall	0.0
SS03 @ 3'	12/6/2019	3	West Sidewall	0.0
SS04 @ 3'	12/6/2019	3	South Sidewall	0.0
SS05 @ 3'	12/6/2019	3	East Sidewall	0.0

**Notes:**

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

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

ft. = Feet

bgs = Below ground surface

ppm = Parts per million

= Sample submitted for laboratory analysis.

## **ATTACHMENT A**

# Summit Scientific

---

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

December 16, 2019

Mark Longhurst

PDC Energy

1775 Sherman St. STE. 3000

Denver, CO 80203

RE: Olson 29-12 & 22

Enclosed are the results of analyses for samples received by Summit Scientific on 12/06/19 17:30. 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: Olson 29-12 & 22

Project Number: [none]

Project Manager: Mark Longhurst

**Reported:**

12/16/19 09:42

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS01@5'	1912129-01	Soil	12/06/19 12:55	12/06/19 17:30

Summit Scientific

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

19.12.129

# Summit Scientific

S<sub>2</sub>

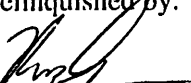
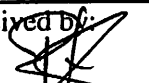
4653 Table Mountain Drive ♦ Golden, Colorado 80403  
303-277-9310

Page 1 of 1

Client: PDC / Tasman Project Manager: Mark Longhurst  
Address: 6855 W 119th Ave E-Mail: mark.longhurst@PDCE.com  
City/State/Zip: Broomfield/ CO/ 80020  
Phone: 303-487-1228 Project Name: Olson 29-12 & 22  
Sampler Name: Max Dahlgrén Project Number:

Sample Name: 14X 29X 31X

					Preservative				Matrix				Analysis Requested						Special Instructions	
ID	Sample Description	Date Sampled	Time Sampled	# of containers	HCl	HNO3	None	Other	Water	Soil	Air-Canister #	Other	8260 BTEX	8260B GBTEXN	8015 DRO	pH/EC	Hold			
1	SS01@5'	12/6/19	1255	1			X			X				X	X	X				
2	SS02@3'		1257														X		On hold 	
3	SS03@3'		1259														X			
4	SS04@3'		1301														X			
5	SS05@3'		1303														X			
6																				
7																				
8																				
9																				
10																				

Relinquished by: 	Date/Time: 12/6/19 1500	Received by: Tasman's Lock Box	Date/Time: 12/6/19 1500	<b>Turn Around Time</b> (Check) Same Day <input type="checkbox"/> 72 hours 24 hours <input type="checkbox"/> Standard <input checked="" type="checkbox"/> 48 hours <input type="checkbox"/> <b>Sample Integrity:</b> Temperature Upon Receipt: 3.3 Samples Intact: <input checked="" type="radio"/> Yes <input type="radio"/> No	<b>Notes:</b>
Relinquished by: Tasman's Lock Box	Date/Time: 12/06/19 1730	Received by: 	Date/Time: 12/06/19 1730		
Relinquished by:	Date/Time:	Received by:	Date/Time:		

# Sample Receipt Checklist

S2 Work Order 1912129

Client: POC/TASMAN Client Project ID: OLSON 29-12-22

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

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

Temp (°C)	3.3
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Thermometer ID: 61857155-K

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature at 4°C +/- 2°C <sup>(1)</sup> ?				
NOTE: If samples are delivered the same day of sampling, this requirement is met provided that there is evidence that cooling has begun.	X			
Were all samples received intact <sup>(1)</sup> ?	X			
Was adequate sample volume provided <sup>(1)</sup> ?	X			
If custody seals are present, are they intact <sup>(1)</sup> ?			X	
Are samples with holding times due within 48 hours sample due within 48 hours present?		X		
Is a chain-of-custody (COC) form present and filled out completely <sup>(1)</sup> ?	X			
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	X			
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	X			
Is the COC properly relinquished by the client w/ date and time recorded <sup>(1)</sup> ?	X			
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.		.	X	
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			X	
If samples are acid preserved for metals, is the pH ≤ 2 <sup>(1)</sup> ?			X	
Record the pH in Comments.				
If dissolved metals are requested, were samples field filtered?			X	

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 of Custodian

Date/Time

12/86/19 1806



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

Project: Olson 29-12 & 22

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
12/16/19 09:42

**SS01@5'**  
**1912129-01 (Soil)**

**Summit Scientific**

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

Date Sampled: **12/06/19 12:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1912113	12/10/19	12/14/19	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
Naphthalene	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **12/06/19 12:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		141 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		101 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		102 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **12/06/19 12:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1912089	12/09/19	12/11/19	EPA 8015M	

Date Sampled: **12/06/19 12:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		100 %	30-150		"	"	"	"	

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

Date Sampled: **12/06/19 12:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	8.86		pH Units	1	1912130	12/11/19	12/11/19	EPA 9045D	

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

Project: Olson 29-12 & 22

Project Number: [none]

Project Manager: Mark Longhurst

**Reported:**  
12/16/19 09:42

**SS01@5'**  
**1912129-01 (Soil)**

**Summit Scientific**

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

**Specific Conductance by EPA Method 120.1**

Date Sampled: **12/06/19 12:55**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Specific Conductance (EC)	<b>0.780</b>	0.0100		mmhos/cm	1	1912131	12/11/19	12/11/19	EPA 120.1	

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

Project: Olson 29-12 & 22

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
12/16/19 09:42

## 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 1912113 - EPA 5030 Soil MS

##### Blank (1912113-BLK1)

Prepared: 12/10/19 Analyzed: 12/13/19

Benzene	ND	0.0020	mg/kg							
Toluene	ND	0.0050	"							
Ethylbenzene	ND	0.0050	"							
Xylenes (total)	ND	0.010	"							
Naphthalene	ND	0.010	"							
Gasoline Range Hydrocarbons	ND	0.50	"							
Surrogate: 1,2-Dichloroethane-d4	0.0505		"	0.0400		126	23-173			
Surrogate: Toluene-d8	0.0387		"	0.0400		96.8	20-170			
Surrogate: 4-Bromofluorobenzene	0.0398		"	0.0400		99.6	21-167			

##### LCS (1912113-BS1)

Prepared: 12/10/19 Analyzed: 12/13/19

Benzene	0.111	0.0020	mg/kg	0.100		111	70-130			
Toluene	0.116	0.0050	"	0.100		116	70-130			
Ethylbenzene	0.120	0.0050	"	0.100		120	70-130			
m,p-Xylene	0.236	0.010	"	0.200		118	70-130			
o-Xylene	0.115	0.0050	"	0.100		115	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0517		"	0.0400		129	23-173			
Surrogate: Toluene-d8	0.0395		"	0.0400		98.8	20-170			
Surrogate: 4-Bromofluorobenzene	0.0387		"	0.0400		96.8	21-167			

##### Matrix Spike (1912113-MS1)

Source: 1912126-01

Prepared: 12/10/19 Analyzed: 12/13/19

Benzene	0.113	0.0020	mg/kg	0.100	ND	113	70-130			
Toluene	0.118	0.0050	"	0.100	ND	118	70-130			
Ethylbenzene	0.123	0.0050	"	0.100	ND	123	70-130			
m,p-Xylene	0.242	0.010	"	0.200	ND	121	70-130			
o-Xylene	0.118	0.0050	"	0.100	ND	118	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0514		"	0.0400		128	23-173			
Surrogate: Toluene-d8	0.0382		"	0.0400		95.5	20-170			
Surrogate: 4-Bromofluorobenzene	0.0395		"	0.0400		98.8	21-167			

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

Project: Olson 29-12 & 22

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
12/16/19 09:42

**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 1912113 - EPA 5030 Soil MS**

Matrix Spike Dup (1912113-MSD1)	Source: 1912126-01			Prepared: 12/10/19 Analyzed: 12/13/19						
Benzene	0.115	0.0020	mg/kg	0.100	ND	115	70-130	1.74	30	
Toluene	0.119	0.0050	"	0.100	ND	119	70-130	0.609	30	
Ethylbenzene	0.124	0.0050	"	0.100	ND	124	70-130	0.995	30	
m,p-Xylene	0.248	0.010	"	0.200	ND	124	70-130	2.29	30	
o-Xylene	0.118	0.0050	"	0.100	ND	118	70-130	0.152	30	
Surrogate: 1,2-Dichloroethane-d4	0.0522		"	0.0400		130	23-173			
Surrogate: Toluene-d8	0.0395		"	0.0400		98.8	20-170			
Surrogate: 4-Bromofluorobenzene	0.0410		"	0.0400		103	21-167			

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

Project: Olson 29-12 & 22

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
12/16/19 09:42

**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 1912089 - EPA 3550A**

**Blank (1912089-BLK1)**

Prepared: 12/09/19 Analyzed: 12/10/19

C10-C28 (DRO) ND 50 mg/kg

**LCS (1912089-BS1)**

Prepared: 12/09/19 Analyzed: 12/10/19

C10-C28 (DRO) 409 50 mg/kg 500 81.8 70-130

**Matrix Spike (1912089-MS1)**

**Source: 1912091-01**

Prepared: 12/09/19 Analyzed: 12/10/19

C10-C28 (DRO) 425 50 mg/kg 500 8.32 83.4 70-130

**Matrix Spike Dup (1912089-MSD1)**

**Source: 1912091-01**

Prepared: 12/09/19 Analyzed: 12/10/19

C10-C28 (DRO) 451 50 mg/kg 500 8.32 88.5 70-130 5.74 20

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

Project: Olson 29-12 & 22

Project Number: [none]

Project Manager: Mark Longhurst

**Reported:**  
12/16/19 09:42

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

#### Summit Scientific

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

#### Batch 1912130 - General Preparation

##### LCS (1912130-BS1)

Prepared & Analyzed: 12/11/19

pH	9.19	pH Units	9.18	100	95-105
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##### Duplicate (1912130-DUP1)

Source: 1912165-01

Prepared & Analyzed: 12/11/19

pH	7.47	pH Units	7.54	0.933	20
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Summit Scientific

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

Project: Olson 29-12 & 22

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
12/16/19 09:42

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

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

**Batch 1912131 - General Preparation**

**Blank (1912131-BLK1)**

Prepared & Analyzed: 12/11/19

Specific Conductance (EC) ND 0.0100 mmhos/cm

**LCS (1912131-BS1)**

Prepared & Analyzed: 12/11/19

Specific Conductance (EC) 0.714 0.0100 mmhos/cm 0.750 95.2 90-110

**Duplicate (1912131-DUP1)**

**Source: 1912165-01**

Prepared & Analyzed: 12/11/19

Specific Conductance (EC) 0.250 0.0100 mmhos/cm 0.249 0.341 20

Summit Scientific

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PDC Energy

1775 Sherman St. STE. 3000

Denver CO, 80203

Project: Olson 29-12 & 22

Project Number: [none]

Project Manager: Mark Longhurst

**Reported:**

12/16/19 09:42

### 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