

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 ⁽²⁾ (mg/kg)	pH (units)	EC (mmhos/cm)
COGCC Table 910-1 Soil Standard (mg/kg) ⁽¹⁾			0.17	85	100	175	23	500	6-9	<4
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 ⁽¹⁾	Field Measured VOC Concentration ⁽²⁾ (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 blue ink, appearing to read 'P. Shrewsbury', written in a cursive style.

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

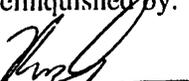
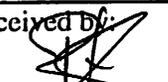
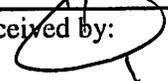
Summit Scientific

S₂

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

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:

ID	Sample Description	Date Sampled	Time Sampled	# of containers	Preservative				Matrix			Analysis Requested					Special Instructions			
					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	Turn Around Time (Check) Same Day _____ 72 hours 24 hours _____ Standard <input checked="" type="checkbox"/> 48 hours _____	Notes: Sample Integrity: 3.3 Temperature Upon Receipt: 3.3 Samples Intact: <input checked="" type="radio"/> Yes <input type="radio"/> No
Relinquished by: Fasman'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: PDC/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
-----------	-----

Thermometer ID: 61857155-K

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature at 4°C +/- 2°C ⁽¹⁾ ? 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 ⁽¹⁾ ?	X			
Was adequate sample volume provided ⁽¹⁾ ?	X			
If custody seals are present, are they intact ⁽¹⁾ ?			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 ⁽¹⁾ ?	X			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	X			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	X			
Is the COC properly relinquished by the client w/ date and time recorded ⁽¹⁾ ?	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) ⁽¹⁾ ? 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 ⁽¹⁾ ? Record the pH in Comments.			X	
If dissolved metals are requested, were samples field filtered?			X	

Additional Comments (if any):

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

BB
Custodian Printed Name or Initials

[Signature]
Signature of Custodian

12/8/19
Date/Time 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'
191219-01 (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)	0.780	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		Notes
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	

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	Notes
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	

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			

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
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Extractable Petroleum Hydrocarbons by 8015 - Quality Control
Summit Scientific

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

Batch 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
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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			
Duplicate (1912130-DUP1)			Source: 1912165-01		Prepared & Analyzed: 12/11/19					
pH	7.47		pH Units	7.54				0.933	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

Specific Conductance by EPA Method 120.1 - Quality Control
Summit Scientific

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

Batch 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