

TABLE 1
FORMER MARIE 1-23 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'	12/26/2019	5	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	7.51	0.217

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 MARIE 1-23 TANK BATTERY
VOC CONCENTRATIONS SUMMARY TABLE

Sample ID	Date Sampled	Depth (ft. bgs)	Sample Location ⁽¹⁾	Field Measured VOC Concentration ⁽²⁾ (ppm)
SS01 @ 5'	12/26/2019	5	Base	3.1
SS02 @ 3'	12/26/2019	3	North Sidewall	2.2
SS03 @ 3'	12/26/2019	3	South Sidewall	8.8
SS04 @ 3'	12/26/2019	3	East Sidewall	2.4
SS05 @ 3'	12/26/2019	3	West Sidewall	2.8

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

January 06, 2020

Mark Longhurst

PDC Energy

1775 Sherman St. STE. 3000

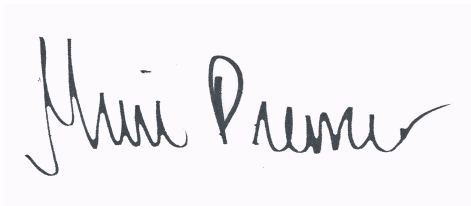
Denver, CO 80203

RE: Marie 1-23

Work Order #1912403

Enclosed are the results of analyses for samples received by Summit Scientific on 12/26/19 17:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, reading "Muri Premer", is displayed on a light purple rectangular background.

Muri Premer For Paul Shrewsbury
President



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

Project: Marie 1-23
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/06/20 10:56

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS01@5'	1912403-01	Soil	12/26/19 09:30	12/26/19 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.

1912403

Summit Scientific

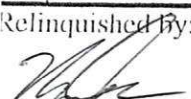
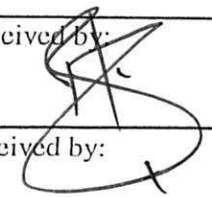
S₂

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: Marie 1-23
Sampler Name: Max Dahlgren Project Number:

ID	Sample Description	Date Sampled	Time Sampled	# of containers	Preservative				Matrix				Analysis Requested						Special Instructions
					HCl	HNO ₃	None	Other	Water	Soil	Air-Canister #	Other	8260 BTEX	8260B GBTEXN	8015 DRO	pH / EC	Hold		
1	SS01 @ 5'	12/26/19	930	1			X			X				X	X	X			
2	SS02 @ 3'		935														X		
3	SS03 @ 3'		940														X		
4	SS04 @ 3'		945														X		
5	SS05 @ 3'		950														X		
6																			
7																			
8																			
9																			
10																			

Relinquished by: 	Date/Time: 12/26/19 1530	Received by: Tasman's Lock Box	Date/Time:	Turn Around Time (Check) Same Day — 72 hours 24 hours — Standard <input checked="" type="checkbox"/> 48 hours —	Notes:
Relinquished by: Tasman's Lock Box	Date/Time: 12/26/19 1730	Received by: 	Date/Time: 12/26/19 1730	Sample Integrity: Temperature Upon Receipt: 1.4 Samples Intact: Yes No	
Relinquished by:	Date/Time:	Received by:	Date/Time:		

Sample Receipt Checklist

S2 Work Order 1912403

Client: PDC/TASMAN Client Project ID: MAIE 1-23

Shipped Via: H.D./P.U./FedEx/UPS/USPS/Other Airbill #: _____

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

Temp (°C)	<u>1.4</u>
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Thermometer ID: 61857155-K

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature at 4°C +/- 2°C ⁽¹⁾ ? 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 ⁽¹⁾ ?	<u>X</u>			
Was adequate sample volume provided ⁽¹⁾ ?	<u>X</u>			
If custody seals are present, are they intact ⁽¹⁾ ?			<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 ⁽¹⁾ ?	<u>X</u>			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<u>X</u>			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<u>X</u>			
Is the COC properly relinquished by the client w/ date and time recorded ⁽¹⁾ ?	<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) ⁽¹⁾ ? Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect			<u>X</u>	
If samples are acid preserved for metals, is the pH ≤ 2 ⁽¹⁾ ? Record the pH in Comments.			<u>X</u>	
If dissolved metals are requested, were samples field filtered?			<u>X</u>	
Additional Comments (if any): 				
⁽¹⁾ If NO, then contact the client before proceeding with analysis and note in case narrative.				

PDC
Custodian Printed Name or Initials

[Signature]
Signature of Custodian

12/26/19
Date/Time 1806



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

Project: Marie 1-23
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/06/20 10:56

SS01@5'
1912403-01 (Soil)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **12/26/19 09:30**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	0.0020		mg/kg	1	2001010	01/02/20	01/03/20	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: **12/26/19 09:30**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		118 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		103 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		107 %		21-167		"	"	"	"	

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **12/26/19 09:30**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
C10-C28 (DRO)	ND	50		mg/kg	1	2001011	01/02/20	01/03/20	EPA 8015M	

Date Sampled: **12/26/19 09:30**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: o-Terphenyl		114 %		30-150		"	"	"	"	

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **12/26/19 09:30**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
pH	7.51			pH Units	1	2001004	01/02/20	01/02/20	EPA 9045D	

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1775 Sherman St. STE. 3000
Denver CO, 80203

Project: Marie 1-23
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/06/20 10:56

SS01@5'
1912403-01 (Soil)

Summit Scientific

Physical Parameters by APHA/ASTM/EPA Methods

Specific Conductance by EPA Method 120.1

Date Sampled: **12/26/19 09:30**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Specific Conductance (EC)	0.217	0.0100		mmhos/cm	1	2001005	01/02/20	01/02/20	EPA 120.1	

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

Project: Marie 1-23
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/06/20 10:56

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 2001010 - EPA 5030 Soil MS

Blank (2001010-BLK1)

Prepared & Analyzed: 01/02/20

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	0.0409		"	0.0400		102	23-173			
Surrogate: Toluene-d8	0.0429		"	0.0400		107	20-170			
Surrogate: 4-Bromofluorobenzene	0.0424		"	0.0400		106	21-167			

LCS (2001010-BS1)

Prepared & Analyzed: 01/02/20

Benzene	0.0845	0.0020	mg/kg	0.100		84.5	70-130			
Toluene	0.0760	0.0050	"	0.100		76.0	70-130			
Ethylbenzene	0.0860	0.0050	"	0.100		86.0	70-130			
m,p-Xylene	0.159	0.010	"	0.200		79.5	70-130			
o-Xylene	0.0821	0.0050	"	0.100		82.1	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0342		"	0.0400		85.5	23-173			
Surrogate: Toluene-d8	0.0410		"	0.0400		102	20-170			
Surrogate: 4-Bromofluorobenzene	0.0398		"	0.0400		99.4	21-167			

Matrix Spike (2001010-MS1)

Source: 1912392-02

Prepared & Analyzed: 01/02/20

Benzene	0.0710	0.0020	mg/kg	0.100	ND	71.0	70-130			
Toluene	0.0805	0.0050	"	0.100	ND	80.5	70-130			
Ethylbenzene	0.0878	0.0050	"	0.100	ND	87.8	70-130			
m,p-Xylene	0.163	0.010	"	0.200	ND	81.6	70-130			
o-Xylene	0.0841	0.0050	"	0.100	ND	84.1	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0347		"	0.0400		86.8	23-173			
Surrogate: Toluene-d8	0.0422		"	0.0400		105	20-170			
Surrogate: 4-Bromofluorobenzene	0.0397		"	0.0400		99.2	21-167			

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

Project: Marie 1-23
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/06/20 10:56

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 2001010 - EPA 5030 Soil MS

Matrix Spike Dup (2001010-MSD1)		Source: 1912392-02			Prepared & Analyzed: 01/02/20					
Benzene	0.0716	0.0020	mg/kg	0.100	ND	71.6	70-130	0.757	30	
Toluene	0.0793	0.0050	"	0.100	ND	79.3	70-130	1.46	30	
Ethylbenzene	0.0873	0.0050	"	0.100	ND	87.3	70-130	0.548	30	
m,p-Xylene	0.162	0.010	"	0.200	ND	81.2	70-130	0.479	30	
o-Xylene	0.0843	0.0050	"	0.100	ND	84.3	70-130	0.250	30	
Surrogate: 1,2-Dichloroethane-d4	0.0362		"	0.0400		90.4	23-173			
Surrogate: Toluene-d8	0.0411		"	0.0400		103	20-170			
Surrogate: 4-Bromofluorobenzene	0.0401		"	0.0400		100	21-167			

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

Project: Marie 1-23
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/06/20 10:56

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 2001011 - EPA 3550A

Blank (2001011-BLK1)

Prepared & Analyzed: 01/02/20

C10-C28 (DRO) ND 50 mg/kg

LCS (2001011-BS1)

Prepared & Analyzed: 01/02/20

C10-C28 (DRO) 489 50 mg/kg 500 97.9 70-130

Matrix Spike (2001011-MS1)

Source: 1912394-06

Prepared & Analyzed: 01/02/20

C10-C28 (DRO) 473 50 mg/kg 500 15.0 91.7 70-130

Matrix Spike Dup (2001011-MSD1)

Source: 1912394-06

Prepared & Analyzed: 01/02/20

C10-C28 (DRO) 507 50 mg/kg 500 15.0 98.5 70-130 6.92 20

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

Project: Marie 1-23
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/06/20 10:56

Physical Parameters by APHA/ASTM/EPA Methods - Quality Control
Summit Scientific

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

Batch 2001004 - General Preparation

LCS (2001004-BS1)

Prepared & Analyzed: 01/02/20

pH	9.19	pH Units	9.18	100	95-105
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Duplicate (2001004-DUP1)

Source: 1912366-01

Prepared & Analyzed: 01/02/20

pH	7.95	pH Units	7.92	0.378	20
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PDC Energy
1775 Sherman St. STE. 3000
Denver CO, 80203

Project: Marie 1-23
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/06/20 10:56

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 2001005 - General Preparation

Blank (2001005-BLK1)

Prepared & Analyzed: 01/02/20

Specific Conductance (EC) ND 0.0100 mmhos/cm

LCS (2001005-BS1)

Prepared & Analyzed: 01/02/20

Specific Conductance (EC) 0.708 0.0100 mmhos/cm 0.750 94.5 90-110

Duplicate (2001005-DUP1)

Source: 1912366-01

Prepared & Analyzed: 01/02/20

Specific Conductance (EC) 0.854 0.0100 mmhos/cm 0.852 0.352 20

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

Project: Marie 1-23
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/06/20 10:56

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