

TABLE 1
FORMER LINKUS 41-24 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'	1/23/2020	5	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	8.04	0.701

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 LINKUS 41-24 TANK BATTERY
VOC CONCENTRATIONS SUMMARY TABLE

Sample ID	Date Sampled	Depth (ft. bgs)	Sample Location ⁽¹⁾	Field Measured VOC Concentration ⁽²⁾ (ppm)
SS01 @ 5'	1/23/2020	5	Base	0.2
SS02 @ 3'	1/23/2020	3	North Sidewall	8.4
SS03 @ 3'	1/23/2020	3	West Sidewall	0.0
SS04 @ 3'	1/23/2020	3	South Sidewall	0.0
SS05 @ 3'	1/23/2020	3	East Sidewall	0.4

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 30, 2020

Mark Longhurst

PDC Energy

1775 Sherman St. STE. 3000

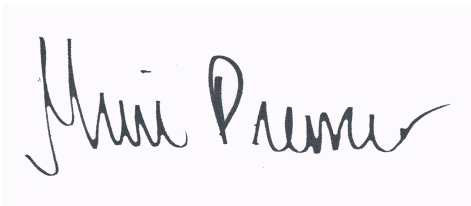
Denver, CO 80203

RE: Linkus 41-24

Work Order #2001262

Enclosed are the results of analyses for samples received by Summit Scientific on 01/23/20 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: Linkus 41-24
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/30/20 10:42

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS01@5'	2001262-01	Soil	01/23/20 10:00	01/23/20 17:30

Summit Scientific

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

Summit Scientific

S₂

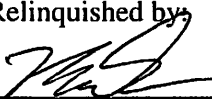
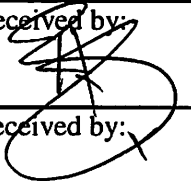

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4653 Table Mountain Drive ♦ Golden, Colorado 80403
303-277-9310

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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:	Linkus 41-24
Sampler Name:	Max Dahlgren	Project Number:	

					Preservative				Matrix				Analysis Requested							Special Instructions		
ID	Sample Description	Date Sampled	Time Sampled	# of containers	HCl	HNO3	None	Other	Water	Soil	Air-Canister #	Other	\$260 BTEX	\$260B GBTEXN	\$8015 DRO	pH / EC		Hold				
1	SS01 @ 5'	1/23/20	1000	1			X			X				X	X	X						
2	SS02 @ 3'		1005															X				
3	SS03 @ 3'		1010																			
4	SS04 @ 3'		1015																			
5	SS05 @ 3'		1020																			
6																						
7																						
8																						
9																						
10																						

Relinquished by: 	Date/Time: 1/23/20 1530	Received by: Tasman's Lock Box	Date/Time:	Turn Around Time (Check) Same Day <input type="checkbox"/> 72 hours 24 hours <input type="checkbox"/> Standard <input checked="" type="checkbox"/> 48 hours <input type="checkbox"/>	Notes:
Relinquished by: Tasman's Lock Box	Date/Time: 01/23/2020 1730	Received by: 	Date/Time: 01/23/2020 1730	Sample Integrity: Temperature Upon Receipt:  Samples Intact: <input checked="" type="radio"/> Yes <input type="radio"/> No	
Relinquished by:	Date/Time:	Received by:	Date/Time:		

Sample Receipt Checklist

S2 Work Order 2001262

Client: PDC / TASMAN

Client Project ID: LINKUS 41-24

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

Airbill #: _____

Matrix (check all that apply):

☐ Air

☒ Soil/Solid

☐ Water

☐ Other: _____

(Describe)

Temp (°C)

5.5

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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all samples received intact ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was adequate sample volume provided ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If custody seals are present, are they intact ⁽¹⁾ ?	<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 checked="" type="checkbox"/>	<input type="checkbox"/>	
Is a chain-of-custody (COC) form present and filled out completely ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is the COC properly relinquished by the client w/ date and time recorded ⁽¹⁾ ?	<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) ⁽¹⁾ ? Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If samples are acid preserved for metals, is the pH ≤ 2 ⁽¹⁾ ? Record the pH in Comments.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If dissolved metals are requested, were samples field filtered?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Additional Comments (if any):

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

RZ

Custodian Printed Name or Initials

Signature of Custodian

1/23/20

Date/Time



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

Project: Linkus 41-24
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/30/20 10:42

SS01@5'
2001262-01 (Soil)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **01/23/20 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	2001340	01/24/20	01/27/20	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: **01/23/20 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		92.0 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		96.4 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		101 %	21-167		"	"	"	"	

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **01/23/20 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	2001339	01/24/20	01/25/20	EPA 8015M	

Date Sampled: **01/23/20 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		107 %	30-150		"	"	"	"	

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **01/23/20 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	8.04		pH Units	1	2001336	01/24/20	01/24/20	EPA 9045D	

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

Project: Linkus 41-24
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/30/20 10:42

SS01@5'
2001262-01 (Soil)

Summit Scientific

Physical Parameters by APHA/ASTM/EPA Methods

Specific Conductance by EPA Method 120.1

Date Sampled: **01/23/20 10:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Specific Conductance (EC)	0.701	0.0100		mmhos/cm	1	2001337	01/24/20	01/24/20	EPA 120.1	

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

Project: Linkus 41-24

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/30/20 10:42

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 2001340 - EPA 5030 Soil MS

Blank (2001340-BLK1)

Prepared: 01/24/20 Analyzed: 01/25/20

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	0.0413		"	0.0400		103		23-173		
Surrogate: Toluene-d8	0.0388		"	0.0400		96.9		20-170		
Surrogate: 4-Bromofluorobenzene	0.0409		"	0.0400		102		21-167		

LCS (2001340-BS1)

Prepared: 01/24/20 Analyzed: 01/25/20

Benzene	0.142	0.0020	mg/kg	0.150		95.0		70-130		
Toluene	0.140	0.0050	"	0.150		93.5		70-130		
Ethylbenzene	0.142	0.0050	"	0.150		94.8		70-130		
m,p-Xylene	0.287	0.010	"	0.300		95.6		70-130		
o-Xylene	0.140	0.0050	"	0.150		93.6		70-130		
Surrogate: 1,2-Dichloroethane-d4	0.0411		"	0.0400		103		23-173		
Surrogate: Toluene-d8	0.0398		"	0.0400		99.5		20-170		
Surrogate: 4-Bromofluorobenzene	0.0389		"	0.0400		97.4		21-167		

Matrix Spike (2001340-MS1)

Source: 2001255-02

Prepared: 01/24/20 Analyzed: 01/25/20

Benzene	0.140	0.0020	mg/kg	0.150	ND	93.3		70-130		
Toluene	0.139	0.0050	"	0.150	ND	92.3		70-130		
Ethylbenzene	0.141	0.0050	"	0.150	ND	93.7		70-130		
m,p-Xylene	0.282	0.010	"	0.300	ND	93.9		70-130		
o-Xylene	0.137	0.0050	"	0.150	ND	91.0		70-130		
Surrogate: 1,2-Dichloroethane-d4	0.0411		"	0.0400		103		23-173		
Surrogate: Toluene-d8	0.0396		"	0.0400		99.0		20-170		
Surrogate: 4-Bromofluorobenzene	0.0404		"	0.0400		101		21-167		

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

Project: Linkus 41-24
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/30/20 10:42

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 2001340 - EPA 5030 Soil MS

Matrix Spike Dup (2001340-MSD1)		Source: 2001255-02			Prepared: 01/24/20 Analyzed: 01/25/20					
Benzene	0.136	0.0020	mg/kg	0.150	ND	90.8	70-130	2.74	30	
Toluene	0.136	0.0050	"	0.150	ND	90.8	70-130	1.70	30	
Ethylbenzene	0.138	0.0050	"	0.150	ND	91.8	70-130	2.07	30	
m,p-Xylene	0.278	0.010	"	0.300	ND	92.8	70-130	1.17	30	
o-Xylene	0.134	0.0050	"	0.150	ND	89.3	70-130	1.86	30	
Surrogate: 1,2-Dichloroethane-d4	0.0389		"	0.0400		97.3	23-173			
Surrogate: Toluene-d8	0.0398		"	0.0400		99.4	20-170			
Surrogate: 4-Bromofluorobenzene	0.0395		"	0.0400		98.7	21-167			

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

Project: Linkus 41-24
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/30/20 10:42

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 2001339 - EPA 3550A

Blank (2001339-BLK1)

Prepared & Analyzed: 01/24/20

C10-C28 (DRO) ND 50 mg/kg

LCS (2001339-BS1)

Prepared & Analyzed: 01/24/20

C10-C28 (DRO) 491 50 mg/kg 500 98.1 70-130

Matrix Spike (2001339-MS1)

Source: 2001255-02

Prepared & Analyzed: 01/24/20

C10-C28 (DRO) 487 50 mg/kg 500 7.36 96.0 70-130

Matrix Spike Dup (2001339-MSD1)

Source: 2001255-02

Prepared & Analyzed: 01/24/20

C10-C28 (DRO) 485 50 mg/kg 500 7.36 95.4 70-130 0.528 20

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PDC Energy
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Denver CO, 80203

Project: Linkus 41-24

Project Number: [none]

Project Manager: Mark Longhurst

Reported:
01/30/20 10:42

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 2001336 - General Preparation

LCS (2001336-BS1)

Prepared & Analyzed: 01/24/20

pH	9.21	pH Units	9.18	100	95-105
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Duplicate (2001336-DUP1)

Source: 2001262-01

Prepared & Analyzed: 01/24/20

pH	8.00	pH Units	8.04	0.499	20
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PDC Energy
1775 Sherman St. STE. 3000
Denver CO, 80203

Project: Linkus 41-24
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/30/20 10:42

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 2001337 - General Preparation

Blank (2001337-BLK1)

Prepared & Analyzed: 01/24/20

Specific Conductance (EC) ND 0.0100 mmhos/cm

LCS (2001337-BS1)

Prepared & Analyzed: 01/24/20

Specific Conductance (EC) 0.776 0.0100 mmhos/cm 0.750 103 90-110

Duplicate (2001337-DUP1)

Source: 2001262-01

Prepared & Analyzed: 01/24/20

Specific Conductance (EC) 0.710 0.0100 mmhos/cm 0.701 1.35 20

Summit Scientific

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

Project: Linkus 41-24

Project Number: [none]

Project Manager: Mark Longhurst

Reported:

01/30/20 10:42

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