

TABLE 1
WACKER 31, 32-10 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 ⁽²⁾ (mg/kg)	pH (units)	EC (mmhos/cm)
COGCC standards for soil (mg/kg) ⁽¹⁾			0.17	85	100	175	23	500	6-9	<4
SS01 @ 4.5'	4/3/2017	4.5	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	8.22	0.847

Notes:

1. Standards for soil are taken from 2 CCR 404-1, Table 910-1, effective January 30, 2015.

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

EC = Electrical conductivity

mmhos/cm = millimhos per centimeter

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

Attachment A

Summit Scientific

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

April 09, 2017

Mark Longhurst
PDC Energy
1775 Sherman St. STE. 3000
Denver, CO 80203
RE: Wacker 31, 32-10

Enclosed are the results of analyses for samples received by Summit Scientific on 04/03/17 16:40. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to be 'Ben Shrewsbury', with a long, sweeping horizontal line extending to the right.

Ben Shrewsbury
Laboratory Manager



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

Project: Wacker 31, 32-10

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
04/09/17 16:55

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS01@4.5'	1704018-01	Soil	04/03/17 10:03	04/03/17 16:40

Summit Scientific

A handwritten signature in black ink, appearing to be 'Mark Longhurst', written over a horizontal line.

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.

Page 2 of 10



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

Project: Wacker 31, 32-10
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
04/09/17 16:55

Sample Receipt Checklist

S2 Work Order: 1704018

Client: PDC

Client Project ID: Wacker 31, 32-10

Shipped Via: P/U

(UPS, FedEx, Hand Delivered, Pick-up, etc.)

Airbill #:

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

Cooler ID					
Temp (°C)	<u>2.0</u>				

Thermometer ID: 61857155-K

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature just above 0°C to ≤ 6°C ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
NOTE: If samples are delivered the same day of sampling, this requirement is waived provided that there is evidence that cooling has begun.				
Were all samples received intact ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
If custody seals are present, are they intact ⁽¹⁾ ?			<input checked="" type="checkbox"/>	
Are short holding time analytes or samples with HTs due within 48 hours present?			<input checked="" type="checkbox"/>	
Is a chain-of-custody (COC) form present and filled out completely ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client w/ date and time recorded ⁽¹⁾ ?	<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) ⁽¹⁾ ?			<input checked="" type="checkbox"/>	
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 ⁽¹⁾ ?			<input checked="" type="checkbox"/>	
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):				

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

Nakita
Custodian Printed Name

[Signature]
Signature or Initials of Custodian

4/3/17 1745
Date/Time



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

Project: Wacker 31, 32-10
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
04/09/17 16:55

SS01@4.5'
1704018-01 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **04/03/17 10:03**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1704047	04/05/17	04/06/17	8015M	

Date Sampled: **04/03/17 10:03**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		99.0 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **04/03/17 10:03**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1704048	04/05/17	04/05/17	EPA 8260B	
Benzene	ND	0.0020	"	"	"	"	"	"	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **04/03/17 10:03**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		101 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		96.6 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		96.1 %	21-167		"	"	"	"	

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **04/03/17 10:03**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	8.22	0.100	pH Units	1	1704043	04/05/17	04/05/17	EPA 9045	

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

Project: Wacker 31, 32-10
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
04/09/17 16:55

SS01@4.5'
1704018-01 (Soil)

Summit Scientific

Physical Parameters by APHA/ASTM/EPA Methods

Specific Conductance (EC)	0.847	0.0100 mmhos/cm	1	1704044	04/05/17	04/05/17	SM 2510B
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1775 Sherman St. STE. 3000
Denver CO, 80203

Project: Wacker 31, 32-10
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
04/09/17 16:55

Extractable Petroleum Hydrocarbons by 8015 - Quality Control
Summit Scientific

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

Batch 1704047 - EPA 3550A

Blank (1704047-BLK1)

Prepared: 04/05/17 Analyzed: 04/06/17

C10-C28 (DRO) ND 50 mg/kg

Surrogate: o-Terphenyl 12.4 " 12.5 99.1 30-150

LCS (1704047-BS1)

Prepared: 04/05/17 Analyzed: 04/06/17

C10-C28 (DRO) 446 50 mg/kg 499 89.4 73-134

Surrogate: o-Terphenyl 11.7 " 12.5 93.8 30-150

Matrix Spike (1704047-MS1)

Source: 1703317-01

Prepared: 04/05/17 Analyzed: 04/06/17

C10-C28 (DRO) 429 50 mg/kg 499 35.1 79.0 50-148

Surrogate: o-Terphenyl 11.3 " 12.5 90.1 30-150

Matrix Spike Dup (1704047-MSD1)

Source: 1703317-01

Prepared: 04/05/17 Analyzed: 04/06/17

C10-C28 (DRO) 470 50 mg/kg 499 35.1 87.2 50-148 9.03 20

Surrogate: o-Terphenyl 12.3 " 12.5 98.6 30-150

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1775 Sherman St. STE. 3000
Denver CO, 80203

Project: Wacker 31, 32-10
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
04/09/17 16:55

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 1704048 - EPA 5030 Soil MS

Blank (1704048-BLK1)

Prepared & Analyzed: 04/05/17

Naphthalene	ND	0.010	mg/kg							
Benzene	ND	0.0020	"							
Toluene	ND	0.0050	"							
Ethylbenzene	ND	0.0050	"							
Xylenes (total)	ND	0.010	"							
Gasoline Range Hydrocarbons	ND	0.50	"							
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0368</i>		<i>"</i>	<i>0.0400</i>		<i>91.9</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0404</i>		<i>"</i>	<i>0.0400</i>		<i>101</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0356</i>		<i>"</i>	<i>0.0400</i>		<i>89.0</i>	<i>21-167</i>			

LCS (1704048-BS1)

Prepared & Analyzed: 04/05/17

Naphthalene	ND	0.010	mg/kg				66-138			
Benzene	0.0929	0.0020	"	0.100		92.9	58-130			
Toluene	0.0967	0.0050	"	0.100		96.7	61-134			
Ethylbenzene	0.0938	0.0050	"	0.0992		94.5	74-139			
m,p-Xylene	0.185	0.010	"	0.200		92.4	73-137			
o-Xylene	0.0923	0.0050	"	0.0980		94.2	73-141			
Xylenes (total)	0.277	0.010	"				0-200			
Gasoline Range Hydrocarbons	0.188	0.50	"				30-150			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0358</i>		<i>"</i>	<i>0.0400</i>		<i>89.6</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0393</i>		<i>"</i>	<i>0.0400</i>		<i>98.2</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0370</i>		<i>"</i>	<i>0.0400</i>		<i>92.5</i>	<i>21-167</i>			

Matrix Spike (1704048-MS1)

Source: 1703308-01

Prepared & Analyzed: 04/05/17

Naphthalene	ND	0.010	mg/kg		ND		10-158			
Benzene	0.0944	0.0020	"	0.100	ND	94.4	30-131			
Toluene	0.0989	0.0050	"	0.100	ND	98.9	30-134			
Ethylbenzene	0.0965	0.0050	"	0.0992	ND	97.3	22-153			
m,p-Xylene	0.189	0.010	"	0.200	ND	94.9	10-159			
o-Xylene	0.0980	0.0050	"	0.0980	ND	99.9	31-151			
Xylenes (total)	0.287	0.010	"		ND		30-160			
Gasoline Range Hydrocarbons	1.93	0.50	"		0.304		30-160			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0366</i>		<i>"</i>	<i>0.0400</i>		<i>91.5</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0396</i>		<i>"</i>	<i>0.0400</i>		<i>99.0</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0403</i>		<i>"</i>	<i>0.0400</i>		<i>101</i>	<i>21-167</i>			

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Project: Wacker 31, 32-10
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
04/09/17 16:55

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 1704048 - EPA 5030 Soil MS

Matrix Spike Dup (1704048-MSD1)		Source: 1703308-01			Prepared & Analyzed: 04/05/17					
Naphthalene	ND	0.010	mg/kg		ND		10-158		42	
Benzene	0.0924	0.0020	"	0.100	ND	92.4	30-131	2.12	34	
Toluene	0.0991	0.0050	"	0.100	ND	99.1	30-134	0.212	30	
Ethylbenzene	0.0943	0.0050	"	0.0992	ND	95.1	22-153	2.36	24	
m,p-Xylene	0.185	0.010	"	0.200	ND	92.7	10-159	2.34	68	
o-Xylene	0.0927	0.0050	"	0.0980	ND	94.6	31-151	5.51	38	
Xylenes (total)	0.278	0.010	"		ND		30-160	3.41	30	
Gasoline Range Hydrocarbons	1.97	0.50	"		0.304		30-160	1.60	30	
Surrogate: 1,2-Dichloroethane-d4	0.0361		"	0.0400		90.3	23-173			
Surrogate: Toluene-d8	0.0394		"	0.0400		98.6	20-170			
Surrogate: 4-Bromofluorobenzene	0.0368		"	0.0400		91.9	21-167			

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

Project: Wacker 31, 32-10
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
04/09/17 16:55

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

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

Batch 1704043 - General Preparation

LCS (1704043-BS1)

Prepared & Analyzed: 04/05/17

pH	8.04	0.100	pH Units	8.00	100	95-105
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Duplicate (1704043-DUP1)

Source: 1704018-01

Prepared & Analyzed: 04/05/17

pH	8.19	0.100	pH Units	8.22	0.366	20
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Batch 1704044 - General Preparation

Blank (1704044-BLK1)

Prepared & Analyzed: 04/05/17

Specific Conductance (EC)	ND	0.0100	mmhos/cm
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LCS (1704044-BS1)

Prepared & Analyzed: 04/05/17

Specific Conductance (EC)	0.751	0.0100	mmhos/cm	0.750	100	90-110
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Duplicate (1704044-DUP1)

Source: 1704018-01

Prepared & Analyzed: 04/05/17

Specific Conductance (EC)	0.845	0.0100	mmhos/cm	0.847	0.177	20
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PDC Energy
1775 Sherman St. STE. 3000
Denver CO, 80203

Project: Wacker 31, 32-10

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
04/09/17 16:55

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