

March 8, 2016

Mr. Randall Ferguson
EHS Senior Compliance Specialist
PDC Energy, Inc.
1775 Sherman Street, Suite 3000
Denver, CO 80203

Re: **Produced Water Vessel Closure Report**
Charles 1 Tank Battery
SENW S14 T6N R66W
Blanket Remediation #: 9440

Dear Mr. Ferguson,

On behalf of PDC Energy, Inc. (PDC), Tasman Geosciences, Inc. (Tasman) has prepared this Produced Water Vessel Closure Report (Report) to document environmental sampling activities performed at the above-referenced site. This Report is being submitted under the Form 27 Management Plan for Closure of Produced Water Vessels, which has been assigned Blanket Remediation #9440 by the Colorado Oil and Gas Conservation Commission (COGCC).

A summary of excavation and environmental sampling activities is provided below.

Site Assessment Activities

On February 25, 2016, excavation activities were completed following the removal of the partially buried produced water vessel. Soil encountered in the excavation area was field screened for volatile organic compound (VOC) concentrations using a photoionization detector (PID). Approximately 340 cubic yards of material were removed and transported to the Waste Management Facility in Ault, Colorado for disposal under PDC waste manifests.

Four (4) soil samples (SS01 – SS04) were collected from the sidewalls of the excavation area at approximately 11 feet below ground surface (bgs). Soil samples were submitted to Summit Scientific Laboratories in Golden, Colorado for analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, and total petroleum hydrocarbons (TPH) - gasoline range organics (GRO) by Environmental Protection Agency (EPA) Method 8260B, TPH - diesel range organics (DRO) by EPA Method 8015, pH, and electrical conductivity (EC). Analytical results indicated organic compound concentrations were below COGCC Table 910-1 standards in all four (4) soil sample locations. EC concentrations were in exceedance of regulatory standards in two (2) soil sample locations (SS01 and SS02). However, additional soil removal was not completed as samples were collected below the designed root zone.

Groundwater was encountered in the excavation area at approximately 13 feet bgs. A groundwater sample (GW01) was collected and submitted for laboratory analysis of BTEX. Analytical results indicated BTEX concentrations were below COGCC Table 910-1 groundwater standards.

The excavation extent and soil and groundwater sample locations are illustrated on Figure 2. Soil analytical results are summarized in Table 1 and groundwater analytical results are summarized in Table 2. The laboratory reports are included as Attachment A.

Conclusions

As confirmed by the soil and groundwater analytical data described herein, petroleum hydrocarbon impacts in exceedance of regulatory standards were successfully removed during excavation activities. Consequently, no further site investigation is recommended at this time.

Please contact me at (720) 409-8791 if you have any questions regarding this report.

Sincerely,



Christine Wasko
Project Manager
Tasman Geosciences, Inc.

Enclosures:

Figure 1 – Site Location Map
Figure 2 – Excavation Site Map
Table 1 – Soil Analytical Results Summary Table
Table 2 – Groundwater Analytical Results Summary Table
Attachment A – Laboratory Analytical Reports

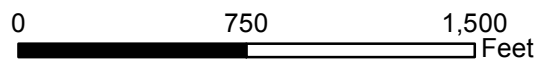
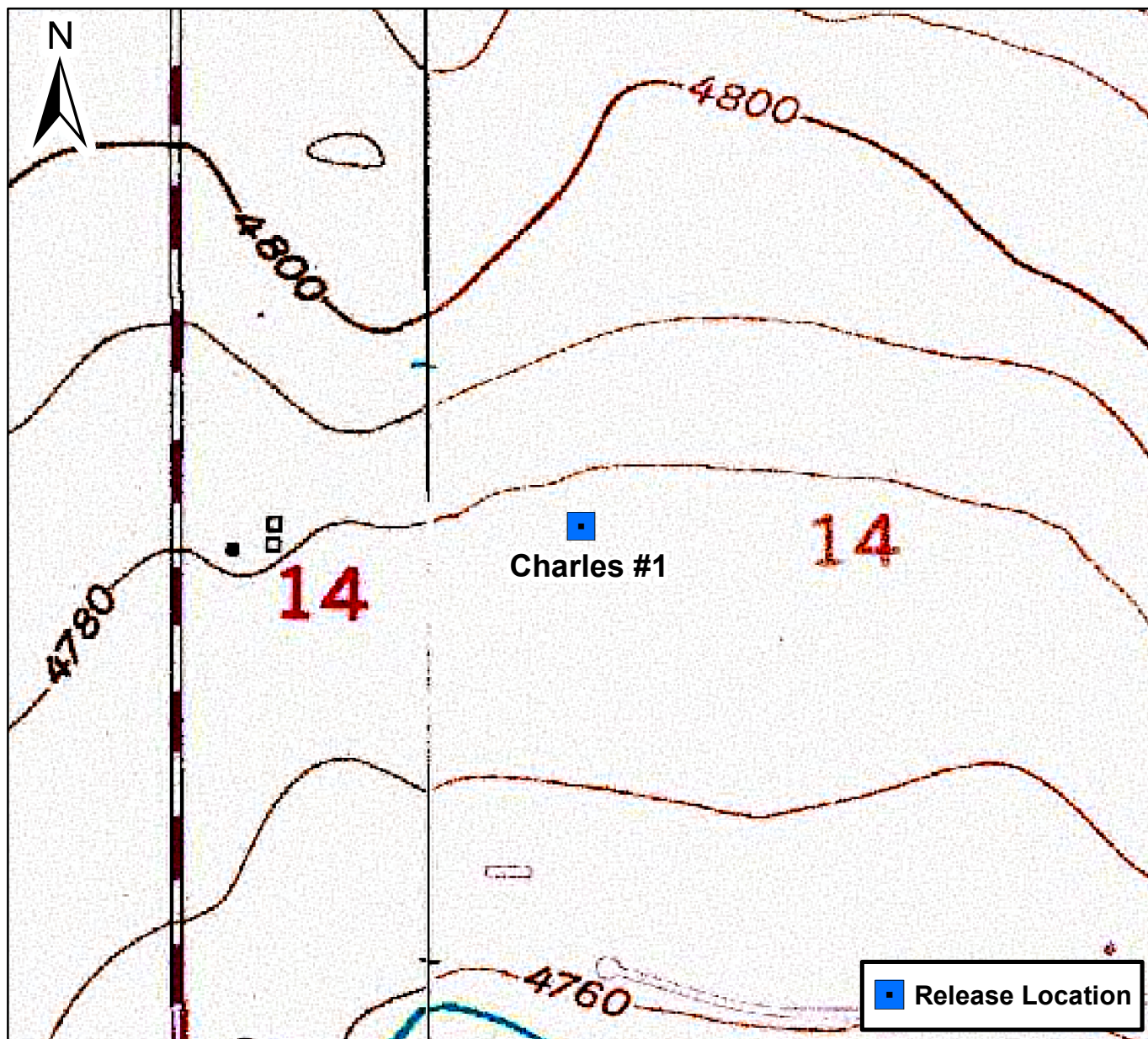


Figure 1

Site Location Map
Charles #1

SENW S14 T6N R66W
Weld County, Colorado










DRAWN BY: MP	Facility Diagram PDC Energy, Inc. – DJ Basin Charles 1 Tank Battery SENW S14 T6N R66W Weld County, CO	 TASMAN GEOSCIENCES 6899 Pecos Street, Unit C Denver, CO 80221	LEGEND  Excavation Extent  Soil Sample Location  Release Location  Groundwater Sample Location	FIGURE 2 EXCAVATION SITE MAP
DATE: 3/8/2016			All locations are approximate unless otherwise noted	

TABLE 1
CHARLES 1 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)	EC (mmhos/cm)	pH (units)
COGCC standards for soil (mg/kg) ⁽¹⁾			0.17	85	100	175	23	500	<4	6-9
SS01 @ 11'	2/25/2016	11	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	6.26	7.55
SS02 @ 11'	2/25/2016	11	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	4.08	7.73
SS03 @ 11'	2/25/2016	11	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	3.75	7.71
SS04 @ 11'	2/25/2016	11	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	1.10	8.13

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.

TABLE 2
CHARLES 1 TANK BATTERY
GROUNDWATER ANALYTICAL RESULTS SUMMARY TABLE

Sample ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Depth to Water (feet bgs)
COGCC Table 910-1 Groundwater Standard (µg/L) ⁽¹⁾		5	560	700	1,400	
GW01	3/7/2016	1.9	9.3	1.2	15	~ 13

Notes:

1. Groundwater standards referenced from 2 CCR 404-1, Table 910-1, effective January 30, 2015.

COGCC = Colorado Oil and Gas Conservation Commission

µg/L= Micrograms per liter

bgs = Below ground surface

(<) = Analytical result is less than the indicated laboratory reporting limit.

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

ATTACHMENT A

Summit Scientific

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

March 03, 2016

Mark Longhurst
PDC Energy
1775 Sherman St. STE. 3000
Denver, CO 80203
RE: Charles 1

Enclosed are the results of analyses for samples received by Summit Scientific on 02/25/16 17:00. 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: Charles 1
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
03/03/16 10:37

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS01@11'	1602206-01	Soil	02/25/16 09:15	02/25/16 17:00
SS02@11'	1602206-02	Soil	02/25/16 09:22	02/25/16 17:00
SS03@11'	1602206-03	Soil	02/25/16 09:31	02/25/16 17:00
SS04@11'	1602206-04	Soil	02/25/16 09:40	02/25/16 17:00

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.



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

Project: Charles 1
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
03/03/16 10:37

SS01@11'
1602206-01 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **02/25/16 09:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1602274	02/29/16	02/29/16	8015M	

Date Sampled: **02/25/16 09:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		97.3 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **02/25/16 09:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1602275	02/29/16	03/01/16	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: **02/25/16 09:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		114 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		100 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %	21-167		"	"	"	"	

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **02/25/16 09:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	6.26	0.0100	mmhos/cm	1	1603024	03/02/16	03/02/16	SM 2510B	

Summit Scientific

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

Project: Charles 1
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
03/03/16 10:37

SS01@11'
1602206-01 (Soil)

Summit Scientific

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **02/25/16 09:15**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
pH	7.55	0.100	pH Units	1	1603023	03/02/16	03/02/16	EPA 9045	

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

Project: Charles 1
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
03/03/16 10:37

SS02@11'
1602206-02 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 02/25/16 09:22

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1602274	02/29/16	02/29/16	8015M	

Date Sampled: 02/25/16 09:22

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		99.7 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 02/25/16 09:22

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1602275	02/29/16	03/01/16	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: 02/25/16 09:22

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		114 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.5 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		103 %	21-167		"	"	"	"	

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: 02/25/16 09:22

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	4.08	0.0100	mmhos/cm	1	1603024	03/02/16	03/02/16	SM 2510B	

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

Project: Charles 1
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
03/03/16 10:37

SS02@11'
1602206-02 (Soil)

Summit Scientific

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **02/25/16 09:22**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
pH	7.73	0.100	pH Units	1	1603023	03/02/16	03/02/16	EPA 9045	

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

Project: Charles 1
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
03/03/16 10:37

SS03@11'
1602206-03 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **02/25/16 09:31**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1602274	02/29/16	02/29/16	8015M	

Date Sampled: **02/25/16 09:31**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		97.8 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **02/25/16 09:31**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1602275	02/29/16	03/01/16	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: **02/25/16 09:31**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		115 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.7 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		105 %	21-167		"	"	"	"	

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **02/25/16 09:31**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	3.75	0.0100	mmhos/cm	1	1603024	03/02/16	03/02/16	SM 2510B	

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

Project: Charles 1
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
03/03/16 10:37

SS03@11'
1602206-03 (Soil)

Summit Scientific

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **02/25/16 09:31**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
pH	7.71	0.100	pH Units	1	1603023	03/02/16	03/02/16	EPA 9045	

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

Project: Charles 1
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
03/03/16 10:37

SS04@11'
1602206-04 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 02/25/16 09:40

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1602274	02/29/16	02/29/16	8015M	

Date Sampled: 02/25/16 09:40

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		99.7 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 02/25/16 09:40

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1602275	02/29/16	03/01/16	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: 02/25/16 09:40

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		110 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		101 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %	21-167		"	"	"	"	

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: 02/25/16 09:40

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	1.10	0.0100	mmhos/cm	1	1603024	03/02/16	03/02/16	SM 2510B	

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

Project: Charles 1
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
03/03/16 10:37

SS04@11'
1602206-04 (Soil)

Summit Scientific

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **02/25/16 09:40**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
pH	8.13	0.100	pH Units	1	1603023	03/02/16	03/02/16	EPA 9045	

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

Project: Charles 1
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
03/03/16 10:37

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 1602274 - EPA 3550A

Blank (1602274-BLK1)

Prepared & Analyzed: 02/29/16

C10-C28 (DRO)	ND	50	mg/kg							
Surrogate: o-Terphenyl	12.5		"	12.5		100	30-150			

LCS (1602274-BS1)

Prepared & Analyzed: 02/29/16

C10-C28 (DRO)	435	50	mg/kg	499		87.2	73-134			
Surrogate: o-Terphenyl	12.7		"	12.5		101	30-150			

Matrix Spike (1602274-MS1)

Source: 1602206-01

Prepared & Analyzed: 02/29/16

C10-C28 (DRO)	434	50	mg/kg	494	18.1	84.3	50-148			
Surrogate: o-Terphenyl	12.5		"	12.4		101	30-150			

Matrix Spike Dup (1602274-MSD1)

Source: 1602206-01

Prepared & Analyzed: 02/29/16

C10-C28 (DRO)	448	50	mg/kg	497	18.1	86.6	50-148	3.15	13	
Surrogate: o-Terphenyl	12.7		"	12.5		102	30-150			

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.



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

Project: Charles 1
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
03/03/16 10:37

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 1602275 - EPA 5030 Soil MS

Blank (1602275-BLK1)

Prepared & Analyzed: 02/29/16

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	"							
Surrogate: 1,2-Dichloroethane-d4	0.0433		"	0.0400		108	23-173			
Surrogate: Toluene-d8	0.0397		"	0.0400		99.2	20-170			
Surrogate: 4-Bromofluorobenzene	0.0400		"	0.0400		100	21-167			

LCS (1602275-BS1)

Prepared: 02/29/16 Analyzed: 03/01/16

Naphthalene	ND	0.010	mg/kg				66-138			
Benzene	0.104	0.0020	"	0.100		104	58-130			
Toluene	0.0992	0.0050	"	0.100		99.2	61-134			
Ethylbenzene	0.111	0.0050	"	0.0992		112	74-139			
m,p-Xylene	0.216	0.010	"	0.200		108	73-137			
o-Xylene	0.105	0.0050	"	0.0980		108	73-141			
Xylenes (total)	0.321	0.010	"				0-200			
Gasoline Range Hydrocarbons	2.60	0.50	"				30-150			
Surrogate: 1,2-Dichloroethane-d4	0.0434		"	0.0400		108	23-173			
Surrogate: Toluene-d8	0.0413		"	0.0400		103	20-170			
Surrogate: 4-Bromofluorobenzene	0.0388		"	0.0400		97.0	21-167			

Matrix Spike (1602275-MS1)

Source: 1602206-01

Prepared: 02/29/16 Analyzed: 03/01/16

Naphthalene	ND	0.010	mg/kg		ND		10-158			
Benzene	0.0904	0.0020	"	0.0998	ND	90.6	30-131			
Toluene	0.0857	0.0050	"	0.0998	ND	85.9	30-134			
Ethylbenzene	0.0969	0.0050	"	0.0990	ND	97.9	22-153			
m,p-Xylene	0.189	0.010	"	0.199	ND	94.7	10-159			
o-Xylene	0.0924	0.0050	"	0.0978	ND	94.4	31-151			
Xylenes (total)	0.281	0.010	"		ND		30-160			
Gasoline Range Hydrocarbons	2.16	0.50	"		ND		30-160			
Surrogate: 1,2-Dichloroethane-d4	0.0462		"	0.0399		116	23-173			
Surrogate: Toluene-d8	0.0410		"	0.0399		103	20-170			
Surrogate: 4-Bromofluorobenzene	0.0392		"	0.0399		98.1	21-167			

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.



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

Project: Charles 1
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
03/03/16 10:37

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 1602275 - EPA 5030 Soil MS

Matrix Spike Dup (1602275-MSD1)		Source: 1602206-01			Prepared: 02/29/16		Analyzed: 03/01/16			
Naphthalene	ND	0.010	mg/kg		ND		10-158		42	
Benzene	0.0902	0.0020	"	0.0951	ND	94.9	30-131	0.242	34	
Toluene	0.0862	0.0050	"	0.0951	ND	90.7	30-134	0.602	30	
Ethylbenzene	0.0971	0.0050	"	0.0943	ND	103	22-153	0.220	24	
m,p-Xylene	0.188	0.010	"	0.190	ND	99.0	10-159	0.492	68	
o-Xylene	0.0925	0.0050	"	0.0932	ND	99.3	31-151	0.125	38	
Xylenes (total)	0.280	0.010	"		ND		30-160	0.289	30	
Gasoline Range Hydrocarbons	2.18	0.50	"		ND		30-160	1.04	30	
Surrogate: 1,2-Dichloroethane-d4	0.0440		"	0.0380		116	23-173			
Surrogate: Toluene-d8	0.0396		"	0.0380		104	20-170			
Surrogate: 4-Bromofluorobenzene	0.0377		"	0.0380		99.2	21-167			

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.



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

Project: Charles 1
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
03/03/16 10:37

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 1603023 - General Preparation

LCS (1603023-BS1)					Prepared & Analyzed: 03/02/16					
pH	8.00	0.100	pH Units	8.00	100	95-105				
Duplicate (1603023-DUP1)					Source: 1602206-01 Prepared & Analyzed: 03/02/16					
pH	7.55	0.100	pH Units	7.55	0.00	20				

Batch 1603024 - General Preparation

Blank (1603024-BLK1)					Prepared & Analyzed: 03/02/16					
Specific Conductance (EC)	ND	0.0100	mmhos/cm							
LCS (1603024-BS1)					Prepared & Analyzed: 03/02/16					
Specific Conductance (EC)	0.505	0.0100	mmhos/cm	0.500	101	90-110				
Duplicate (1603024-DUP1)					Source: 1602206-01 Prepared & Analyzed: 03/02/16					
Specific Conductance (EC)	3.74	0.0100	mmhos/cm	6.26	50.4	20				QR-03

Summit Scientific

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

Project: Charles 1
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
03/03/16 10:37

Notes and Definitions

QR-03 The RPD value for the sample duplicate or MS/MSD was outside of QC acceptance limits due to matrix interference. QC batch accepted based on LCS and/or LCSD recovery and/or RPD values.

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

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

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

March 08, 2016

Mark Longhurst
PDC Energy
1775 Sherman St. STE. 3000
Denver, CO 80203
RE: Charles 1

Enclosed are the results of analyses for samples received by Summit Scientific on 03/07/16 17:00. 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: Charles 1
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
03/08/16 06:20

GW01
1603049-01 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **03/07/16 12:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	1.9	1.0	ug/l	1	1603064	03/07/16	03/07/16	EPA 8260B	
Toluene	9.3	1.0	"	"	"	"	"	"	
Ethylbenzene	1.2	1.0	"	"	"	"	"	"	
Xylenes (total)	15	1.0	"	"	"	"	"	"	

Date Sampled: **03/07/16 12:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		112 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		101 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		102 %	45-146		"	"	"	"	

Summit Scientific

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

Project: Charles 1
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
03/08/16 06:20

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 1603064 - EPA 5030 Water MS

Blank (1603064-BLK1)

Prepared & Analyzed: 03/08/16

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	14.4		"	13.3		108	37-154			
Surrogate: Toluene-d8	13.4		"	13.3		100	45-149			
Surrogate: 4-Bromofluorobenzene	13.1		"	13.3		98.0	45-146			

LCS (1603064-BS1)

Prepared & Analyzed: 03/08/16

Benzene	30.7	1.0	ug/l	33.3		92.2	51-132			
Toluene	31.4	1.0	"	33.3		94.1	51-138			
Ethylbenzene	32.2	1.0	"	33.1		97.3	58-146			
m,p-Xylene	63.7	2.0	"	66.5		95.7	57-144			
o-Xylene	33.6	1.0	"	32.7		103	53-146			
Surrogate: 1,2-Dichloroethane-d4	14.3		"	13.3		107	37-154			
Surrogate: Toluene-d8	13.2		"	13.3		99.2	45-149			
Surrogate: 4-Bromofluorobenzene	13.9		"	13.3		104	45-146			

Matrix Spike (1603064-MS1)

Source: 1603034-02

Prepared & Analyzed: 03/08/16

Benzene	31.8	1.0	ug/l	33.3	ND	95.5	34-141			
Toluene	32.2	1.0	"	33.3	ND	96.6	27-151			
Ethylbenzene	32.7	1.0	"	33.1	ND	99.0	29-160			
m,p-Xylene	65.0	2.0	"	66.5	ND	97.7	20-166			
o-Xylene	33.4	1.0	"	32.7	ND	102	33-159			
Surrogate: 1,2-Dichloroethane-d4	13.4		"	13.3		100	37-154			
Surrogate: Toluene-d8	13.5		"	13.3		101	45-149			
Surrogate: 4-Bromofluorobenzene	13.0		"	13.3		97.7	45-146			

Summit Scientific

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

Project: Charles 1
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
03/08/16 06:20

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 1603064 - EPA 5030 Water MS

Matrix Spike Dup (1603064-MSD1)		Source: 1603034-02			Prepared & Analyzed: 03/08/16					
Benzene	31.8	1.0	ug/l	33.3	ND	95.5	34-141	0.0628	32	
Toluene	32.7	1.0	"	33.3	ND	98.1	27-151	1.60	25	
Ethylbenzene	33.4	1.0	"	33.1	ND	101	29-160	1.91	50	
m,p-Xylene	65.9	2.0	"	66.5	ND	99.1	20-166	1.34	36	
o-Xylene	34.0	1.0	"	32.7	ND	104	33-159	1.81	26	
Surrogate: 1,2-Dichloroethane-d4	13.2		"	13.3		98.7	37-154			
Surrogate: Toluene-d8	13.5		"	13.3		101	45-149			
Surrogate: 4-Bromofluorobenzene	13.3		"	13.3		100	45-146			

Summit Scientific

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

Project: Charles 1
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
03/08/16 06:20

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

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.

A handwritten signature in black ink, appearing to be 'MSM'.