

January 4, 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
Brown-McCarty 5 & 30-43 Tank Battery
Facility ID: 323366
NESE S30 T4N R67W
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 September 8, 2015, confirmation sampling 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). Groundwater was encountered in the excavation area at approximately 3 feet below ground surface (bgs). Four soil samples (SS01 – SS04) were collected from the sidewalls of the excavation area at approximately 2 feet bgs. 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, electrical conductivity (EC), and pH. In addition, a groundwater sample (GW01) was collected and submitted for laboratory analysis of BTEX.

Analytical results indicated organic compound concentrations and physical parameters were in compliance with COGCC Table 910-1 standards in the four soil sample locations. In addition, BTEX concentrations were below COGCC standards in the groundwater sample.

The excavation extent and soil and groundwater sample locations are illustrated on Figure 1. Soil analytical data is summarized in Table 1 and groundwater analytical data is summarized in Table 2. The laboratory analytical report is provided in Attachment A.

Conclusions

Based on the analytical data described herein, petroleum hydrocarbon impacts above regulatory standards were not encountered during the removal of the produced water vessel. 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,

A handwritten signature in blue ink that reads 'Christine Wasko'.

Christine Wasko
Project Manager
Tasman Geosciences, Inc.

Enclosures:

Figure 1 – Sample Location Map

Table 1 – Soil Analytical Results Summary Table

Table 2 – Groundwater Analytical Results Summary Table

Attachment A – Laboratory Analytical Report



Note: Surface drainage direction is estimated based on site topography and is not related to regional topography.

DRAWN BY: MAP
 DATE: 12/22/2015

Facility Diagram
 PDC Energy – DJ Basin
 Brown-McCarty 5 & 30-43 Tank Battery
 NESE S30 T4N R67W
 Weld County, CO

TASMAN GEOSCIENCES
 6899 Pecos St., Unit C
 Denver, CO 80221

LEGEND
 - - - Excavation Extent
 + Soil Sample Location
 ▲ Groundwater Sample Location

All locations are approximate unless otherwise noted

FIGURE 1
SAMPLE LOCATION MAP

TABLE 1
BROWN-McCARTY 5 30-43 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 or 2x BG	6-9
SS01 @ 2'	9/8/2015	2	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	0.671	8.42
SS02 @ 2'	9/8/2015	2	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	0.742	8.01
SS03 @ 2'	9/8/2015	2	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	0.757	8.22
SS04 @ 2'	9/8/2015	2	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	0.502	8.34

Notes:

- Standards for soil are taken from 2 CCR 404-1, Table 910-1, effective February 1, 2014.
 - 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
BROWN-McCARTY 5 30-43 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	9/8/2015	3.8	<1.0	1.6	4.2	~3

Notes:

1. Groundwater standards referenced from 2 CCR 404-1, Table 910-1, effective February 1, 2014.

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

September 11, 2015

Mark Longhurst

PDC Energy

1775 Sherman St. STE. 3000

Denver, CO 80203

RE: Brown McCarty 30-5 + 30-43

Enclosed are the results of analyses for samples received by Summit Scientific on 09/08/15 16:42. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Paul Shrewsbury

President



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

Project: Brown McCarty 30-5 + 30-43

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/11/15 16:39

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
GW01	1509061-01	Water	09/08/15 16:00	09/08/15 16:42
SS01@2'	1509061-02	Soil	09/08/15 15:40	09/08/15 16:42
SS02@2'	1509061-03	Soil	09/08/15 15:45	09/08/15 16:42
SS03@2'	1509061-04	Soil	09/08/15 15:50	09/08/15 16:42
SS04@2'	1509061-05	Soil	09/08/15 15:55	09/08/15 16:42

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: Brown McCarty 30-5 + 30-43

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/11/15 16:39

Summit Scientific 1509061

741 Corporate Circle Suite 1 • Golden, Colorado 80401
303-277-9310 • 303-374-5933 Fax

Page 1 of 1

Client: PDC Energy
Address: _____
City/State/Zip: _____
Phone: _____ Fax: _____
Sampler Name: Eric Siegel

Project Manager: Mark Longhurst
E-Mail: Mark.Longhurst@PDCE.com
Project Name: Brown McCarty 30-5 + 30-43
Project Number: _____

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative				Matrix			Analyze For:					Special Instructions	
				HCl	HNO ₃	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)	8260 BTEX	8260 Gro/Amp	8015 DRD	pH		EC
GW01	9/8/15	1600	3	X				X				X	X	X	X	X	HOLD, pending GW results
SS01e2'		1540	1		X							X	X	X	X	X	
SS02e2'		1545	1		X							X	X	X	X	X	
SS03e2'		1550	1		X							X	X	X	X	X	
SS04e2'		1555	1		X							X	X	X	X	X	
Relinquished by: <u>E. A. Ajaj</u> Date/Time: <u>9/8/15</u>				Received by: <u>[Signature]</u> Date/Time: <u>9-8-15 16:42</u>				Turn Around Time (Check) Same Day <input checked="" type="checkbox"/> 72 Hours <input type="checkbox"/> 24 Hours <input type="checkbox"/> Standard <input type="checkbox"/> 48 Hours <input type="checkbox"/>					Notes: Hold SAR if soil samples run, pending EC results				
Relinquished by: <u>[Signature]</u> Date/Time: <u>9-8-15 17:45</u>				Received by: _____ Date/Time: _____				Sample Integrity: Temperature Upon Receipt: <u>83°C</u> Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>									
Relinquished by: _____ Date/Time: _____				Received in Lab by: _____ Date/Time: _____													

www.s2scientific.com



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

Project: Brown McCarty 30-5 + 30-43

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 09/11/15 16:39

GW01
1509061-01 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/08/15 16:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	3.8	1.0	ug/l	1	1509065	09/08/15	09/08/15	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	1.6	1.0	"	"	"	"	"	"	
Xylenes (total)	4.2	1.0	"	"	"	"	"	"	

Date Sampled: **09/08/15 16:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		133 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		103 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		109 %	45-146		"	"	"	"	

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PDC Energy
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Denver CO, 80203

Project: Brown McCarty 30-5 + 30-43

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/11/15 16:39

SS01@2'
1509061-02 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **09/08/15 15:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1509078	09/09/15	09/09/15	8015M	

Date Sampled: **09/08/15 15:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		100 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/08/15 15:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1509079	09/09/15	09/09/15	EPA 8260B	
Benzene	ND	0.0020	"	"	"	"	"	"	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	50	"	"	"	"	"	"	

Date Sampled: **09/08/15 15:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		117 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.9 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.2 %	21-167		"	"	"	"	

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **09/08/15 15:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	0.671	0.0100	mmhos/cm	1	1509103	09/11/15	09/11/15	SM 2510B	

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PDC Energy
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Project: Brown McCarty 30-5 + 30-43

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 09/11/15 16:39

SS01@2'
1509061-02 (Soil)

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Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **09/08/15 15:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	8.42	0.100	pH Units	1	1509095	09/10/15	09/11/15	EPA 9045	

Date Sampled: **09/08/15 15:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	81.1		%	"	1509068	09/09/15	09/10/15	% calculation	

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Project: Brown McCarty 30-5 + 30-43

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/11/15 16:39

SS02@2'
1509061-03 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **09/08/15 15:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1509078	09/09/15	09/10/15	8015M	

Date Sampled: **09/08/15 15:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		98.1 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/08/15 15:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1509079	09/09/15	09/10/15	EPA 8260B	
Benzene	ND	0.0020	"	"	"	"	"	"	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	50	"	"	"	"	"	"	

Date Sampled: **09/08/15 15:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		129 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		106 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		106 %	21-167		"	"	"	"	

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **09/08/15 15:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	0.742	0.0100	mmhos/cm	1	1509103	09/11/15	09/11/15	SM 2510B	

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

Project: Brown McCarty 30-5 + 30-43

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 09/11/15 16:39

SS02@2'
1509061-03 (Soil)

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Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **09/08/15 15:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	8.01	0.100	pH Units	1	1509095	09/10/15	09/11/15	EPA 9045	

Date Sampled: **09/08/15 15:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	79.8		%	"	1509068	09/09/15	09/10/15	% calculation	

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

Project: Brown McCarty 30-5 + 30-43

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/11/15 16:39

SS03@2'
1509061-04 (Soil)

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Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **09/08/15 15:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1509078	09/09/15	09/10/15	8015M	

Date Sampled: **09/08/15 15:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		97.2 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/08/15 15:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1509079	09/09/15	09/10/15	EPA 8260B	
Benzene	ND	0.0020	"	"	"	"	"	"	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	50	"	"	"	"	"	"	

Date Sampled: **09/08/15 15:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		127 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		104 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		110 %	21-167		"	"	"	"	

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **09/08/15 15:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	0.757	0.0100	mmhos/cm	1	1509103	09/11/15	09/11/15	SM 2510B	

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

Project: Brown McCarty 30-5 + 30-43

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 09/11/15 16:39

SS03@2'
1509061-04 (Soil)

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Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **09/08/15 15:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	8.22	0.100	pH Units	1	1509095	09/10/15	09/11/15	EPA 9045	

Date Sampled: **09/08/15 15:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	79.4		%	"	1509068	09/09/15	09/10/15	% calculation	

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

Project: Brown McCarty 30-5 + 30-43

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/11/15 16:39

SS04@2'
1509061-05 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **09/08/15 15:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1509078	09/09/15	09/10/15	8015M	

Date Sampled: **09/08/15 15:55**

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

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/08/15 15:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1509079	09/09/15	09/10/15	EPA 8260B	
Benzene	ND	0.0020	"	"	"	"	"	"	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	50	"	"	"	"	"	"	

Date Sampled: **09/08/15 15:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		129 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		103 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		111 %	21-167		"	"	"	"	

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **09/08/15 15:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	0.502	0.0100	mmhos/cm	1	1509103	09/11/15	09/11/15	SM 2510B	

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

Project: Brown McCarty 30-5 + 30-43

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 09/11/15 16:39

SS04@2'
1509061-05 (Soil)

Summit Scientific

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **09/08/15 15:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	8.34	0.100	pH Units	1	1509095	09/10/15	09/11/15	EPA 9045	

Date Sampled: **09/08/15 15:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	80.6		%	"	1509068	09/09/15	09/10/15	% calculation	

Summit Scientific

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

Project: Brown McCarty 30-5 + 30-43

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/11/15 16:39

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 1509078 - EPA 3550A

Blank (1509078-BLK1)				Prepared & Analyzed: 09/09/15							
C10-C28 (DRO)	ND	50	mg/kg								
<i>Surrogate: o-Terphenyl</i>	12.8		"	12.2		105	30-150				
LCS (1509078-BS1)				Prepared & Analyzed: 09/09/15							
C10-C28 (DRO)	453	50	mg/kg	499		90.8	73-134				
<i>Surrogate: o-Terphenyl</i>	12.1		"	12.2		98.9	30-150				
Matrix Spike (1509078-MS1)				Source: 1509061-02		Prepared & Analyzed: 09/09/15					
C10-C28 (DRO)	446	50	mg/kg	487	ND	91.5	50-148				
<i>Surrogate: o-Terphenyl</i>	11.5		"	11.9		96.4	30-150				
Matrix Spike Dup (1509078-MSD1)				Source: 1509061-02		Prepared & Analyzed: 09/09/15					
C10-C28 (DRO)	431	50	mg/kg	466	ND	92.3	50-148	3.54		13	
<i>Surrogate: o-Terphenyl</i>	11.4		"	11.4		100	30-150				

Summit Scientific

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

Project: Brown McCarty 30-5 + 30-43

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/11/15 16:39

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 1509065 - EPA 5030 Water MS

Blank (1509065-BLK1)

Prepared & Analyzed: 09/08/15

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	1.0	"							
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>16.5</i>		<i>"</i>	<i>13.2</i>		<i>125</i>	<i>37-154</i>			
<i>Surrogate: Toluene-d8</i>	<i>13.4</i>		<i>"</i>	<i>13.3</i>		<i>100</i>	<i>45-149</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>14.9</i>		<i>"</i>	<i>13.3</i>		<i>112</i>	<i>45-146</i>			

LCS (1509065-BS1)

Prepared & Analyzed: 09/08/15

Benzene	36.5	1.0	ug/l	33.3		110	51-132			
Toluene	31.8	1.0	"	33.3		95.5	51-138			
Ethylbenzene	35.7	1.0	"	33.1		108	58-146			
m,p-Xylene	67.9	2.0	"	66.5		102	57-144			
o-Xylene	38.5	1.0	"	32.8		117	53-146			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>17.4</i>		<i>"</i>	<i>13.2</i>		<i>132</i>	<i>37-154</i>			
<i>Surrogate: Toluene-d8</i>	<i>13.9</i>		<i>"</i>	<i>13.3</i>		<i>104</i>	<i>45-149</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>15.0</i>		<i>"</i>	<i>13.3</i>		<i>113</i>	<i>45-146</i>			

Matrix Spike (1509065-MS1)

Source: 1509055-01

Prepared & Analyzed: 09/08/15

Benzene	36.7	1.0	ug/l	33.3	ND	110	34-141			
Toluene	31.7	1.0	"	33.3	ND	95.2	27-151			
Ethylbenzene	59.9	1.0	"	33.1	28.4	95.3	29-160			
m,p-Xylene	92.5	2.0	"	66.5	29.1	95.3	20-166			
o-Xylene	38.9	1.0	"	32.8	ND	119	33-159			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>17.0</i>		<i>"</i>	<i>13.2</i>		<i>129</i>	<i>37-154</i>			
<i>Surrogate: Toluene-d8</i>	<i>13.6</i>		<i>"</i>	<i>13.3</i>		<i>102</i>	<i>45-149</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>14.3</i>		<i>"</i>	<i>13.3</i>		<i>107</i>	<i>45-146</i>			

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

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Project Manager: Mark Longhurst

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Volatile Organic Compounds by EPA Method 8260B - Quality Control
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Analyte	Reporting			Spike	Source	%REC		RPD		Notes
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	

Batch 1509065 - EPA 5030 Water MS

Matrix Spike Dup (1509065-MSD1)	Source: 1509055-01			Prepared & Analyzed: 09/08/15						
Benzene	35.9	1.0	ug/l	33.3	ND	108	34-141	2.09	32	
Toluene	31.2	1.0	"	33.3	ND	93.5	27-151	1.75	25	
Ethylbenzene	56.3	1.0	"	33.1	28.4	84.5	29-160	6.14	50	
m,p-Xylene	87.8	2.0	"	66.5	29.1	88.3	20-166	5.16	36	
o-Xylene	38.5	1.0	"	32.8	ND	117	33-159	0.956	26	
Surrogate: 1,2-Dichloroethane-d4	17.2		"	13.2		130	37-154			
Surrogate: Toluene-d8	13.8		"	13.3		103	45-149			
Surrogate: 4-Bromofluorobenzene	14.6		"	13.3		110	45-146			

Batch 1509079 - EPA 5030 Soil MS

Blank (1509079-BLK1)	Prepared & Analyzed: 09/09/15									
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	50	"							
Surrogate: 1,2-Dichloroethane-d4	0.0426		"	0.0396		108	23-173			
Surrogate: Toluene-d8	0.0398		"	0.0400		99.5	20-170			
Surrogate: 4-Bromofluorobenzene	0.0392		"	0.0400		98.0	21-167			

LCS (1509079-BS1)	Prepared & Analyzed: 09/09/15									
Naphthalene	ND	0.010	mg/kg							66-138
Benzene	0.0881	0.0020	"	0.100		88.1	58-130			
Toluene	0.0861	0.0050	"	0.100		86.1	61-134			
Ethylbenzene	0.109	0.0050	"	0.0992		110	74-139			
m,p-Xylene	0.207	0.010	"	0.200		104	73-137			
o-Xylene	0.0978	0.0050	"	0.0984		99.4	73-141			
Surrogate: 1,2-Dichloroethane-d4	0.0424		"	0.0396		107	23-173			
Surrogate: Toluene-d8	0.0391		"	0.0400		97.8	20-170			
Surrogate: 4-Bromofluorobenzene	0.0388		"	0.0400		97.1	21-167			

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Volatile Organic Compounds by EPA Method 8260B - Quality Control
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Analyte	Reporting			Spike	Source	%REC		RPD		Notes
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	

Batch 1509079 - EPA 5030 Soil MS

Matrix Spike (1509079-MS1)

Source: 1509061-02

Prepared & Analyzed: 09/09/15

Naphthalene	ND	0.010	mg/kg		ND		10-158			
Benzene	0.0894	0.0020	"	0.100	ND	89.4	30-131			
Toluene	0.0876	0.0050	"	0.100	ND	87.6	30-134			
Ethylbenzene	0.110	0.0050	"	0.0992	ND	111	22-153			
m,p-Xylene	0.209	0.010	"	0.200	ND	105	10-159			
o-Xylene	0.0983	0.0050	"	0.0984	ND	99.9	31-151			
Surrogate: 1,2-Dichloroethane-d4	0.0441		"	0.0396		111	23-173			
Surrogate: Toluene-d8	0.0394		"	0.0400		98.4	20-170			
Surrogate: 4-Bromofluorobenzene	0.0384		"	0.0400		95.9	21-167			

Matrix Spike Dup (1509079-MSD1)

Source: 1509061-02

Prepared & Analyzed: 09/09/15

Naphthalene	ND	0.010	mg/kg		ND		10-158		42	
Benzene	0.0879	0.0020	"	0.100	ND	87.9	30-131	1.69	34	
Toluene	0.0861	0.0050	"	0.100	ND	86.1	30-134	1.76	30	
Ethylbenzene	0.111	0.0050	"	0.0992	ND	112	22-153	1.09	24	
m,p-Xylene	0.213	0.010	"	0.200	ND	107	10-159	1.86	68	
o-Xylene	0.101	0.0050	"	0.0984	ND	103	31-151	2.95	38	
Surrogate: 1,2-Dichloroethane-d4	0.0462		"	0.0396		117	23-173			
Surrogate: Toluene-d8	0.0385		"	0.0400		96.2	20-170			
Surrogate: 4-Bromofluorobenzene	0.0386		"	0.0400		96.4	21-167			

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Physical Parameters by APHA/ASTM/EPA Methods - Quality Control
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Analyte	Reporting			Spike	Source		%REC		RPD		Notes
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit		

Batch 1509068 - General Preparation

Duplicate (1509068-DUP1)		Source: 1509040-01			Prepared: 09/09/15		Analyzed: 09/10/15				
% Solids	98.0		%		97.8				0.204	20	
Duplicate (1509068-DUP2)		Source: 1509061-02			Prepared: 09/09/15		Analyzed: 09/10/15				
% Solids	81.2		%		81.1				0.123	20	

Batch 1509095 - General Preparation

LCS (1509095-BS1)					Prepared: 09/10/15		Analyzed: 09/11/15				
pH	7.98	0.100	pH Units	8.00	99.8	95-105					
Duplicate (1509095-DUP1)		Source: 1509053-01			Prepared: 09/10/15		Analyzed: 09/11/15				
pH	6.92	0.100	pH Units	6.92	0.00	20					

Batch 1509103 - General Preparation

Blank (1509103-BLK1)					Prepared & Analyzed: 09/11/15						
Specific Conductance (EC)	ND	0.0100	mmhos/cm								
LCS (1509103-BS1)					Prepared & Analyzed: 09/11/15						
Specific Conductance (EC)	0.506	0.0100	mmhos/cm	0.500	101	90-110					
Duplicate (1509103-DUP1)		Source: 1509053-01			Prepared & Analyzed: 09/11/15						
Specific Conductance (EC)	0.470	0.0100	mmhos/cm	0.461	1.97	20					

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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

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