

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**
Adams 1, Gerry 3 Tank Battery
Facility ID: 319509
NESE S24 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 May 8, 2015, confirmation sampling activities were completed following the removal of the partially buried concrete produced water vessel. Soil encountered in the excavation area was field screened for volatile organic compound (VOC) concentrations using a photoionization detector (PID). One soil sample (SS01) was collected below the former vessel location at approximately 7 feet below ground surface (bgs). The sample was 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, and TPH - diesel range organics (DRO) by EPA Method 8015.

Analytical results indicated constituent concentrations in soil sample SS01 were below COGCC Table 910-1 soil standards.

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

Conclusions

Based on the soil analytical data described herein, petroleum hydrocarbon impacts 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,



Christine Wasko
Project Manager
Tasman Geosciences, Inc.

Enclosures:

Figure 1 – Soil Sample Location Map
Table 1 – Soil Analytical Results Summary Table
Attachment A – Laboratory Analytical Report






DRAWN BY: RJB	Facility Diagram PDC Energy – DJ Basin Adams 1, Gerry 3 Tank Battery NESE S24 T6N R66W Weld County, CO	 TASMAN GEOSCIENCES 6899 Pecos St., Unit C Denver, CO 80221	LEGEND  Excavation Extent  Soil Sample Location	FIGURE 1 SOIL SAMPLE LOCATION MAP
DATE: 11/2/2015			All locations are approximate unless otherwise noted	

TABLE 1
ADAMS 1, GERRY 3 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)
COGCC standards for soil (mg/kg) ⁽¹⁾			0.17	85	100	175	23	500
SS01 @ 7'	5/8/2015	7	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50

Notes:

1. Standards for soil are taken from 2 CCR 404-1, Table 910-1, effective February 1, 2014.

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

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

May 10, 2015

Mark Longhurst
PDC Energy
1775 Sherman St. STE. 3000
Denver, CO 80203
RE: Adams 1, Gerry 3

Enclosed are the results of analyses for samples received by Summit Scientific on 05/08/15 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 be 'Ben Shrewsbury', with a long, sweeping horizontal line extending to the right.

Ben Shrewsbury For Paul Shrewsbury
President



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

Project: Adams 1, Gerry 3
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
05/10/15 15:37

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS01@7'	1505082-01	Soil	05/08/15 10:30	05/08/15 17:00

Summit Scientific 1505082
S₂

741 Corporate Circle, Suite J&K • Golden, Colorado 80401
303-277-9310 • 303-374-5933

Page 1 of 1

Client: PDC ENERGY

Project Manager: MARK LONGHURST

Address:

E-Mail: MARK.LONGHURST@PDC.COM

City/State/Zip:

Phone:

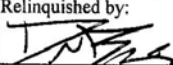
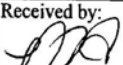
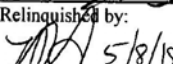
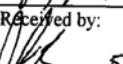
Fax:

Project Name: Adams 1; Gerry 3

Sampler Name: DON BAGGUS

Project Number:

ID	Sample Description	Date Sampled	Time Sampled	# of containers	Preservative				Matrix				Analysis Requested				Special Instructions	
					HCl	HNO ₃	None	Other (Specify)	Groundwater	Soil	Air-Canister #	Other (Specify)	BTX	NAP	TPH-DKO	GRO		
1	SS01@7'	5/8/2015	1030	1			X			X				X	X	X		
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Relinquished by: 	Date/Time: 5/8/2015	Received by: 	Date/Time: 5/8/15 1630	Turn Around Time (Check) Same Day — 72 hours <input checked="" type="checkbox"/> 24 hours — Standard — 48 hours — Sample Integrity: Temperature Upon Receipt: 5.7°C Intact: <input checked="" type="radio"/> Yes <input type="radio"/> No	Notes: ON ICE
Relinquished by: 	Date/Time: 5/8/15 1700	Received by: 	Date/Time: 5/8/1 1700		
Relinquished by:	Date/Time:	Received by:	Date/Time:		

www.s2scientific.com

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: Adams 1, Gerry 3
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
05/10/15 15:37

SS01@7'
1505082-01 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 05/08/15 10:30

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1505091	05/08/15	05/08/15	8015M	

Date Sampled: 05/08/15 10:30

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		103 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 05/08/15 10:30

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1505090	05/08/15	05/08/15	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: 05/08/15 10:30

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		126 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		97.2 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		105 %	21-167		"	"	"	"	

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Denver CO, 80203

Project: Adams 1, Gerry 3
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
05/10/15 15:37

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 1505091 - EPA 3550A

Blank (1505091-BLK1)

Prepared & Analyzed: 05/08/15

C10-C28 (DRO) ND 50 mg/kg

Surrogate: o-Terphenyl 13.1 " 12.2 107 30-150

LCS (1505091-BS1)

Prepared & Analyzed: 05/08/15

C10-C28 (DRO) 475 50 mg/kg 501 94.9 73-134

Surrogate: o-Terphenyl 12.9 " 12.2 106 30-150

Matrix Spike (1505091-MS1)

Source: 1505081-01

Prepared & Analyzed: 05/08/15

C10-C28 (DRO) 429 50 mg/kg 471 8.62 89.3 50-148

Surrogate: o-Terphenyl 11.9 " 11.5 104 30-150

Matrix Spike Dup (1505091-MSD1)

Source: 1505081-01

Prepared & Analyzed: 05/08/15

C10-C28 (DRO) 433 50 mg/kg 471 8.62 90.0 50-148 0.827 13

Surrogate: o-Terphenyl 12.1 " 11.5 105 30-150

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PDC Energy
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Project: Adams 1, Gerry 3
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
05/10/15 15:37

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 1505090 - EPA 5030 Soil MS

Blank (1505090-BLK1)

Prepared & Analyzed: 05/08/15

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	0.50	"							
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0455</i>		<i>"</i>	<i>0.0396</i>		<i>115</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0405</i>		<i>"</i>	<i>0.0400</i>		<i>101</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0430</i>		<i>"</i>	<i>0.0400</i>		<i>107</i>	<i>21-167</i>			

LCS (1505090-BS1)

Prepared & Analyzed: 05/08/15

Naphthalene	ND	0.010	mg/kg				66-138			
Benzene	0.0824	0.0020	"	0.100		82.4	58-130			
Toluene	0.0902	0.0050	"	0.100		90.2	61-134			
Ethylbenzene	0.102	0.0050	"	0.0992		102	74-139			
m,p-Xylene	0.212	0.010	"	0.200		106	73-137			
o-Xylene	0.104	0.0050	"	0.0984		106	73-141			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0475</i>		<i>"</i>	<i>0.0396</i>		<i>120</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0370</i>		<i>"</i>	<i>0.0400</i>		<i>92.6</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0400</i>		<i>"</i>	<i>0.0400</i>		<i>100</i>	<i>21-167</i>			

Matrix Spike (1505090-MS1)

Source: 1505081-01

Prepared & Analyzed: 05/08/15

Naphthalene	ND	0.010	mg/kg		ND		10-158			
Benzene	0.0782	0.0020	"	0.0978	ND	79.9	30-131			
Toluene	0.0830	0.0050	"	0.0978	ND	84.8	30-134			
Ethylbenzene	0.0887	0.0050	"	0.0971	ND	91.4	22-153			
m,p-Xylene	0.184	0.010	"	0.195	ND	94.2	10-159			
o-Xylene	0.0911	0.0050	"	0.0963	ND	94.6	31-151			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0444</i>		<i>"</i>	<i>0.0387</i>		<i>115</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0365</i>		<i>"</i>	<i>0.0391</i>		<i>93.1</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0347</i>		<i>"</i>	<i>0.0391</i>		<i>88.7</i>	<i>21-167</i>			

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Denver CO, 80203

Project: Adams 1, Gerry 3
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
05/10/15 15:37

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 1505090 - EPA 5030 Soil MS

Matrix Spike Dup (1505090-MSD1)			Source: 1505081-01		Prepared & Analyzed: 05/08/15					
Naphthalene	ND	0.010	mg/kg		ND		10-158		42	
Benzene	0.0774	0.0020	"	0.0969	ND	79.9	30-131	0.974	34	
Toluene	0.0857	0.0050	"	0.0969	ND	88.5	30-134	3.22	30	
Ethylbenzene	0.0961	0.0050	"	0.0961	ND	100	22-153	8.04	24	
m,p-Xylene	0.202	0.010	"	0.193	ND	104	10-159	9.10	68	
o-Xylene	0.0989	0.0050	"	0.0953	ND	104	31-151	8.25	38	
Surrogate: 1,2-Dichloroethane-d4	0.0474		"	0.0384		123	23-173			
Surrogate: Toluene-d8	0.0374		"	0.0388		96.6	20-170			
Surrogate: 4-Bromofluorobenzene	0.0378		"	0.0388		97.4	21-167			

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

Project: Adams 1, Gerry 3

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
05/10/15 15:37

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

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