

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**
Koehler Frank 13-27 Tank Battery
Facility ID: 322556
NWSW S27 T6N R65W
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 January 15, 2014, excavation and sampling activities were completed following the removal of two partially buried concrete produced water vessels. Soil encountered in the excavation areas was field screened for volatile organic compound (VOC) concentrations using a photoionization detector (PID). One soil sample (SS01) was collected below the former produced water vessel (Vault 1) located near the separator at approximately 8 feet below ground surface (bgs). A second soil sample (SS02) was collected below the former produced water vessel (Vault 2) located near production tanks at approximately 7 feet bgs. Both 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, and TPH - diesel range organics (DRO) by EPA Method 8015.

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

The excavation extent and soil sample locations are illustrated on Figures 1 and 2. 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 in exceedance of regulatory standards were not encountered during the removal of the produced water vessels. 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.

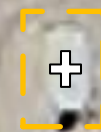
Sincerely,



Christine Wasko
Project Manager
Tasman Geosciences, Inc.

Enclosures:

Figure 1 – Soil Sample Location Map (Vault 1)
Figure 2 – Soil Sample Location Map (Vault 2)
Table 1 – Soil Analytical Results Summary Table
Attachment A – Laboratory Analytical Report

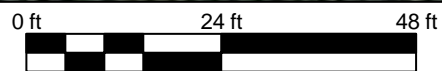


SS01 @ 8'

Surface
Drainage



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



Google earth

(Historical Image 2012)

DRAWN BY: MAP

DATE: 12/23/2015

Facility Diagram
PDC Energy – DJ Basin
Koehler Frank 13-27 Tank Battery
NWSW S27 T6N R65W
Weld County, CO



TASMAN
GEOSCIENCES

6899 Pecos St., Unit C
Denver, CO 80221

LEGEND




- Excavation Extent
+ Soil Sample Location

All locations are
approximate unless
otherwise noted

FIGURE 1

SOIL SAMPLE
LOCATION MAP
(VAULT 1)



DRAWN BY: MAP	Facility Diagram PDC Energy – DJ Basin Koehler Frank 13-27 Tank Battery NWSW S27 T6N R65W Weld County, CO	 TASMAN GEOSCIENCES	LEGEND  Excavation Extent  Soil Sample Location	FIGURE 2 SOIL SAMPLE LOCATION MAP (VAULT 2)
DATE: 12/23/2015				

All locations are approximate unless otherwise noted

TABLE 1
KOEHLER FRANK 13-27 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 @ 8'	1/15/2014	8	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
SS02 @ 7'	1/15/2014	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

January 22, 2014

Brandon Bruns
PDC Energy
1775 Sherman St. STE. 3000
Denver, CO 80203
RE: Koehler Frank 13-27

Enclosed are the results of analyses for samples received by Summit Scientific on 01/15/14 16:50. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

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

Ben Shrewsbury
President / Laboratory Manager



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

Project: Koehler Frank 13-27

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
01/22/14 18:30

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS01@8'	1401066-01	Soil	01/15/14 12:00	01/15/14 16:50
SS02@7'	1401066-02	Soil	01/15/14 12:15	01/15/14 16:50

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.



www.s2scientific.com

Page 2 of 8



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

Project: Koehler Frank 13-27

Project Number: [none]
Project Manager: Brandon Brunns

Reported:
01/22/14 18:30

SS01@8'
1401066-01 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **01/15/14 12:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1401061	01/15/14	01/16/14	8015M	

Date Sampled: **01/15/14 12:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		72.3 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **01/15/14 12:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1401060	"	01/15/14	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: **01/15/14 12:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		98.5 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		97.0 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		94.2 %	21-167		"	"	"	"	

Summit Scientific

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

Project: Koehler Frank 13-27
Project Number: [none]
Project Manager: Brandon Brunns

Reported:
01/22/14 18:30

SS02@7'
1401066-02 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **01/15/14 12:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1401061	01/15/14	01/16/14	8015M	

Date Sampled: **01/15/14 12:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		72.7 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **01/15/14 12:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1401060	"	01/15/14	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: **01/15/14 12:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		105 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		97.5 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		94.4 %	21-167		"	"	"	"	

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1775 Sherman St. STE. 3000
Denver CO, 80203

Project: Koehler Frank 13-27

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
01/22/14 18:30

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 1401061 - EPA 3550A

Blank (1401061-BLK1)

Prepared: 01/15/14 Analyzed: 01/16/14

C10-C28 (DRO) ND 50 mg/kg

LCS (1401061-BS1)

Prepared: 01/15/14 Analyzed: 01/16/14

C10-C28 (DRO) 492 50 mg/kg 495 99.3 73-134

Matrix Spike (1401061-MS1)

Source: 1401063-03

Prepared: 01/15/14 Analyzed: 01/16/14

C10-C28 (DRO) 470 50 mg/kg 492 37.8 87.7 50-148

Matrix Spike Dup (1401061-MSD1)

Source: 1401063-03

Prepared: 01/15/14 Analyzed: 01/16/14

C10-C28 (DRO) 477 50 mg/kg 488 37.8 90.0 50-148 1.59 13

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

Project: Koehler Frank 13-27
Project Number: [none]
Project Manager: Brandon Bruns

Reported:
01/22/14 18:30

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 1401060 - EPA 5030 Soil MS

Blank (1401060-BLK1)

Prepared & Analyzed: 01/15/14

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	0.0404		"	0.0397	102	23-173				
Surrogate: Toluene-d8	0.0390		"	0.0400	97.5	20-170				
Surrogate: 4-Bromofluorobenzene	0.0385		"	0.0400	96.2	21-167				

LCS (1401060-BS1)

Prepared & Analyzed: 01/15/14

Naphthalene	ND	0.010	mg/kg			66-138				
Benzene	0.123	0.0020	"	0.0994	124	58-130				
Toluene	0.114	0.0050	"	0.0994	115	61-134				
Ethylbenzene	0.121	0.0050	"	0.0994	122	74-139				
m,p-Xylene	0.242	0.010	"	0.199	122	73-137				
o-Xylene	0.118	0.0050	"	0.0994	119	73-141				
Surrogate: 1,2-Dichloroethane-d4	0.0401		"	0.0395	102	23-173				
Surrogate: Toluene-d8	0.0387		"	0.0398	97.3	20-170				
Surrogate: 4-Bromofluorobenzene	0.0388		"	0.0398	97.5	21-167				

Matrix Spike (1401060-MS1)

Source: 1401063-03

Prepared & Analyzed: 01/15/14

Naphthalene	ND	0.010	mg/kg		ND	10-158				
Benzene	0.100	0.0020	"	0.0962	ND	30-131				
Toluene	0.0956	0.0050	"	0.0962	ND	30-134				
Ethylbenzene	0.106	0.0050	"	0.0962	ND	22-153				
m,p-Xylene	0.212	0.010	"	0.192	ND	10-159				
o-Xylene	0.106	0.0050	"	0.0962	ND	31-151				
Surrogate: 1,2-Dichloroethane-d4	0.0390		"	0.0382	102	23-173				
Surrogate: Toluene-d8	0.0377		"	0.0385	98.1	20-170				
Surrogate: 4-Bromofluorobenzene	0.0375		"	0.0385	97.5	21-167				

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Denver CO, 80203

Project: Koehler Frank 13-27

Project Number: [none]
Project Manager: Brandon Brunns

Reported:
01/22/14 18:30

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 1401060 - EPA 5030 Soil MS

Matrix Spike Dup (1401060-MSD1)		Source: 1401063-03			Prepared & Analyzed: 01/15/14					
Naphthalene	ND	0.010	mg/kg		ND		10-158		42	
Benzene	0.0954	0.0020	"	0.0951	ND	100	30-131	5.13	34	
Toluene	0.0912	0.0050	"	0.0951	ND	96.0	30-134	4.71	30	
Ethylbenzene	0.103	0.0050	"	0.0951	ND	108	22-153	3.18	24	
m,p-Xylene	0.202	0.010	"	0.190	ND	106	10-159	4.99	68	
o-Xylene	0.101	0.0050	"	0.0951	ND	106	31-151	4.54	38	
Surrogate: 1,2-Dichloroethane-d4	0.0386		"	0.0377		102	23-173			
Surrogate: Toluene-d8	0.0368		"	0.0380		96.8	20-170			
Surrogate: 4-Bromofluorobenzene	0.0376		"	0.0380		98.8	21-167			

Summit Scientific

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1775 Sherman St. STE. 3000
Denver CO, 80203

Project: Koehler Frank 13-27

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
01/22/14 18:30

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

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