PDC Energy, Inc.

First Quarter 2019 Groundwater Monitoring Summary

April 24, 2019

Former Swanson 34-20 Tank Battery
SWSE Section 20 T6N R66W
Spill Point ID # 436120
Remediation # 11750

This groundwater monitoring summary has been prepared by Tasman Geosciences, Inc. for the former Swanson 34-20 tank battery. On March 4, 2019, groundwater monitoring was conducted at all five monitoring well locations (BH01 – BH05). Five groundwater samples were submitted to Summit Scientific Laboratory for analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) by USEPA Method 8260B.

First quarter 2019 analytical results indicate that BTEX concentrations are below applicable COGCC Table 910-1 groundwater standards in all monitoring well locations

Monitored natural attenuation (MNA) was selected as the remediation strategy for this site during the third quarter 2018 and will remain the selected remediation strategy for the second quarter 2019.

Second quarter 2019 groundwater sampling will be conducted during June 2019. Sample locations and corresponding analytical results are illustrated on Figure 1. Groundwater elevation data is presented on Figure 2. Analytical results are summarized in Table 1. The laboratory report is included as Attachment A.

BH03		
Compound (µg/L)	12/17/2018	3/4/2019
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<2.0	<2.0
Depth to Water (ft. bgs)	6.79	7.76

BH04		
Compound (µg/L)	12/17/2018	3/4/2019
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<2.0	<2.0
Depth to Water (ft. bgs)	7.63	8.60

BH02		
Compound (µg/L)	12/17/2018	3/4/2019
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<2.0	<2.0
Depth to Water (ft. bgs)	6.25	7.18

BH01		
Compound (µg/L)	12/17/2018	3/4/2019
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<2.0	<2.0
Depth to Water (ft. bgs)	6.75	7.72

BH05		
Compound (µg/L)	12/17/2018	3/4/2019
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<2.0	<2.0
Depth to Water (ft. bgs)	7.37	8.28

DATE: April 3, 2019
DESIGNED BY: C. Hamlin
DRAWN BY: K. Chritz

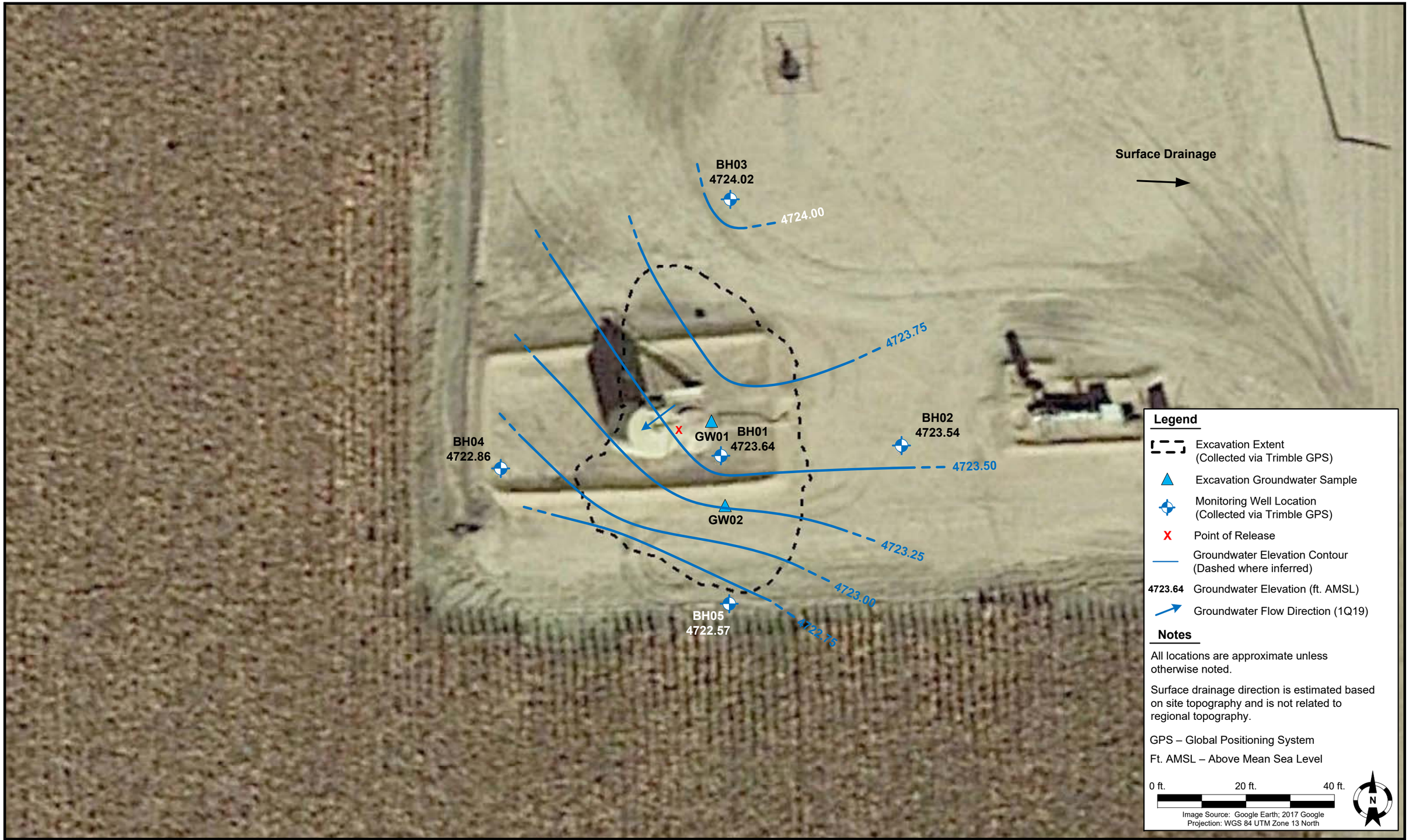
TASMAN GEOSCIENCES

Tasman Geosciences, Inc.
6899 Pecos Street – Unit C
Denver, CO 80221

PDC Energy, Inc. – DJ Basin
Former Swanson 34-20 Tank Battery
SWSE, Section 20, Township 6 North, Range 66 West
Weld County, Colorado

GROUNDWATER ANALYICAL RESULTS MAP

FIGURE 1



Legend

- Excavation Extent (Collected via Trimble GPS)
- Excavation Groundwater Sample
- Monitoring Well Location (Collected via Trimble GPS)
- X — Point of Release
- Groundwater Elevation Contour (Dashed where inferred)
- 4723.64 — Groundwater Elevation (ft. AMSL)
- Groundwater Flow Direction (1Q19)

Notes

All locations are approximate unless otherwise noted.

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

GPS – Global Positioning System

Ft. AMSL – Above Mean Sea Level

0 ft. 20 ft. 40 ft.

N

Image Source: Google Earth; 2017 Google
Projection: WGS 84 UTM Zone 13 North

DATE:	April 8, 2019
DESIGNED BY:	C. Hamlin
DRAWN BY:	C. Olson

TASMAN GEOSCIENCES

Tasman Geosciences, Inc.
6899 Pecos Street – Unit C
Denver, CO 80221

PDC Energy, Inc. – DJ Basin
Former Swanson 34-20 Tank Battery
SWSE, Section 20, Township 6 North, Range 66 West
Weld County, Colorado

GROUNDWATER ELEVATION CONTOUR FIGURE

FIGURE 2

TABLE 1
FORMER SWANSON 34-20 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 [2] (feet)	Groundwater Elevation (ft AMSL)
COGCC Table 910-1 Groundwater Standard (µg/L)[1]		**5**	**560**	**700**	**1,400**		
GW01	8/17/2018	**13**	<1.0	<1.0	<2.0	~ 8.0	NM
GW02	8/22/2018	**72**	<1.0	25	490	~ 8.0	NM
BH01	9/28/2018	3.8	<1.0	16	67	4.97	4726.39
BH01	12/17/2018	<1.0	<1.0	<1.0	<2.0	6.75	4724.61
BH01	3/4/2019	<1.0	<1.0	<1.0	<2.0	7.72	4723.64
BH02	9/28/2018	<1.0	<1.0	<1.0	<2.0	4.48	4726.24
BH02	12/17/2018	<1.0	<1.0	<1.0	<2.0	6.25	4724.47
BH02	3/4/2019	<1.0	<1.0	<1.0	<2.0	7.18	4723.54
BH03	9/28/2018	<1.0	<1.0	<1.0	<2.0	4.90	4726.88
BH03	12/17/2018	<1.0	<1.0	<1.0	<2.0	6.79	4724.99
BH03	3/4/2019	<1.0	<1.0	<1.0	<2.0	7.76	4724.02
BH04	9/28/2018	<1.0	<1.0	<1.0	<2.0	5.84	4725.62
BH04	12/17/2018	<1.0	<1.0	<1.0	<2.0	7.63	4723.83
BH04	3/4/2019	<1.0	<1.0	<1.0	<2.0	8.60	4722.86
BH05	9/28/2018	<1.0	<1.0	<1.0	<2.0	5.67	4725.18
BH05	12/17/2018	<1.0	<1.0	<1.0	<2.0	7.37	4723.48
BH05	3/4/2019	<1.0	<1.0	<1.0	<2.0	8.28	4722.57

Notes:

1. Groundwater standards referenced from 2 CCR 404-1, Table 910-1, effective May 1, 2018.
2. Depth to water measurements were collected from top of casing and adjusted using survey data to reflect depth of water from ground surface.

COGCC = Colorado Oil and Gas Conservation Commission
µg/L = Micrograms per liter
(<) = Analytical result is less than the indicated laboratory reporting limit.
ft AMSL = Feet Above Mean Sea Level
NM = Not Measured
BOLD = Analytical result is in exceedance of COGCC groundwater standards.

ATTACHMENT A

Summit Scientific

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

March 07, 2019

Mark Longhurst

PDC Energy

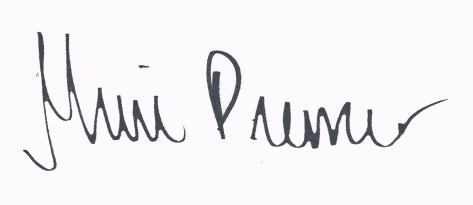
1775 Sherman St. STE. 3000

Denver, CO 80203

RE: Swanson 34-20

Enclosed are the results of analyses for samples received by Summit Scientific on 03/04/19 17:50. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Muri Premer For Paul Shrewsbury

President

S2

PDC Energy	Project: Swanson 34-20	
1775 Sherman St. STE. 3000	Project Number: [none]	**Reported:**
Denver CO, 80203	Project Manager: Mark Longhurst	03/07/19 11:07

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	1903017-01	Water	03/04/19 12:15	03/04/19 17:50
BH02	1903017-02	Water	03/04/19 12:00	03/04/19 17:50
BH03	1903017-03	Water	03/04/19 12:02	03/04/19 17:50
BH04	1903017-04	Water	03/04/19 11:44	03/04/19 17:50
BH05	1903017-05	Water	03/04/19 11:55	03/04/19 17:50

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.

1903017

Summit Scientific

741 Corporate Circle Suite I ♦ Golden, Colorado 80401
303-277-9310 ♦ 303-374-5933 Fax

Client:	PDC	Project Manager:	Mark Longhurst
Address:		E-Mail:	Mark.Longhurst@pdce.com
City/State/Zip:		Project Name:	Swanson 34-20
Phone:	Fax:	Project Number:	
Sampler Name:	Jake McCarver		

				Preservative				Matrix				Analyze For:								
Sample Description	Date Sampled	Time Sampled	Number of Containers	HCl	HNO_3	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)	BTEX (8260)								Special Instructions
BH01	3/4/2019	12:15	3	X				X				X								
BH02	3/4/2019	12:00	3	X				X				X								
BH03	3/4/2019	12:02	3	X				X				X								
BH04	3/4/2019	11:44	3	X				X				X								
BH05	3/4/2019	11:55	3	X				X				X								

Relinquished by:	Date/Time: 3/4/19 1745 1750	Received by:	Date/Time: 3.4.19 1750
Relinquished by:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Date/Time:	Received in Lab by:	Date/Time:

Turn Around Time (Check)

Same Day		72 Hours	
24 Hours		Standard	X
48 Hours			

Sample Integrity:

Temperature Upon Receipt: 2.8

Intact: Yes ✓ No

Sample Receipt Checklist

S2 Work Order 1903017

Client: PDC Client Project ID: Swanson 34-20

Shipped Via: H.D./P.U./FedEx/UPS/USPS/Other P.U. Airbill #: _____

Matrix (check all that apply): ____Air ____Soil/Solid ✓ Water ____Other:_____ (Describe)

Temp (°C)	2.8

Thermometer ID: 61857155-K

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature at 4°C +/- 2°C (1)? NOTE: If samples are delivered the same day of sampling, this requirement is met provided that there is evidence that cooling has begun.	✓			
Were all samples received intact (1)?	✓			
Was adequate sample volume provided (1)?	✓			
If custody seals are present, are they intact (1)?			✓	
Are samples with holding times due within 48 hours sample due within 48 hours present?			✓	
Is a chain-of-custody (COC) form present and filled out completely (1)?	✓			
Does the COC agree with the number and type of sample bottles received (1)?	✓			
Do the sample IDs on the bottle labels match the COC (1)?	✓			
Is the COC properly relinquished by the client w/ date and time recorded (1)?	✓			
For volatiles in water – is there headspace present? **If yes, contact client and note in narrative.**		✓		
Are samples preserved that require preservation **(excluding cooling)** (1)? Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect	✓			HCl
If samples are acid preserved for metals, is the pH ≤ 2(1)? Record the pH in Comments.			✓	
If dissolved metals are requested, were samples field filtered?			✓	
Additional Comments (if any):				

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

CP
Custodian Printed Name or Initials

Signature of Custodian

3.4.19 1810
Date/Time

S2

PDC Energy	Project: Swanson 34-20	
1775 Sherman St. STE. 3000	Project Number: [none]	**Reported:**
Denver CO, 80203	Project Manager: Mark Longhurst	03/07/19 11:07

BH01

1903017-01 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **03/04/19 12:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1903045	03/05/19	03/06/19	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **03/04/19 12:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		*114 %*	*23-173*		"	"	"	"	
Surrogate: Toluene-d8		*101 %*	*20-170*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*91.8 %*	*21-167*		"	"	"	"	

S2

PDC Energy	Project: Swanson 34-20	
1775 Sherman St. STE. 3000	Project Number: [none]	**Reported:**
Denver CO, 80203	Project Manager: Mark Longhurst	03/07/19 11:07

BH02

1903017-02 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **03/04/19 12:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1903045	03/05/19	03/06/19	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **03/04/19 12:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		*123 %*	*23-173*		"	"	"	"	
Surrogate: Toluene-d8		*101 %*	*20-170*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*92.7 %*	*21-167*		"	"	"	"	

S2

PDC Energy	Project: Swanson 34-20	
1775 Sherman St. STE. 3000	Project Number: [none]	**Reported:**
Denver CO, 80203	Project Manager: Mark Longhurst	03/07/19 11:07

BH03

1903017-03 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **03/04/19 12:02**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1903045	03/05/19	03/06/19	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **03/04/19 12:02**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		*123 %*	*23-173*		"	"	"	"	
Surrogate: Toluene-d8		*105 %*	*20-170*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*95.3 %*	*21-167*		"	"	"	"	

S2

PDC Energy	Project: Swanson 34-20	
1775 Sherman St. STE. 3000	Project Number: [none]	**Reported:**
Denver CO, 80203	Project Manager: Mark Longhurst	03/07/19 11:07

BH04

1903017-04 (Water)

Summit Scientific

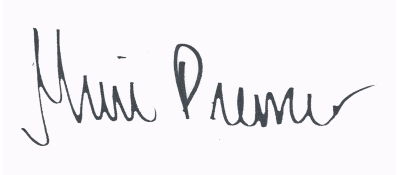
Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **03/04/19 11:44**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1903045	03/05/19	03/06/19	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **03/04/19 11:44**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		*116 %*	*23-173*		"	"	"	"	
Surrogate: Toluene-d8		*105 %*	*20-170*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*93.5 %*	*21-167*		"	"	"	"	



S2

PDC Energy	Project: Swanson 34-20	
1775 Sherman St. STE. 3000	Project Number: [none]	**Reported:**
Denver CO, 80203	Project Manager: Mark Longhurst	03/07/19 11:07

BH05

1903017-05 (Water)

Summit Scientific

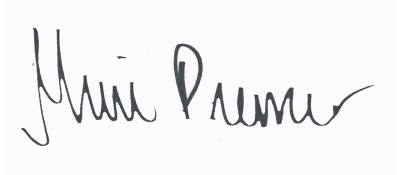
Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **03/04/19 11:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1903045	03/05/19	03/06/19	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **03/04/19 11:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		*108 %*	*23-173*		"	"	"	"	
Surrogate: Toluene-d8		*103 %*	*20-170*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*94.3 %*	*21-167*		"	"	"	"	



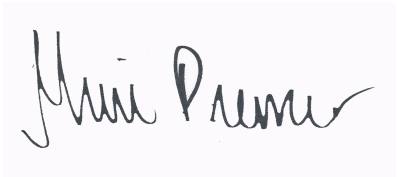
S2

PDC Energy	Project: Swanson 34-20	
1775 Sherman St. STE. 3000	Project Number: [none]	**Reported:**
Denver CO, 80203	Project Manager: Mark Longhurst	03/07/19 11:07

Volatile Organic Compounds by EPA Method 8260B - Quality Control

Summit Scientific

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1903045 - EPA 5030 Water MS										
Blank (1903045-BLK1)				Prepared & Analyzed: 03/05/19						
Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	2.0	"							
Surrogate: 1,2-Dichloroethane-d4	*12.8*		*"*	*13.3*		*96.0*	*23-173*			
Surrogate: Toluene-d8	*13.2*		*"*	*13.3*		*99.3*	*20-170*			
Surrogate: 4-Bromofluorobenzene	*12.8*		*"*	*13.3*		*96.1*	*21-167*			
LCS (1903045-BS1)				Prepared: 03/05/19 Analyzed: 03/06/19						
Benzene	36.5	1.0	ug/l	33.3		109	70-130			
Toluene	38.6	1.0	"	33.3		116	70-130			
Ethylbenzene	41.6	1.0	"	33.3		125	70-130			
m,p-Xylene	77.5	2.0	"	66.7		116	70-130			
o-Xylene	37.5	1.0	"	33.3		113	70-130			
Surrogate: 1,2-Dichloroethane-d4	*13.4*		*"*	*13.3*		*101*	*23-173*			
Surrogate: Toluene-d8	*14.4*		*"*	*13.3*		*108*	*20-170*			
Surrogate: 4-Bromofluorobenzene	*12.8*		*"*	*13.3*		*96.0*	*21-167*			
Matrix Spike (1903045-MS1)	**Source: 1903017-01**			Prepared: 03/05/19 Analyzed: 03/06/19						
Benzene	33.6	1.0	ug/l	33.3	ND	101	70-130			
Toluene	34.4	1.0	"	33.3	ND	103	70-130			
Ethylbenzene	38.2	1.0	"	33.3	ND	114	70-130			
m,p-Xylene	71.0	2.0	"	66.7	ND	107	70-130			
o-Xylene	34.7	1.0	"	33.3	ND	104	70-130			
Surrogate: 1,2-Dichloroethane-d4	*15.2*		*"*	*13.3*		*114*	*23-173*			
Surrogate: Toluene-d8	*13.4*		*"*	*13.3*		*100*	*20-170*			
Surrogate: 4-Bromofluorobenzene	*12.9*		*"*	*13.3*		*96.5*	*21-167*			



S2

PDC Energy	Project: Swanson 34-20	
1775 Sherman St. STE. 3000	Project Number: [none]	**Reported:**
Denver CO, 80203	Project Manager: Mark Longhurst	03/07/19 11:07

Volatile Organic Compounds by EPA Method 8260B - Quality Control

Summit Scientific

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1903045 - EPA 5030 Water MS										
Matrix Spike Dup (1903045-MSD1)	**Source: 1903017-01**			Prepared: 03/05/19 Analyzed: 03/06/19						
Benzene	36.5	1.0	ug/l	33.3	ND	109	70-130	8.10	30	
Toluene	38.1	1.0	"	33.3	ND	114	70-130	10.3	30	
Ethylbenzene	41.9	1.0	"	33.3	ND	126	70-130	9.32	30	
m,p-Xylene	79.1	2.0	"	66.7	ND	119	70-130	10.7	30	
o-Xylene	38.2	1.0	"	33.3	ND	115	70-130	9.63	30	
Surrogate: 1,2-Dichloroethane-d4	*16.2*		*"*	*13.3*		*121*	*23-173*			
Surrogate: Toluene-d8	*13.8*		*"*	*13.3*		*103*	*20-170*			
Surrogate: 4-Bromofluorobenzene	*13.0*		*"*	*13.3*		*97.7*	*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	Project: Swanson 34-20	
1775 Sherman St. STE. 3000	Project Number: [none]	**Reported:**
Denver CO, 80203	Project Manager: Mark Longhurst	03/07/19 11:07

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