

PDC Energy, Inc.
Fourth Quarter 2017 Groundwater Monitoring Summary

January 31, 2018

Nelson 11, 21-33 Tank Battery
NWNW Section 33 T5N R67W
Spill Point ID # 448930
Remediation # 10053

This groundwater monitoring summary has been prepared by Tasman Geosciences, Inc. for the Nelson 11, 21-33 tank battery. Per the Condition of Approval (COA) issued by the COGCC on August 2, 2017, groundwater elevation contours indicating groundwater flow direction are illustrated on the attached Figure 2. On October 2, 2017, groundwater monitoring was conducted at all ten monitoring well locations (BH01 – BH10). Ten groundwater samples were submitted to Summit Scientific Laboratory for analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) by USEPA Method 8260B. Analytical results are summarized in Table 1 and the laboratory report is included as Attachment A. Sample locations and corresponding analytical results are illustrated on Figure 1. Fourth quarter 2017 analytical results indicate that benzene concentrations are above the applicable COGCC Table 910-1 groundwater standards in monitoring wells BH03 and BH04. BTEX concentrations are below applicable regulatory standards in eight monitoring well locations.

Monitored natural attenuation (MNA) was selected as the remediation strategy for this site during the second quarter 2017. Due to persisting elevated benzene concentrations, enhanced fluid recovery (EFR)/ air sparge (AS) will be initiated as the selected remediation strategy beginning the first quarter 2018.

First quarter 2018 groundwater sampling will be conducted during January 2018.

COUNTY ROAD 52

BH07

BH06

BH02

BH08

BH03

BH01

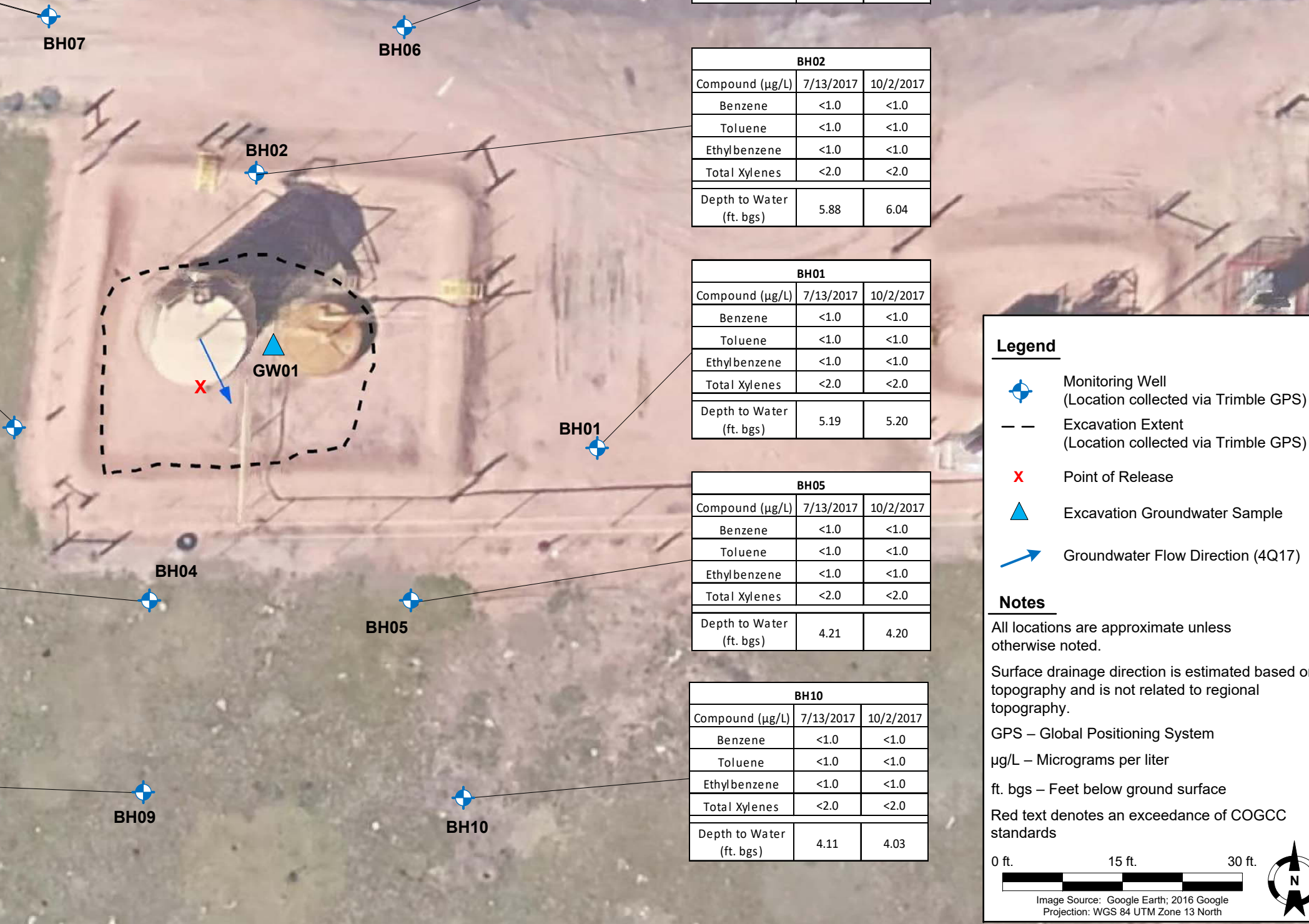
BH04

BH05

BH09

BH10

GW01



BH07		
Compound (µg/L)	7/13/2017	10/2/2017
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)	5.61	5.90

BH03		
Compound (µg/L)	7/13/2017	10/2/2017
Benzene	<1.0	13
Toluene	<1.0	6.6
Ethylbenzene	<1.0	<1.0
Total Xylenes	<2.0	7.1
Depth to Water (ft. bgs)	4.13	4.26

BH08		
Compound (µg/L)	7/13/2017	10/2/2017
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)	3.89	4.01

BH04		
Compound (µg/L)	7/13/2017	10/2/2017
Benzene	<1.0	63
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<2.0	16
Depth to Water (ft. bgs)	4.12	4.14

BH09		
Compound (µg/L)	7/13/2017	10/2/2017
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)	4.03	3.98

BH06		
Compound (µg/L)	7/13/2017	10/2/2017
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)	6.33	6.61

BH02		
Compound (µg/L)	7/13/2017	10/2/2017
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)	5.88	6.04

BH01		
Compound (µg/L)	7/13/2017	10/2/2017
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)	5.19	5.20

BH05		
Compound (µg/L)	7/13/2017	10/2/2017
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)	4.21	4.20

BH10		
Compound (µg/L)	7/13/2017	10/2/2017
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)	4.11	4.03

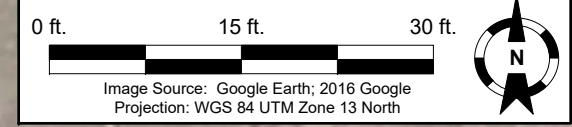
SURFACE DRAINAGE

Legend

- Monitoring Well (Location collected via Trimble GPS)
- Excavation Extent (Location collected via Trimble GPS)
- Point of Release
- Excavation Groundwater Sample
- Groundwater Flow Direction (4Q17)

Notes

All locations are approximate unless otherwise noted.
 Surface drainage direction is estimated based on topography and is not related to regional topography.
 GPS – Global Positioning System
 µg/L – Micrograms per liter
 ft. bgs – Feet below ground surface
 Red text denotes an exceedance of COGCC standards



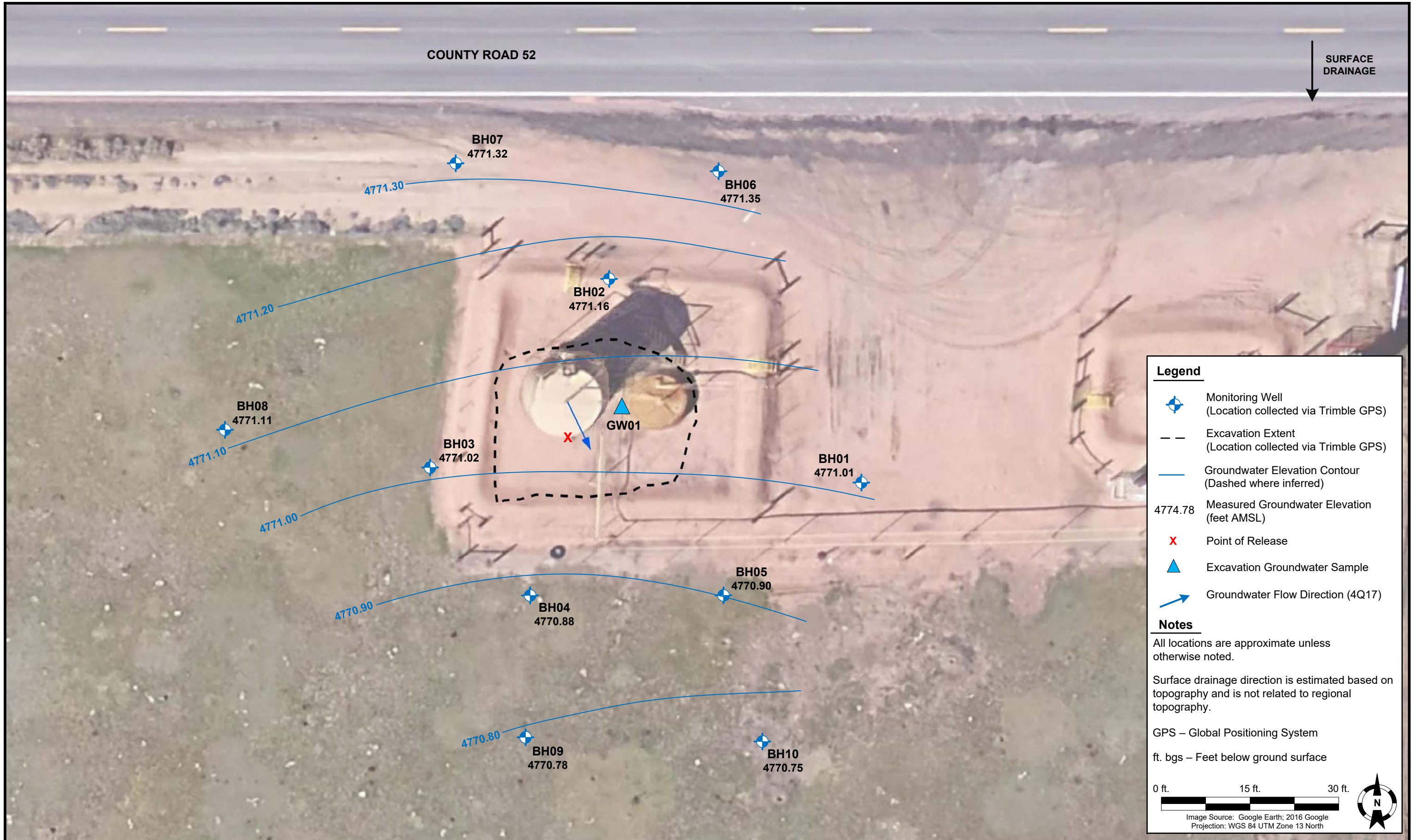
DATE: October 9, 2017
 DESIGNED BY: C. Hamlin
 DRAWN BY: C. Armbruster

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

PDC Energy, Inc. – DJ Basin
Nelson 11, 21-33 Tank Battery
 NWNW, Section 33, Township 5 North, Range 67 West
 Weld County, Colorado

GROUNDWATER ANALYTICAL RESULTS MAP

FIGURE 1



Legend

- Monitoring Well (Location collected via Trimble GPS)
- Excavation Extent (Location collected via Trimble GPS)
- Groundwater Elevation Contour (Dashed where inferred)
- 4774.78 Measured Groundwater Elevation (feet AMSL)
- Point of Release
- Excavation Groundwater Sample
- Groundwater Flow Direction (4Q17)

Notes

All locations are approximate unless otherwise noted.

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

GPS – Global Positioning System

ft. bgs – Feet below ground surface

0 ft. 15 ft. 30 ft.

Image Source: Google Earth; 2016 Google
Projection: WGS 84 UTM Zone 13 North

DATE: December 11, 2017

DESIGNED BY: C. Hamlin

DRAWN BY: B. Nelson



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

PDC Energy, Inc. – DJ Basin
Nelson 11, 21-33 Tank Battery
NWNW, Section 33, Township 5 North, Range 67 West
Weld County, Colorado

**GROUNDWATER
ELEVATION CONTOUR
MAP**

**FIGURE
2**

TABLE 1
NELSON 11, 21-33 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)
COGCC Table 910-1 Groundwater Standard (µg/L) ⁽¹⁾		5	560	700	1,400	
GW01	2/6/2017	210	350	6.2	360	~ 10
BH01	6/5/2017	<1.0	<1.0	<1.0	<2.0	6.80
BH01	7/13/2017	<1.0	<1.0	<1.0	<2.0	5.19
BH01	10/2/2017	<1.0	<1.0	<1.0	<2.0	5.20
BH02	6/5/2017	44	160	5.3	80	7.62
BH02	7/13/2017	<1.0	<1.0	<1.0	<2.0	5.88
BH02	10/2/2017	<1.0	<1.0	<1.0	<2.0	6.04
BH03	6/5/2017	61	310	10	160	5.78
BH03	7/13/2017	<1.0	<1.0	<1.0	<2.0	4.13
BH03	10/2/2017	13	6.6	<1.0	7.1	4.26
BH04	6/5/2017	220	690	18	260	5.62
BH04	7/13/2017	<1.0	<1.0	<1.0	<2.0	4.12
BH04	10/2/2017	63	<1.0	<1.0	16	4.14
BH05	6/5/2017	450	24	<1.0	26	5.71
BH05	7/13/2017	<1.0	<1.0	<1.0	<2.0	4.21
BH05	10/2/2017	<1.0	<1.0	<1.0	<2.0	4.20
BH06	7/13/2017	<1.0	<1.0	<1.0	<2.0	6.33
BH06	10/2/2017	<1.0	<1.0	<1.0	<2.0	6.61
BH07	7/13/2017	<1.0	<1.0	<1.0	<2.0	5.61
BH07	10/2/2017	<1.0	<1.0	<1.0	<2.0	5.90
BH08	7/13/2017	<1.0	<1.0	<1.0	<2.0	3.89
BH08	10/2/2017	<1.0	<1.0	<1.0	<2.0	4.01
BH09	7/13/2017	<1.0	<1.0	<1.0	<2.0	4.03
BH09	10/2/2017	<1.0	<1.0	<1.0	<2.0	3.98
BH10	7/13/2017	<1.0	<1.0	<1.0	<2.0	4.11
BH10	10/2/2017	<1.0	<1.0	<1.0	<2.0	4.03

TABLE 1
NELSON 11, 21-33 TANK BATTERY
GROUNDWATER ANALYTICAL RESULTS SUMMARY TABLE

Notes:

1. Groundwater standards referenced from 2 CCR 404-1, Table 910-1, effective January 30, 2015.
2. Depth to water measurements were measured from top of well casing or ground surface for monitoring well samples and excavation samples, respectively. Subsequent monitoring well measurements were collected from top of casing and adjusted using survey data and product of thickness 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.

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

October 08, 2017

Mark Longhurst
PDC Energy
1775 Sherman St. STE. 3000
Denver, CO 80203
RE: Nelson 11, 21-33

Enclosed are the results of analyses for samples received by Summit Scientific on 10/02/17 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 'Ben Shrewsbury', with a long, sweeping horizontal line extending to the right.

Ben Shrewsbury
Laboratory Manager



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

Project: Nelson 11, 21-33

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
10/08/17 16:53

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	1710003-01	Water	10/02/17 12:10	10/02/17 17:00
BH02	1710003-02	Water	10/02/17 12:37	10/02/17 17:00
BH03	1710003-03	Water	10/02/17 13:25	10/02/17 17:00
BH04	1710003-04	Water	10/02/17 13:50	10/02/17 17:00
BH05	1710003-05	Water	10/02/17 13:18	10/02/17 17:00
BH06	1710003-06	Water	10/02/17 12:22	10/02/17 17:00
BH07	1710003-07	Water	10/02/17 12:12	10/02/17 17:00
BH08	1710003-08	Water	10/02/17 13:09	10/02/17 17:00
BH09	1710003-09	Water	10/02/17 13:33	10/02/17 17:00
BH10	1710003-10	Water	10/02/17 13:03	10/02/17 17:00


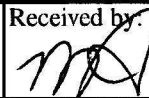
Summit Scientific

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.

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

Client: PDC
Address: _____
City/State/Zip: _____
Phone: _____ Fax: _____
Sampler Name: Tyler Blessisng

Project Manager: Mark Longhurst
E-Mail: Mark.Longhurst@pdce.com
Project Name: Nelson 11, 21-33
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)	BTEX (8260)								
BH01	10/2/2017	12:10	3			X		X				X								
BH02	10/2/2017	12:37	3			X		X				X								
BH03	10/2/2017	13:25	3			X		X				X								
BH04	10/2/2017	13:50	3			X		X				X								
BH05	10/2/2017	13:18	3			X		X				X								
BH06	10/2/2017	12:22	3			X		X				X								
BH07	10/2/2017	12:12	3			X		X				X								
BH08	10/2/2017	13:09	3			X		X				X								
BH09	10/2/2017	13:33	3			X		X				X								
BH10	10/2/2017	13:03	3			X		X				X								
Relinquished by: 				Date/Time: 10/2/17 1700				Received by: 				Date/Time: 10/2/17 1700				Turn Around Time (Check)				Notes: on ice
												Same Day <input type="checkbox"/> 72 Hours <input type="checkbox"/>								
												24 Hours <input type="checkbox"/> Standard <input checked="" type="checkbox"/>								
Relinquished by:				Date/Time:				Received by:				Date/Time:				48 Hours <input type="checkbox"/>				
Relinquished by:				Date/Time:				Received in Lab by:				Date/Time:				Sample Integrity:				
																Temperature Upon Receipt: 4.8°C				
																Intact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No				

1710003

Sample Receipt Checklist

S2 Work Order: _____

Client: PDC Client Project ID: Nelson 11, 21-33

Shipped Via: P/U Airbill #: _____
(UPS, FedEx, Hand Delivered, Pick-up, etc.)

Matrix (check all that apply): Air Soil/Solid Water Other: _____
(Describe)

Cooler ID				
Temp (°C)	4.8			

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.	<input checked="" type="checkbox"/>			
Were all samples received intact ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
If custody seals are present, are they intact ⁽¹⁾ ?			<input checked="" type="checkbox"/>	
Are short holding time analytes or samples with HTs due within 48 hours present?			<input checked="" type="checkbox"/>	
Is a chain-of-custody (COC) form present and filled out completely ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client w/ date and time recorded ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.		<input checked="" type="checkbox"/>		
Are samples preserved that require preservation (excluding cooling) ⁽¹⁾ ? Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect			<input checked="" type="checkbox"/>	
If samples are acid preserved for metals, is the pH ≤ 2 ⁽¹⁾ ? Record the pH in Comments.			<input checked="" type="checkbox"/>	
If dissolved metals are requested, were samples field filtered?			<input checked="" type="checkbox"/>	
Additional Comments (if any):				
⁽¹⁾ If NO, then contact the client before proceeding with analysis and note in case narrative.				

Nakita
Custodian Printed Name

[Signature]
Signature or Initials of Custodian

10/2/17 1745
Date/Time



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

Project: Nelson 11, 21-33

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 10/08/17 16:53

BH01
1710003-01 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/02/17 12:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1710018	10/04/17	10/04/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **10/02/17 12:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		<i>140 %</i>	<i>37-154</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: Toluene-d8</i>		<i>96.1 %</i>	<i>45-149</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>		<i>95.0 %</i>	<i>45-146</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	

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: Nelson 11, 21-33

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 10/08/17 16:53

BH02
1710003-02 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/02/17 12:37**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1710018	10/06/17	10/06/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **10/02/17 12:37**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		105 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		66.1 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		96.4 %	45-146		"	"	"	"	

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: Nelson 11, 21-33

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 10/08/17 16:53

BH03
1710003-03 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/02/17 13:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	13	1.0	ug/l	1	1710018	10/06/17	10/06/17	EPA 8260B	
Toluene	6.6	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	7.1	2.0	"	"	"	"	"	"	

Date Sampled: **10/02/17 13:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		123 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		76.0 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		95.9 %	45-146		"	"	"	"	

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: Nelson 11, 21-33

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 10/08/17 16:53

BH04
1710003-04 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/02/17 13:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	63	1.0	ug/l	1	1710018	10/06/17	10/06/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	16	2.0	"	"	"	"	"	"	

Date Sampled: **10/02/17 13:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		105 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		96.6 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		97.0 %	45-146		"	"	"	"	

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: Nelson 11, 21-33

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 10/08/17 16:53

BH05
1710003-05 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/02/17 13:18**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1710018	10/06/17	10/06/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **10/02/17 13:18**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		106 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		64.9 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.8 %	45-146		"	"	"	"	

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: Nelson 11, 21-33

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 10/08/17 16:53

BH06
1710003-06 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/02/17 12:22**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1710018	10/05/17	10/05/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **10/02/17 12:22**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		97.2 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		109 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.2 %	45-146		"	"	"	"	

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: Nelson 11, 21-33

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 10/08/17 16:53

BH07
1710003-07 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/02/17 12:12**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1710018	10/05/17	10/05/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **10/02/17 12:12**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		108 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		105 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.5 %	45-146		"	"	"	"	

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: Nelson 11, 21-33

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 10/08/17 16:53

BH08
1710003-08 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/02/17 13:09**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1710018	10/05/17	10/05/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **10/02/17 13:09**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		110 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		102 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.5 %	45-146		"	"	"	"	

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: Nelson 11, 21-33

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 10/08/17 16:53

BH09
1710003-09 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/02/17 13:33**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1710018	10/05/17	10/05/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **10/02/17 13:33**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		112 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		101 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.1 %	45-146		"	"	"	"	

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: Nelson 11, 21-33

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 10/08/17 16:53

BH10
1710003-10 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/02/17 13:03**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1710018	10/05/17	10/05/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **10/02/17 13:03**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		108 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		94.7 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.2 %	45-146		"	"	"	"	

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: Nelson 11, 21-33

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
10/08/17 16:53

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 1710018 - EPA 5030 Water MS

Blank (1710018-BLK1)

Prepared & Analyzed: 10/04/17

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	2.0	"							
Surrogate: 1,2-Dichloroethane-d4	12.7		"	13.3		95.6	37-154			
Surrogate: Toluene-d8	10.7		"	13.3		80.0	45-149			
Surrogate: 4-Bromofluorobenzene	13.0		"	13.3		97.4	45-146			

LCS (1710018-BS1)

Prepared & Analyzed: 10/04/17

Benzene	43.0	1.0	ug/l	33.3		129	51-132			
Toluene	32.2	1.0	"	33.3		96.6	51-138			
Ethylbenzene	36.4	1.0	"	33.1		110	58-146			
m,p-Xylene	66.9	2.0	"	66.5		101	57-144			
o-Xylene	33.2	1.0	"	32.7		102	53-146			
Surrogate: 1,2-Dichloroethane-d4	16.9		"	13.3		126	37-154			
Surrogate: Toluene-d8	12.6		"	13.3		94.1	45-149			
Surrogate: 4-Bromofluorobenzene	13.2		"	13.3		99.1	45-146			

Matrix Spike (1710018-MS1)

Source: 1710003-01

Prepared & Analyzed: 10/04/17

Benzene	39.3	1.0	ug/l	33.3	ND	118	34-141			
Toluene	31.7	1.0	"	33.3	ND	95.0	27-151			
Ethylbenzene	42.2	1.0	"	33.1	ND	128	29-160			
m,p-Xylene	77.5	2.0	"	66.5	ND	116	20-166			
o-Xylene	38.4	1.0	"	32.7	ND	117	33-159			
Surrogate: 1,2-Dichloroethane-d4	15.1		"	13.3		113	37-154			
Surrogate: Toluene-d8	13.5		"	13.3		101	45-149			
Surrogate: 4-Bromofluorobenzene	12.9		"	13.3		96.6	45-146			

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: Nelson 11, 21-33

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 10/08/17 16:53

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 1710018 - EPA 5030 Water MS

Matrix Spike Dup (1710018-MSD1)	Source: 1710003-01			Prepared & Analyzed: 10/04/17						
Benzene	37.0	1.0	ug/l	33.3	ND	111	34-141	5.97	32	
Toluene	29.5	1.0	"	33.3	ND	88.5	27-151	7.03	25	
Ethylbenzene	42.0	1.0	"	33.1	ND	127	29-160	0.452	50	
m,p-Xylene	76.5	2.0	"	66.5	ND	115	20-166	1.21	36	
o-Xylene	38.2	1.0	"	32.7	ND	117	33-159	0.340	26	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>14.3</i>		<i>"</i>	<i>13.3</i>		<i>107</i>	<i>37-154</i>			
<i>Surrogate: Toluene-d8</i>	<i>10.3</i>		<i>"</i>	<i>13.3</i>		<i>77.6</i>	<i>45-149</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>12.8</i>		<i>"</i>	<i>13.3</i>		<i>95.9</i>	<i>45-146</i>			

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: Nelson 11, 21-33

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
10/08/17 16:53

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