



PDC Energy, Inc.
Third Quarter 2022 Groundwater Monitoring Summary

October 4, 2022

Former Willman 42-16 Wellhead
SENE Section 16 T4N R65W
Remediation # 18936

This groundwater monitoring summary has been prepared by Tasman, Inc. for the former Willman 42-16 Wellhead.

Site History and Background

On September 30, 2021, a historic hydrocarbon release was discovered at the wellhead location during decommissioning activities. Following the discovery, mitigation activities were initiated, and on October 7, 2021, approximately 35 cubic yards of impacted material were removed from the former excavation. During excavation activities, groundwater was encountered in the excavation at approximately 6 feet below ground surface (bgs). Groundwater vacuum recovery operations were conducted concurrent with excavation activities and approximately 5 barrels of groundwater were removed from site. On June 7, 2022, five monitoring wells (BH01 – BH05) were installed via hand auger to confirm the absence of dissolved-phase hydrocarbon impacts within and adjacent to the former excavation extent.

Groundwater Monitoring Activities

On September 22, 2022, groundwater monitoring was conducted at all five monitoring wells (BH01 – BH05). Five groundwater samples were submitted to Summit Scientific Laboratories for analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, 1,2,4-trimethylbenzene (TMB), 1,3,5-TMB by EPA Method 8260B, chloride and sulfate anions by EPA Method 300.0 and total dissolved solids (TDS) by Method SM 2540C.

Third quarter 2022 analytical results indicated that organic constituent concentrations were in compliance with the applicable COGCC Table 915-1 groundwater standards in all monitoring well locations. Additionally, inorganic parameters were in compliance with the applicable regulatory standards or within 1.25x the background concentrations of the up- and cross-gradient monitoring wells (BH02 and BH03) in all five monitoring well locations. Sample locations and corresponding analytical results are illustrated on Figures 1 and 2. Groundwater elevation data is illustrated on Figure 3. Groundwater analytical results are summarized in Tables 1 and 2. The laboratory analytical report is included as Attachment A.

Current Remediation Activities and Path Forward

Monitored natural attenuation (MNA) was selected as the remediation strategy for this site during the second quarter 2022 and will remain the selected remediation strategy through the fourth quarter 2022.

Fourth quarter 2022 groundwater sampling will be conducted in December 2022.

BH01		
Compound (µg/L)	6/10/2022	9/22/2022
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<2.0	<2.0
Naphthalene	<1.0	<1.0
1, 2, 4-TMB	<1.0	<1.0
1, 3, 5-TMB	<1.0	<1.0
Depth to Water (ft. bgs)	3.50	0.35

BH02		
Compound (µg/L)	6/10/2022	9/22/2022
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<2.0	<2.0
Naphthalene	<1.0	<1.0
1, 2, 4-TMB	<1.0	<1.0
1, 3, 5-TMB	<1.0	<1.0
Depth to Water (ft. bgs)	3.56	0.38

BH03		
Compound (µg/L)	6/10/2022	9/22/2022
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<2.0	<2.0
Naphthalene	<1.0	<1.0
1, 2, 4-TMB	<1.0	<1.0
1, 3, 5-TMB	<1.0	<1.0
Depth to Water (ft. bgs)	3.61	0.25

BH04		
Compound (µg/L)	6/10/2022	9/22/2022
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<2.0	<2.0
Naphthalene	<1.0	<1.0
1, 2, 4-TMB	<1.0	<1.0
1, 3, 5-TMB	<1.0	<1.0
Depth to Water (ft. bgs)	3.59	0.42

BH05		
Compound (µg/L)	6/10/2022	9/22/2022
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<2.0	<2.0
Naphthalene	<1.0	<1.0
1, 2, 4-TMB	<1.0	<1.0
1, 3, 5-TMB	<1.0	<1.0
Depth to Water (ft. bgs)	3.64	0.35

Legend

- Underground Flowline Location (Collected via Trimble GPS)
- - - Excavation Extent (Collected via Trimble GPS)
- ⊕ Monitoring Well Location (Collected via Trimble GPS)
- Groundwater Flow Direction (3Q22)

Notes

All locations are approximate unless otherwise noted.

µg/L – Micrograms per liter

TMB – Trimethylbenzene

ft. bgs – feet below ground surface

GPS – Global Positioning System

0 ft. 10 ft. 20 ft.

Image Source: Google Earth; July 2019
Projection: WGS 84 UTM Zone 13 North

DATE: October 4, 2022

DESIGNED BY: C. Hamlin

DRAWN BY: S. Anderson

Tasman, Inc.
6855 W. 119th Ave.
Broomfield, CO 80020

PDC Energy, Inc. – DJ Basin
Former Willman 42-16 Wellhead
SENE, Section 16, Township 4 North, Range 65 West
Weld County, Colorado

GROUNDWATER
ANALYTICAL RESULTS
MAP

FIGURE
1

Legend

- Underground Flowline Location (Collected via Trimble GPS)
- - - Excavation Extent (Collected via Trimble GPS)
- Monitoring Well Location (Collected via Trimble GPS)
- Groundwater Flow Direction (3Q22)

Notes

All locations are approximate unless otherwise noted.

mg/L – Milligrams per liter

TDS – Total Dissolved Solids

ft. bgs – Feet below ground surface

GPS – Global Positioning System

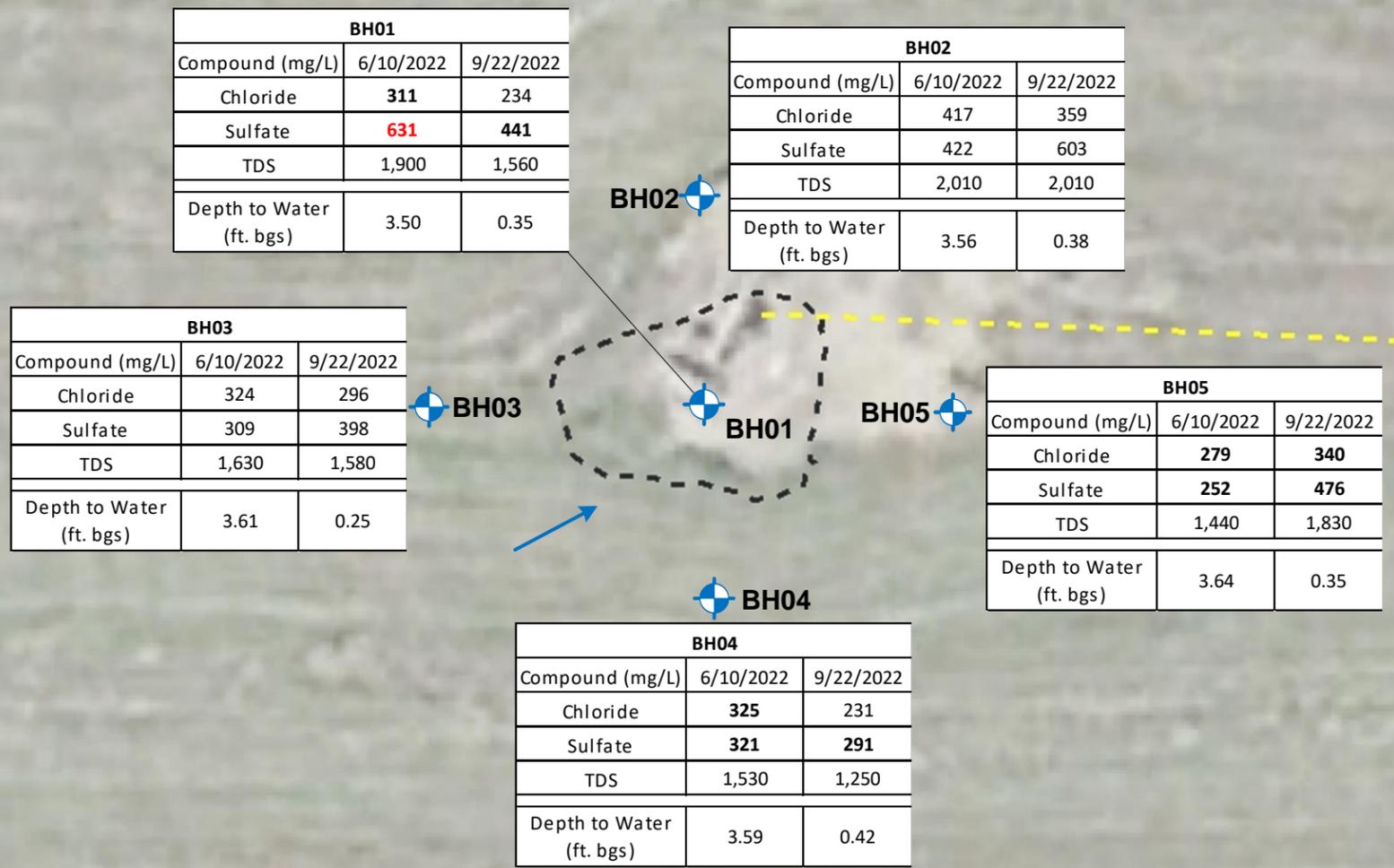
Red text – exceedances of COGCC Table 915-1 standards

Black Bold text – exceedances of COGCC Table 915-1 standards, but within 1.25x background concentrations

COGCC – Colorado Oil and Gas Conservation Commission

0 ft. 10 ft. 20 ft.

Image Source: Google Earth; July 2019
Projection: WGS 84 UTM Zone 13 North



DATE: October 4, 2022

DESIGNED BY: C. Hamlin

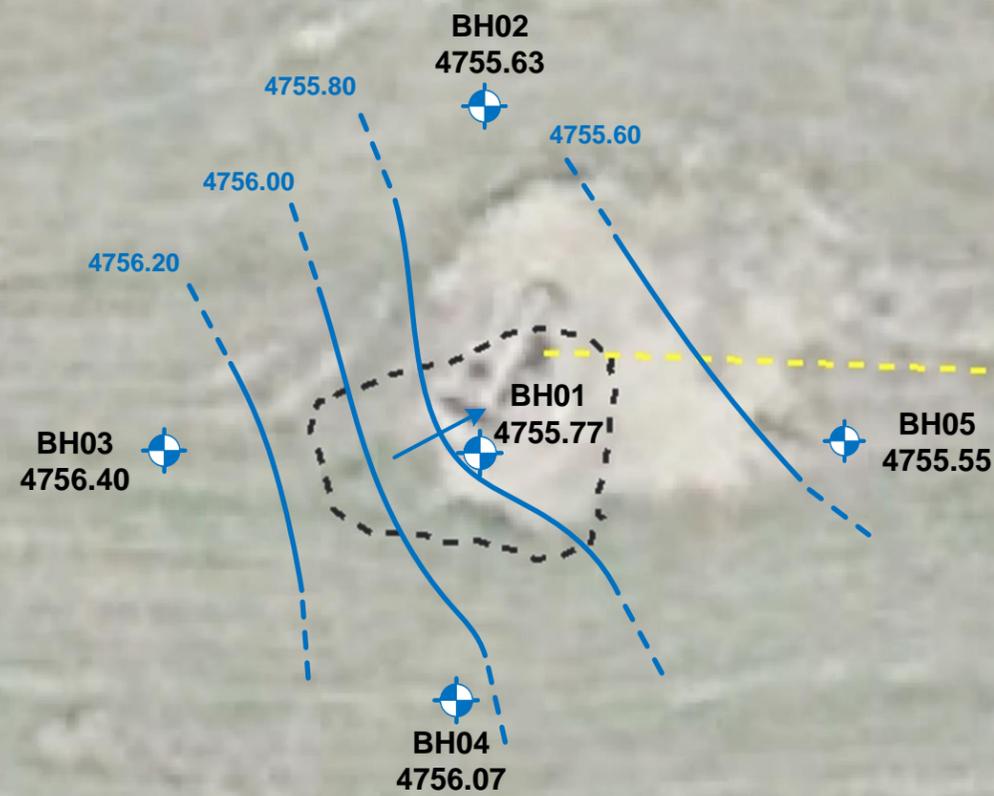
DRAWN BY: S. Anderson

Tasman, Inc.
6855 W. 119th Ave.
Broomfield, CO 80020

PDC Energy, Inc. – DJ Basin
Former Willman 42-16 Wellhead
SENE, Section 16, Township 4 North, Range 65 West
Weld County, Colorado

GROUNDWATER
ANALYTICAL RESULTS
MAP
(INORGANIC PARAMETERS)

FIGURE
2



Legend

-  Monitoring Well Location
(Collected via Trimble GPS)
-  Underground Flowline Location
(Collected via Trimble GPS)
-  Excavation Extent
(Collected via Trimble GPS)
-  Groundwater Elevation Contour
(Dashed where inferred)
- 4680.45** Groundwater Elevation (ft. AMSL)
-  Groundwater Flow Direction (3Q22)

Notes

All locations are approximate unless otherwise noted.

GPS – Global Positioning System

ft. AMSL – Feet Above Mean Sea Level

0 ft. 10 ft. 20 ft.



Image Source: Google Earth; July 2019
Projection: WGS 84 UTM Zone 13 North



DATE: October 14, 2022

DESIGNED BY: C. Hamlin

DRAWN BY: J. Marcus



PDC Energy, Inc. – DJ Basin
Former Willman 42-16 Wellhead
 SENE, Section 16, Township 4 North, Range 65 West
 Weld County, Colorado

**GROUNDWATER
 ELEVATION CONTOUR
 MAP (09/22/2022)**

**FIGURE
 3**

**TABLE 1
FORMER WILLMAN 42-16 WELLHEAD
GROUNDWATER ANALYTICAL RESULTS SUMMARY TABLE
ORGANIC COMPOUNDS**

Sample ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Naphthalene (µg/L)	1,2,4-TMB (µg/L)	1,3,5-TMB (µg/L)	Depth to Water ⁽²⁾ (ft.)	Groundwater Elevation (ft. AMSL)
COGCC Table 915-1 Groundwater Standard (µg/L) ⁽¹⁾		5	560	700	1,400	140	67	67	-	-
BH01	6/10/2022	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	3.50	4752.62
BH01	9/22/2022	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	0.35	4755.77
BH02	6/10/2022	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	3.56	4752.45
BH02	9/22/2022	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	0.38	4755.63
BH03	6/10/2022	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	3.61	4753.04
BH03	9/22/2022	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	0.25	4756.40
BH04	6/10/2022	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	3.59	4752.90
BH04	9/22/2022	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	0.42	4756.07
BH05	6/10/2022	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	3.64	4752.26
BH05	9/22/2022	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	0.35	4755.55

Notes:

1. Groundwater standards referenced from 2 CCR 404-1, Table 915-1, January 15, 2021.
 2. Depth to water measurements were measured from ground surface for excavation samples. Monitoring well measurements were collected from top of casing and adjusted using survey data to reflect depth of water from ground surface.
- TMB = Trimethylbenzene
COGCC = Colorado Oil and Gas Conservation Commission
µg/L = Micrograms per liter
(<) = Analytical result is less than the indicated laboratory reporting limit.
ft. = Feet
AMSL = Above Mean Sea Level

TABLE 2
FORMER WILLMAN 42-16 TANK BATTERY
GROUNDWATER ANALYTICAL RESULTS SUMMARY TABLE
INORGANIC PARAMETERS

Sample ID	Date Sampled	TDS (unit)	Chloride Ion (mg/L)	Sulfate Ion (mg/L)	Depth to Water ⁽²⁾ (ft.)	Groundwater Elevation (ft. AMSL)
COGCC Table 915-1 Groundwater Standard (mg/L) ⁽¹⁾		<1.25 x BCKG	250 or <1.25 x BCKG	250 or <1.25 x BCKG	-	-
BH01	6/10/2022	1,900	311	631	3.50	4752.62
BH01	9/22/2022	1,560	234	441	0.35	4755.77
BH02	6/10/2022	2,010	417	422	3.56	4752.45
BH02	9/22/2022	2,010	359	603	0.38	4755.63
BH03	6/10/2022	1,630	324	309	3.61	4753.04
BH03	9/22/2022	1,580	296	398	0.25	4756.40
BH04	6/10/2022	1,530	325	321	3.59	4752.90
BH04	9/22/2022	1,250	231	291	0.42	4756.07
BH05	6/10/2022	1,440	279	252	3.64	4752.26
BH05	9/22/2022	1,830	340	476	0.35	4755.55

Notes:

1. Groundwater standards referenced from 2 CCR 404-1, Table 915-1, January 15, 2021.
2. Depth to water measurements were measured from ground surface for excavation samples. Monitoring well measurements were collected from top of casing and adjusted using survey data to reflect depth of water from ground surface.

TDS = Total dissolved solids

COGCC = Colorado Oil and Gas Conservation Commission

BCKG = Background

mg/L = Milligrams per liter

(<) = Analytical result is less than the indicated laboratory reporting limit.

ft. = Feet

AMSL = Above Mean Sea Level

Up- / cross-gradient well locations used for background concentration.

BOLD = Analytical result is in exceedance of applicable standard and above 1.25x the background concentration.

BOLD = Analytical result is in exceedance of applicable standard but within 1.25x the background concentration.

Attachment A

Summit Scientific

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

October 03, 2022

Mark Longhurst

PDC Energy

1775 Sherman St. STE. 3000

Denver, CO 80203

RE: Willman 42-16 Wellhead

Work Order #2209473

Enclosed are the results of analyses for samples received by Summit Scientific on 09/22/22 18:03. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Mikayla Axtell For Paul Shrewsbury

President



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

Project: Willman 42-16 Wellhead

Project Number: [none]

Project Manager: Mark Longhurst

Reported:
10/03/22 13:23

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	2209473-01	Water	09/22/22 10:52	09/22/22 18:03
BH02	2209473-02	Water	09/22/22 11:04	09/22/22 18:03
BH03	2209473-03	Water	09/22/22 11:14	09/22/22 18:03
BH04	2209473-04	Water	09/22/22 11:24	09/22/22 18:03
BH05	2209473-05	Water	09/22/22 11:36	09/22/22 18:03

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.

Summit Scientific

S₂

2209473

4653 Table Mountain Drive ♦ Golden, Colorado 80403
303-277-9310 ♦ 303-374-5933 (f)

Client: PDC/Tasman Project Manager: Mark Longhurst
Address: 6855 W 119th Ave E-Mail: Mark.longhurst@pdce.com
City/State/Zip: Broomfield CO 80020
Phone: 303-487-1228 Project Name: *Willman 42-16 Wellhead*
Sampler Name: Chase Jonjak Project Number:

ID	Sample Description	Date Sampled	Time Sampled	# of containers	Preservative				Matrix				Analysis Requested							Special Instructions
					HCl	HNO3	None	Other	Water	Soil	Air-Canister #	Other	BTEXN -8260B	TPH-(C6-C36)	TMB's(1,2,4)&(1,3,5)	Boron - HWS	pH, EC, SAR	PAH - 915	Metals - 915	
1	BH01	9/22/2022	1052	4	3		1		X				X	X					X	
2	BH02		1104																	
3	BH03		1114																	
4	BH04		1124																	
5	BH05		1136																	
6																				
7																				
8																				
9																				
10																				

Relinquished by: <i>Chase J</i> Date/Time: 9/22/2022 1343	Received by: <i>Tasman Lockbox</i> Date/Time: 9/22/2022 1343	Turn Around Time (Check) Same Day ___ 72 hours 24 hours ___ Standard <input checked="" type="checkbox"/> 48 hours ___ Sample Integrity: Temperature Upon Receipt: <u>4.9</u> Samples Intact: <input checked="" type="checkbox"/> Yes No	Notes:
Relinquished by: <i>Tasman lockbox</i> Date/Time: 9/22/22 1803	Received by: <i>[Signature]</i> Date/Time: 9/22/22 1803		
Relinquished by: _____ Date/Time: _____	Received by: _____ Date/Time: _____		

S₂

Sample Receipt Checklist

S2 Work Order# 2209473

Client: Procterman Client Project ID: Willman 42-14 wellhead

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

Matrix (Check all that apply) Air Soil/Solid Water Other

Temp (°C) Thermometer #

	Yes	No	N/A	Comments (if any)
If samples require cooling, is the temperature < 6°C? ⁽¹⁾ NOTE: If samples are delivered the same day of sampling, this requirement is met if there is evidence that cooling has begun.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If custody seals are present, are they intact? ⁽¹⁾	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OUT OF CE
Are samples due within 48 hours present?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Are water samples with short hold times present? Note the short hold analysis in the comments column - pH, Nitrate/Nitrite, Ferrous Iron (Fe ²⁺), Hexavalent Chromium (Cr ⁶⁺ , Cr VI), COD/BOD, Total Coliform, E. Coli, Total Residual Chlorine (TRC), Dissolved Oxygen	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Is a chain-of-custody (COC) form present and filled out Completely? ⁽¹⁾	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is the COC properly relinquished by the client w/ date and time recorded? ⁽¹⁾	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all samples received intact? ⁽¹⁾	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was adequate sample volume provided? ⁽¹⁾	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the COC agree with the number and type of sample bottles received? ⁽¹⁾	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do the sample IDs on the bottle labels match the COC? ⁽¹⁾	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Are samples preserved that require preservation (excluding cooling)? ⁽¹⁾ Note the type of preservative in the comments column – HCl, H ₂ SO ₄ , NaOH, HNO ₃ , etc.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	HCl
If samples are acid preserved for metals, is the pH ≤ 2? ⁽¹⁾ Record the pH in Comments.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If dissolved metals are requested, were samples field filtered?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Additional Comments (if any):

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

[Signature]
Custodian Printed Name

8-22-22
Date/Time

19:50



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

Project: Willman 42-16 Wellhead

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
10/03/22 13:23

BH01
2209473-01 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/22/22 10:52**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	BF10677	09/26/22	09/28/22	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	
Naphthalene	ND	1.0		"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	1.0		"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	1.0		"	"	"	"	"	"	

Date Sampled: **09/22/22 10:52**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		86.8 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		137 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		91.4 %		21-167		"	"	"	"	

Anions by EPA Method 300.0

Date Sampled: **09/22/22 10:52**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Chloride	234	12.0		mg/L	200	BF10674	09/26/22	09/26/22	EPA 300.0	
Sulfate	441	60.0		"	"	"	"	"	"	

Total Dissolved Solids by SM2540C

Date Sampled: **09/22/22 10:52**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Total Dissolved Solids	1560	10.0		mg/L	1	BF10682	09/26/22	09/27/22	SM2540C	

Summit Scientific

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

Project: Willman 42-16 Wellhead

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
10/03/22 13:23

BH02
2209473-02 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/22/22 11:04**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	BF10677	09/26/22	09/28/22	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	
Naphthalene	ND	1.0		"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	1.0		"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	1.0		"	"	"	"	"	"	

Date Sampled: **09/22/22 11:04**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		87.7 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		114 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		90.2 %		21-167		"	"	"	"	

Anions by EPA Method 300.0

Date Sampled: **09/22/22 11:04**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Chloride	359	12.0		mg/L	200	BF10674	09/26/22	09/26/22	EPA 300.0	
Sulfate	603	60.0		"	"	"	"	"	"	

Total Dissolved Solids by SM2540C

Date Sampled: **09/22/22 11:04**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Total Dissolved Solids	2010	10.0		mg/L	1	BF10682	09/26/22	09/27/22	SM2540C	

Summit Scientific

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

Project: Willman 42-16 Wellhead

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
10/03/22 13:23

BH03
2209473-03 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/22/22 11:14**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	BF10677	09/26/22	09/28/22	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	
Naphthalene	ND	1.0		"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	1.0		"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	1.0		"	"	"	"	"	"	

Date Sampled: **09/22/22 11:14**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		84.6 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		105 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		91.3 %		21-167		"	"	"	"	

Anions by EPA Method 300.0

Date Sampled: **09/22/22 11:14**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Chloride	296	12.0		mg/L	200	BF10674	09/26/22	09/27/22	EPA 300.0	
Sulfate	398	60.0		"	"	"	"	"	"	

Total Dissolved Solids by SM2540C

Date Sampled: **09/22/22 11:14**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Total Dissolved Solids	1580	10.0		mg/L	1	BF10682	09/26/22	09/27/22	SM2540C	

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

Project: Willman 42-16 Wellhead

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
10/03/22 13:23

BH04
2209473-04 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/22/22 11:24**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	BF10677	09/26/22	09/28/22	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	
Naphthalene	ND	1.0		"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	1.0		"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	1.0		"	"	"	"	"	"	

Date Sampled: **09/22/22 11:24**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		70.5 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		120 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		91.7 %		21-167		"	"	"	"	

Anions by EPA Method 300.0

Date Sampled: **09/22/22 11:24**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Chloride	231	12.0		mg/L	200	BF10674	09/26/22	09/27/22	EPA 300.0	
Sulfate	291	60.0		"	"	"	"	"	"	

Total Dissolved Solids by SM2540C

Date Sampled: **09/22/22 11:24**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Total Dissolved Solids	1250	10.0		mg/L	1	BF10682	09/26/22	09/27/22	SM2540C	

Summit Scientific

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

Project: Willman 42-16 Wellhead

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
10/03/22 13:23

BH05
2209473-05 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/22/22 11:36**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	BF10677	09/26/22	09/28/22	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	
Naphthalene	ND	1.0		"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	1.0		"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	1.0		"	"	"	"	"	"	

Date Sampled: **09/22/22 11:36**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		88.1 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		162 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		86.1 %		21-167		"	"	"	"	

Anions by EPA Method 300.0

Date Sampled: **09/22/22 11:36**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Chloride	340	12.0		mg/L	200	BF10674	09/26/22	09/27/22	EPA 300.0	
Sulfate	476	60.0		"	"	"	"	"	"	

Total Dissolved Solids by SM2540C

Date Sampled: **09/22/22 11:36**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Total Dissolved Solids	1830	10.0		mg/L	1	BF10682	09/26/22	09/27/22	SM2540C	

Summit Scientific

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

Project: Willman 42-16 Wellhead

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
10/03/22 13:23

Volatile Organic Compounds by EPA Method 8260B - Quality Control

Summit Scientific

Analyte	Result	Reporting		Spike Level	Source		%REC		RPD		Notes
		Limit	Units		Result	%REC	Limits	RPD	Limit		

Batch BFI0677 - EPA 5030 Water MS

Blank (BFI0677-BLK1)

Prepared: 09/26/22 Analyzed: 09/28/22

Benzene	ND	1.0	ug/l								
Toluene	ND	1.0	"								
Ethylbenzene	ND	1.0	"								
Xylenes (total)	ND	2.0	"								
Naphthalene	ND	1.0	"								
1,2,4-Trimethylbenzene	ND	1.0	"								
1,3,5-Trimethylbenzene	ND	1.0	"								
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>11.2</i>		<i>"</i>	<i>13.3</i>		<i>83.9</i>		<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>15.0</i>		<i>"</i>	<i>13.3</i>		<i>113</i>		<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>12.1</i>		<i>"</i>	<i>13.3</i>		<i>90.8</i>		<i>21-167</i>			

LCS (BFI0677-BS1)

Prepared: 09/26/22 Analyzed: 09/28/22

Benzene	37.0	1.0	ug/l	41.7		88.7		51-132			
Toluene	46.2	1.0	"	41.7		111		51-138			
Ethylbenzene	44.2	1.0	"	41.7		106		58-146			
m,p-Xylene	91.6	2.0	"	83.3		110		57-144			
o-Xylene	43.8	1.0	"	41.7		105		53-146			
Naphthalene	36.5	1.0	"	41.7		87.5		70-130			
1,2,4-Trimethylbenzene	45.8	1.0	"	41.7		110		70-130			
1,3,5-Trimethylbenzene	45.5	1.0	"	41.7		109		70-130			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>11.8</i>		<i>"</i>	<i>13.3</i>		<i>88.4</i>		<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>15.8</i>		<i>"</i>	<i>13.3</i>		<i>118</i>		<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>12.3</i>		<i>"</i>	<i>13.3</i>		<i>92.1</i>		<i>21-167</i>			

Matrix Spike (BFI0677-MS1)

Source: 2209441-04

Prepared: 09/26/22 Analyzed: 09/28/22

Benzene	36.2	1.0	ug/l	41.7	ND	86.9		34-141			
Toluene	41.0	1.0	"	41.7	ND	98.3		27-151			
Ethylbenzene	45.5	1.0	"	41.7	ND	109		29-160			
m,p-Xylene	94.0	2.0	"	83.3	3.24	109		20-166			
o-Xylene	44.0	1.0	"	41.7	ND	106		33-159			
Naphthalene	43.7	1.0	"	41.7	ND	105		70-130			
1,2,4-Trimethylbenzene	47.0	1.0	"	41.7	ND	113		70-130			
1,3,5-Trimethylbenzene	46.7	1.0	"	41.7	ND	112		70-130			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>8.86</i>		<i>"</i>	<i>13.3</i>		<i>66.5</i>		<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>13.5</i>		<i>"</i>	<i>13.3</i>		<i>101</i>		<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>12.3</i>		<i>"</i>	<i>13.3</i>		<i>92.0</i>		<i>21-167</i>			

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

Project: Willman 42-16 Wellhead

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 10/03/22 13:23

Volatile Organic Compounds by EPA Method 8260B - Quality Control
Summit Scientific

Analyte	Result	Reporting		Spike Level	Source		%REC		RPD		Notes
		Limit	Units		Result	%REC	Limits	RPD	Limit		

Batch BFI0677 - EPA 5030 Water MS

Matrix Spike Dup (BFI0677-MSD1)	Source: 2209441-04			Prepared: 09/26/22 Analyzed: 09/28/22							
Benzene	35.7	1.0	ug/l	41.7	ND	85.7	34-141	1.39	30		
Toluene	44.4	1.0	"	41.7	ND	107	27-151	8.06	30		
Ethylbenzene	44.2	1.0	"	41.7	ND	106	29-160	2.81	30		
m,p-Xylene	91.3	2.0	"	83.3	3.24	106	20-166	2.84	30		
o-Xylene	43.4	1.0	"	41.7	ND	104	33-159	1.44	30		
Naphthalene	46.8	1.0	"	41.7	ND	112	70-130	6.87	30		
1,2,4-Trimethylbenzene	45.8	1.0	"	41.7	ND	110	70-130	2.54	30		
1,3,5-Trimethylbenzene	45.7	1.0	"	41.7	ND	110	70-130	2.10	30		
Surrogate: 1,2-Dichloroethane-d4	12.6		"	13.3		94.8	23-173				
Surrogate: Toluene-d8	14.6		"	13.3		109	20-170				
Surrogate: 4-Bromofluorobenzene	12.1		"	13.3		91.0	21-167				

Summit Scientific

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

Project: Willman 42-16 Wellhead

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 10/03/22 13:23

Anions by EPA Method 300.0 - Quality Control
Summit Scientific

Analyte	Result	Reporting		Spike Level	Source		%REC		RPD		Notes
		Limit	Units		Result	%REC	Limits	RPD	Limit		

Batch BFI0674 - General Preparation

Blank (BFI0674-BLK1)

Prepared & Analyzed: 09/26/22

Chloride	ND	0.0600	mg/L						
Sulfate	ND	0.300	"						

LCS (BFI0674-BS1)

Prepared & Analyzed: 09/26/22

Chloride	3.10	0.0600	mg/L	3.00	103	90-110		
Sulfate	16.0	0.300	"	15.0	107	90-110		

Duplicate (BFI0674-DUP1)

Source: 2209441-01

Prepared & Analyzed: 09/26/22

Chloride	257	12.0	mg/L		249		3.16	20
Sulfate	121	60.0	"		122		0.988	20

Matrix Spike (BFI0674-MS1)

Source: 2209441-01

Prepared & Analyzed: 09/26/22

Chloride	841	12.0	mg/L	600	249	98.6	80-120	
Sulfate	3250	60.0	"	3000	122	104	80-120	

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

Project: Willman 42-16 Wellhead

Project Number: [none]

Project Manager: Mark Longhurst

Reported:
 10/03/22 13:23

Total Dissolved Solids by SM2540C - Quality Control

Summit Scientific

Analyte	Result	Reporting		Spike Level	Source		%REC		RPD		Notes
		Limit	Units		Result	%REC	Limits	RPD	Limit		

Batch BFI0682 - General Preparation

Blank (BFI0682-BLK1)

Prepared: 09/26/22 Analyzed: 09/27/22

Total Dissolved Solids ND 10.0 mg/L

Duplicate (BFI0682-DUP1)

Source: 2209450-01

Prepared: 09/26/22 Analyzed: 09/27/22

Total Dissolved Solids 13900 10.0 mg/L 15600 11.7 20

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

Project: Willman 42-16 Wellhead

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
10/03/22 13:23

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