

**PDC Energy, Inc.**  
**First Quarter 2022 Groundwater Monitoring Summary**

February 3, 2022

Former Kristen 1 Wellhead  
NENE Section 24 T4N R67W  
Remediation # 16917

This groundwater monitoring summary has been prepared by Tasman, Inc. for the former Kristin 1 Wellhead.

### **Site History and Background**

On May 7, 2021, a historic hydrocarbon release was discovered at the former wellhead during decommissioning activities. Following the discovery, mitigation activities were initiated and between May 7, and May 12, 2021, approximately 44 cubic yards of impacted material were removed from the former excavation. During excavation activities, groundwater was encountered in the excavation at approximately 3.5 feet below ground surface (bgs). Quarterly groundwater monitoring was initiated during the third quarter 2021.

### **Supplemental Site Investigation Activities**

On January 4, 2022, two background soil borings (BKG03 & BKG04) were advanced to a depth of approximately 6 feet bgs to assess arsenic and selenium concentrations in native soil on site. Four (4) soil samples were collected at depths of 3 feet and 6 feet bgs and were submitted to Summit Scientific Laboratories for analysis of arsenic and selenium by EPA Method 6020B.

Analytical results indicated that arsenic and selenium concentrations were above the applicable COGCC Table 915-1 regulatory standards in both background soil boring locations. Based on the results, arsenic and selenium concentrations recorded in the samples collected from the final excavation extent are representative of native soil conditions. Background soil boring locations are illustrated on Figure 1. Soil analytical results are summarized in Table 1. The analytical report is included in Attachment A. Boring logs are included as Attachment B.

### **Groundwater Monitoring Activities**

On January 4, 2022, groundwater monitoring was conducted at all five temporary monitoring wells (BH01 – BH05). Temporary monitoring wells were advanced via hand auger, gauged and sampled, and subsequently abandoned. Five groundwater samples were submitted to Summit

Scientific Laboratory for analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, 1,2,4-trimethylbenzene (TMB), and 1,3,5-TMB by EPA Method 8260B.

First quarter 2022 analytical results indicated that organic compound concentrations were below the applicable COGCC Table 915-1 groundwater standards in all five monitoring well locations. Sample locations and corresponding analytical results are illustrated on Figure 2. Groundwater elevation data is illustrated on Figure 3. Groundwater analytical results are summarized in Table 2. The laboratory analytical report is included in Attachment A.

### **Current Remediation Activities and Path Forward**

Monitored natural attenuation (MNA) was selected as the remediation strategy for this site during the third quarter 2021 and will remain the selected remediation strategy through the second quarter 2022.

Second quarter 2022 groundwater sampling will be conducted in April 2022.



DATE:	January 4, 2022
DESIGNED BY:	C. Hamlin
DRAWN BY:	D. Vigil

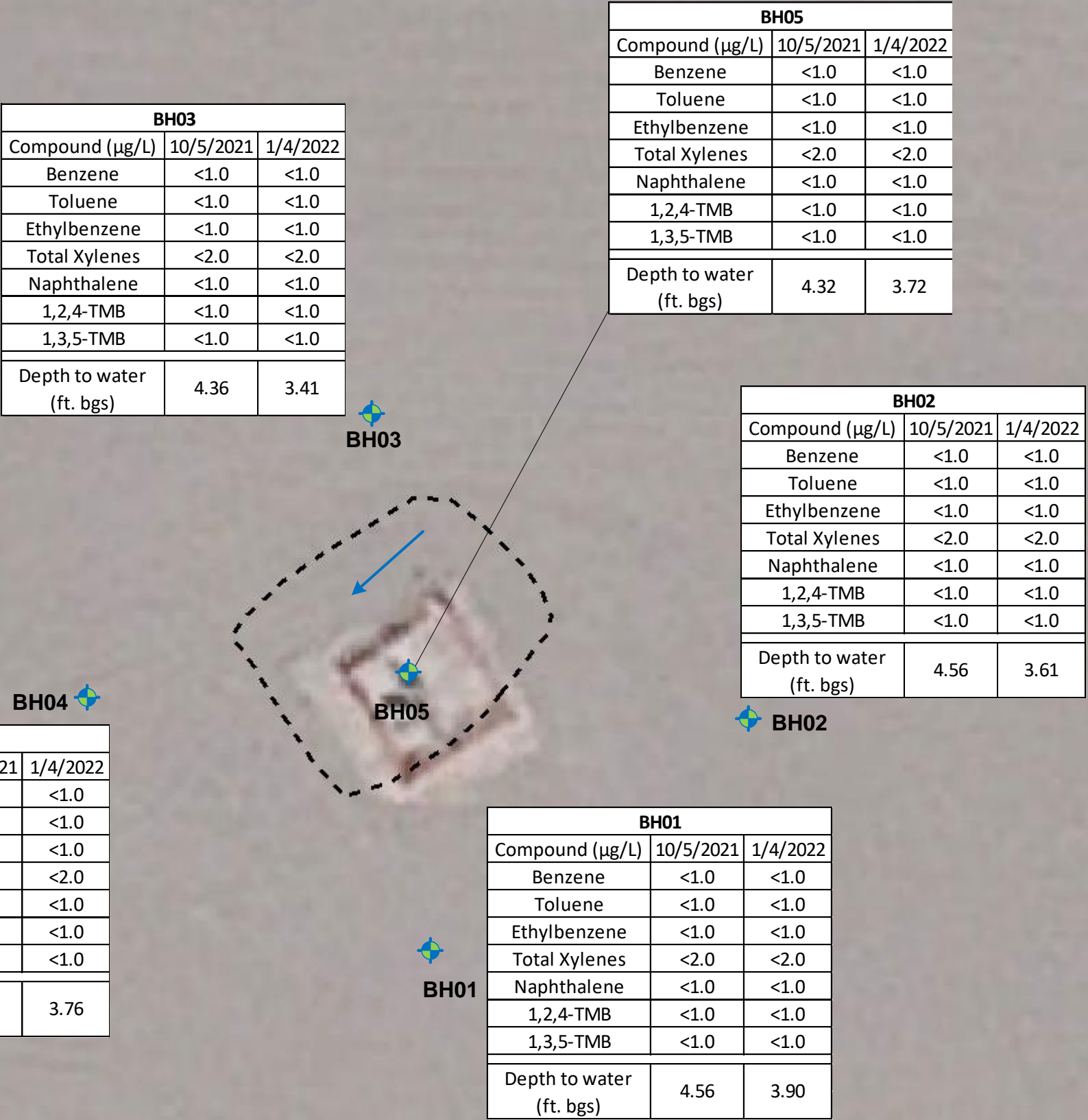


**Tasman, Inc.**  
6855 W. 119<sup>th</sup> Ave.  
Broomfield, CO 80020

**PDC Energy, Inc. – DJ Basin**  
**Former Kristin 1 Wellhead**  
NENE, Section 24, Township 4 North, Range 67 West  
Weld County, Colorado

**SOIL BORING  
LOCATION MAP**

**FIGURE  
1**



**Legend**

- Excavation Extent (Collected via Trimble GPS)
- Temporary Monitoring Well Location (Collected via Trimble GPS)
- Groundwater Flow Direction (1Q22)

**Notes**

All locations are approximate unless otherwise noted.

GPS – Global Positioning System

TMB – Trimethylbenzene

µg/L – Micrograms per liter

ft. bgs – Feet below ground surface

0 ft. 10 ft. 20 ft.

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

DATE: February 3, 2022

DESIGNED BY: B. Nelson

DRAWN BY: D. Vigil

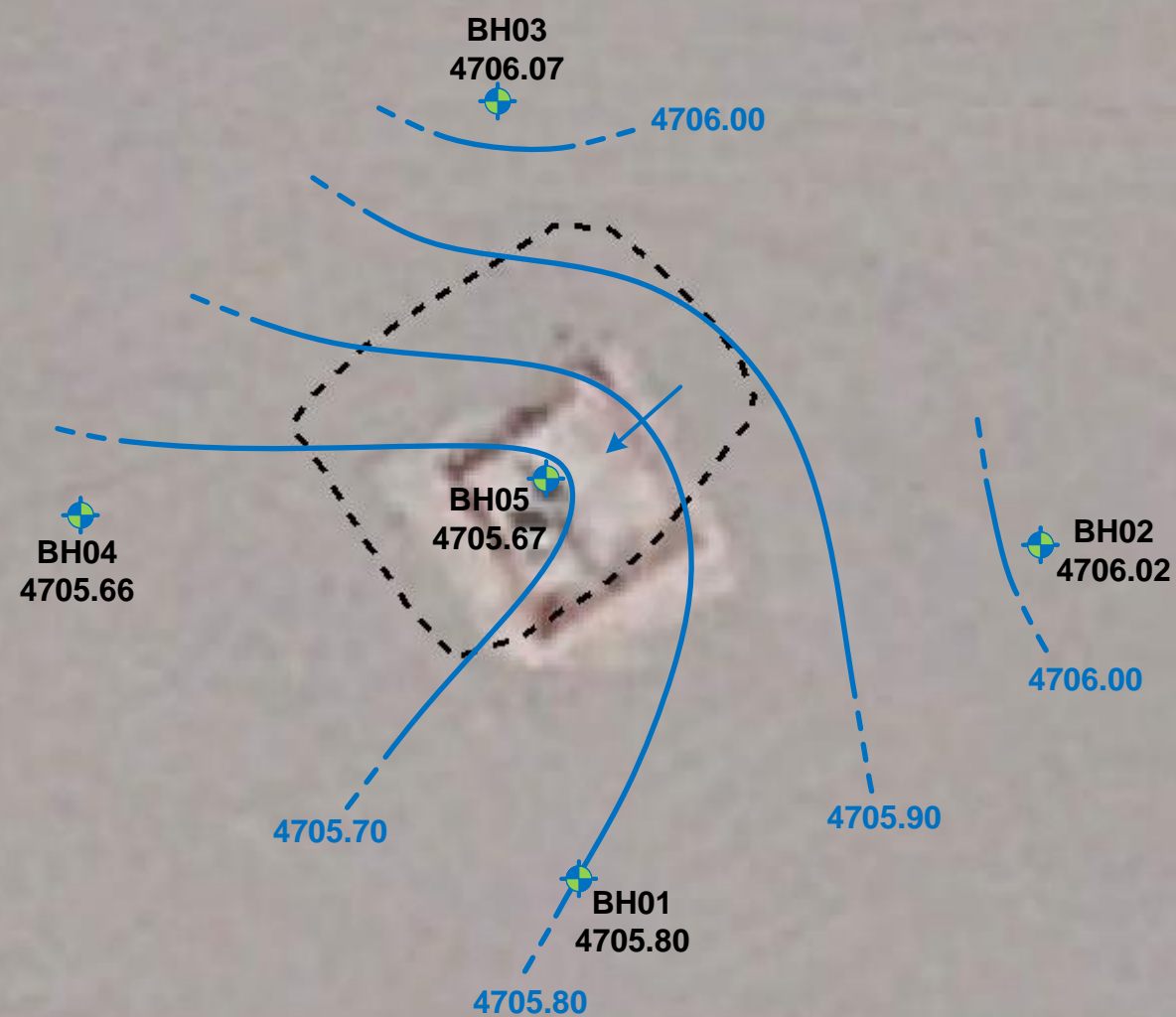
 **TASMAN** Tasman, Inc.  
6855 W. 119<sup>th</sup> Ave.  
Broomfield, CO 80020

**PDC Energy, Inc. – DJ Basin**  
**Former Kristin 1 Wellhead**  
NENE, Section 24, Township 4 North, Range 67 West  
Weld County, Colorado




**GROUNDWATER  
ANALYTICAL RESULTS  
MAP**

**FIGURE  
2**





#### Legend

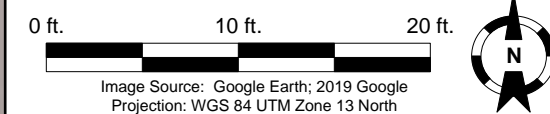
-  Temporary Monitoring Well Location (Collected via Trimble GPS)
-  Groundwater Elevation Contour (Dashed where inferred)
- 4716.24** Groundwater Elevation (ft. AMSL)
-  Groundwater Flow Direction (1Q22)

#### Notes

All locations are approximate unless otherwise noted.

ft. AMSL – Feet Above Mean Sea Level

GPS - Global Positioning System



DATE: January 27, 2022

DESIGNED BY: B. Nelson

DRAWN BY: A. Dahl



**Tasman, Inc.**  
6855 W. 119<sup>th</sup> Ave.  
Broomfield, CO 80020

**PDC Energy, Inc. – DJ Basin**  
**Former Kristin 1 Wellhead**  
NENE, Section 24, Township 4 North, Range 67 West  
Weld County, Colorado

**GROUNDWATER  
ELEVATION CONTOUR  
MAP (01/04/2022)**

**FIGURE  
3**

TABLE 1  
FORMER KRISTIN 1 WELLHEAD  
SOIL ANALYTICAL RESULTS SUMMARY TABLE  
METALS

Sample ID	Date Sampled	Depth	Arsenic (mg/kg)	Barium (mg/kg)	Cadmium (mg/kg)	Chromium (VI) (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)	Zinc (mg/kg)
Residential SSL <sup>(1,2)</sup>			0.68	15,000	71	0.3	3,100	400	1,500	390	390	23,000
Protection of Groundwater SSL <sup>(1,2,3)</sup>			0.29	82	0.38	0.00067	46	14	26	0.26	0.8	370
WH01 @ 3'	5/12/2021	3 ft. bgs	1.56	71.9	0.246	<0.30 <sup>(4)</sup>	14.4	13.8	4.69	0.584	0.130	47.9
BH01 @ 3'	7/8/2021	3 ft. bgs	1.12	NA	NA	NA	NA	NA	NA	0.633	NA	NA
BH02 @ 3'	7/8/2021	3 ft. bgs	0.413	NA	NA	NA	NA	NA	NA	0.747	NA	NA
BH03 @ 3'	7/8/2021	3 ft. bgs	0.344	NA	NA	NA	NA	NA	NA	0.591	NA	NA
BH04 @ 3'	7/8/2021	3 ft. bgs	0.344	NA	NA	NA	NA	NA	NA	0.383	NA	NA
BH05 @ 6'	7/8/2021	6 ft. bgs	3.62	NA	NA	NA	NA	NA	NA	1.01	NA	NA
BKG02 @ 3'	7/8/2021	3 ft. bgs	<0.210	NA	NA	NA	NA	NA	NA	0.344	NA	NA
BKG03 @ 3'	1/4/2022	3 ft. bgs	0.246	NA	NA	NA	NA	NA	NA	0.364	NA	NA
BKG03 @ 6'	1/4/2022	6 ft. bgs	1.39	NA	NA	NA	NA	NA	NA	0.290	NA	NA
BKG04 @ 3'	1/4/2022	3 ft. bgs	2.88	NA	NA	NA	NA	NA	NA	0.702	NA	NA
BKG04 @ 6'	1/4/2022	6 ft. bgs	4.19	NA	NA	NA	NA	NA	NA	1.35	NA	NA

Notes:

1. Compounds referenced from the COGCC 2 CCR 404-1, Table 915-1, effective January 15, 2021.  
2. Soil Screening Levels (SSL) referenced from EPA Regional Screening Levels (EPA RSLs) for Chemical Contaminants at Superfund Sites, effective November 2020.  
3. SSLs are applicable if a pathway for communication with groundwater is present.  
4. Compound falls within COGCC Table 915-1 Footnote 9.

COGCC = Colorado Oil and Gas Conservation Commission

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

mg/kg = Milligrams per kilogram

= Source material characterization sample

ft. = Feet

bgs = Below ground surface

**BOLD** = Analytical result is in exceedance of applicable standard

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

NA = Constituent not analyzed

**TABLE 2**  
**FORMER KRISTIN 1 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 <sup>(2)</sup> (ft.)	Groundwater Elevation (ft. AMSL)
<b>COGCC Table 915-1 Groundwater Standard (µg/L) <sup>(1)</sup></b>		<b>5</b>	<b>560</b>	<b>700</b>	<b>1,400</b>	<b>140</b>	<b>67</b>	<b>67</b>	<b>-</b>	<b>-</b>
GW01	5/12/2021	<b>280</b>	83	110	<b>1,900</b>	43	<b>160</b>	<b>130</b>	3.5	NA
BH01	7/8/2021	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	3.31	4706.52
BH01	10/5/2021	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	4.56	4704.62
BH01	1/4/2022	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	3.90	4705.80
BH02	7/8/2021	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	3.31	4706.48
BH02	10/5/2021	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	4.56	4704.57
BH02	1/4/2022	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	3.61	4706.02
BH03	7/8/2021	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	3.05	4706.50
BH03	10/5/2021	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	4.36	4704.58
BH03	1/4/2022	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	3.41	4706.07
BH04	7/8/2021	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	3.07	4706.55
BH04	10/5/2021	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	4.33	4704.65
BH04	1/4/2022	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	3.76	4705.66
BH05	7/8/2021	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	2.82	4706.81
BH05	10/5/2021	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	4.32	4704.57
BH05	1/4/2022	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	3.72	4705.67

**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

NA = Not applicable

**BOLD** = Analytical result is in exceedance of applicable standard.

## Attachment A



# Summit Scientific

---

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

February 04, 2022

Mark Longhurst

PDC Energy

1775 Sherman St. STE. 3000

Denver, CO 80203

RE: Kristin 1 Wellhead

Work Order #2201017

Enclosed are the results of analyses for samples received by Summit Scientific on 01/04/22 14:15. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, reading "Muri Premer", is displayed on a light purple rectangular background.

Muri Premer

Project Manager



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

Project: Kristin 1 Wellhead  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
02/04/22 17:42

#### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BKG03@3'	2201017-01	Soil	01/04/22 10:50	01/04/22 14:15
BKG03@6'	2201017-02	Soil	01/04/22 11:05	01/04/22 14:15
BKG04@3'	2201017-03	Soil	01/04/22 11:55	01/04/22 14:15
BKG04@6'	2201017-04	Soil	01/04/22 12:10	01/04/22 14:15

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 2201017

S<sub>2</sub>

4653 Table Mountain Drive ♦ Golden, Colorado 80403  
303-277-9310

Page 1 of 1

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: *Kristen 1 Wellhead*  
Sampler Name: *David Vigil* Project Number:

ID	Sample Description	Date Sampled	Time Sampled	# of containers	Preservative				Matrix				Analysis Requested							Special Instructions
					HCl	HNO <sub>3</sub>	None	Other	Water	Soil	Air-Canister #	Other	BTEXN - 8260B	TPH - (C6 - C36)	pH, EC, SAR	Boron - HWS	TMBs (1,2,4)&(1,3,5)	PAH - 915	Metals - 915	
1	BK602 C3'	1/4/22	1050	1			X			X								X	pH, EC, SAR by saturated paste	
2	BK602 C6'		1105	1			X			X							X			
3	BK603 C3'		1155	1			X			X							X			
4	BK603 C6'		1210	1			X			X							X			
5																				
6																				
7																				
8																				
9																				
10																				

Relinquished by: <i>DM NM</i>	Date/Time: 1/4/22 1415	Received by: <i>[Signature]</i>	Date/Time: 1422 1415	Turn Around Time (Check) Same Day <input type="checkbox"/> 72 hours <input type="checkbox"/> 24 hours <input type="checkbox"/> Standard <input checked="" type="checkbox"/> 48 hours <input type="checkbox"/>	Notes: Analysis requested for only: -Arsenic -selenium
Relinquished by:	Date/Time:	Received by:	Date/Time:	Sample Integrity: Temperature Upon Receipt: 11.4 Samples Intact: <input checked="" type="radio"/> Yes <input type="radio"/> No	
Relinquished by:	Date/Time:	Received by:	Date/Time:		

S<sub>2</sub>

2201017

## Sample Receipt Checklist

S2 Work Order#

Client: Roc Trasmann Client Project ID: Kristen I WellheadShipped Via: H.D./P.U./FedEx/UPS/USPS/Other Airbill #:                     Matrix (check all that apply): ☐ Air ☒ Soil/Solid ☐ Water ☐ Other:                       
(Describe)

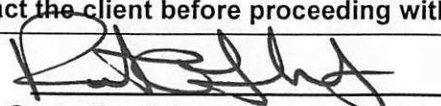
Temp (°C)

11.4

Thermometer ID: G86A9201901378

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature at 4°C +/- 2°C <sup>(1)</sup> ? NOTE: If samples are delivered the same day of sampling, this requirement is met if there is evidence that cooling has begun.	-			on ICE
Were all samples received intact <sup>(1)</sup> ?	-			
Was adequate sample volume provided <sup>(1)</sup> ?	-			
If custody seals are present, are they intact <sup>(1)</sup> ?	-			
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 <sup>(1)</sup> ?	-			
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	-			
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	-			
Is the COC properly relinquished by the client w/ date and time recorded <sup>(1)</sup> ?	-			
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.			-	
Are samples preserved that require preservation (excluding cooling) <sup>(1)</sup> ? Note the type of preservative in the Comments column – HCl, H <sub>2</sub> SO <sub>4</sub> , NaOH, HNO <sub>3</sub> , etc.			-	
If samples are acid preserved for metals, is the pH ≤ 2 <sup>(1)</sup> ? Record the pH in Comments.			-	
If dissolved metals are requested, were samples field filtered?			-	

Additional Comments (if any):

<sup>(1)</sup> If NO, then contact the client before proceeding with analysis and note in case narrative.
  
 Custodian Printed Name or Initials

1.4.22  
 Date/Time



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

Project: Kristin 1 Wellhead  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
02/04/22 17:42

**BKG03@3'**  
**2201017-01 (Soil)**

**Summit Scientific**

**Total Metals by EPA 6020B**

Date Sampled: **01/04/22 10:50**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Arsenic	<b>0.246</b>	0.200		mg/kg dry	1	BFA0096	01/06/22	01/07/22	EPA 6020B	
Selenium	<b>0.364</b>	0.260		"	"	"	"	"	"	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **01/04/22 10:50**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
% Solids	<b>95.3</b>			%	1	BFA0072	01/05/22	01/05/22	Calculation	

Summit Scientific

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

Project: Kristin 1 Wellhead  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
02/04/22 17:42

**BKG03@6'**  
**2201017-02 (Soil)**

**Summit Scientific**

**Total Metals by EPA 6020B**

Date Sampled: **01/04/22 11:05**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Arsenic	<b>1.39</b>	0.200		mg/kg dry	1	BFA0096	01/06/22	01/07/22	EPA 6020B	
Selenium	<b>0.290</b>	0.260		"	"	"	"	"	"	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **01/04/22 11:05**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
% Solids	<b>91.3</b>			%	1	BFA0072	01/05/22	01/05/22	Calculation	

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

Project: Kristin I Wellhead  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
02/04/22 17:42

**BKG04@3'**  
**2201017-03 (Soil)**

**Summit Scientific**

**Total Metals by EPA 6020B**

Date Sampled: **01/04/22 11:55**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Arsenic	<b>2.88</b>	0.200		mg/kg dry	1	BFA0096	01/06/22	01/07/22	EPA 6020B	
Selenium	<b>0.702</b>	0.260		"	"	"	"	"	"	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **01/04/22 11:55**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
% Solids	<b>95.7</b>			%	1	BFA0072	01/05/22	01/05/22	Calculation	

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

Project: Kristin I Wellhead  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
02/04/22 17:42

**BKG04@6'**  
**2201017-04 (Soil)**

**Summit Scientific**

**Total Metals by EPA 6020B**

Date Sampled: **01/04/22 12:10**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Arsenic	<b>4.19</b>	0.200		mg/kg dry	1	BFA0096	01/06/22	01/07/22	EPA 6020B	
Selenium	<b>1.35</b>	0.260		"	"	"	"	"	"	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **01/04/22 12:10**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
% Solids	<b>79.4</b>			%	1	BFA0072	01/05/22	01/05/22	Calculation	

Summit Scientific

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

Project: Kristin 1 Wellhead  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
02/04/22 17:42

**Total Metals by EPA 6020B - Quality Control**  
**Summit Scientific**

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

**Batch BFA0096 - EPA 3050B**

**Blank (BFA0096-BLK1)**

Prepared: 01/06/22 Analyzed: 01/07/22

Arsenic	ND	0.200	mg/kg wet
Selenium	ND	0.260	"

**LCS (BFA0096-BS1)**

Prepared: 01/06/22 Analyzed: 01/07/22

Arsenic	40.2	0.200	mg/kg wet	40.0	100	80-120
Selenium	3.87	0.260	"	4.00	96.7	80-120

**Duplicate (BFA0096-DUP1)**

Source: 2112046-05

Prepared: 01/06/22 Analyzed: 01/07/22

Arsenic	2.58	0.200	mg/kg dry	2.73	5.75	20
Selenium	0.748	0.260	"	0.813	8.36	20

**Matrix Spike (BFA0096-MS1)**

Source: 2112046-05

Prepared: 01/06/22 Analyzed: 01/07/22

Arsenic	43.2	0.200	mg/kg dry	43.5	2.73	93.0	75-125
Selenium	4.19	0.260	"	4.35	0.813	77.8	75-125

**Matrix Spike Dup (BFA0096-MSD1)**

Source: 2112046-05

Prepared: 01/06/22 Analyzed: 01/07/22

Arsenic	43.5	0.200	mg/kg dry	43.5	2.73	93.8	75-125	0.754	25
Selenium	4.43	0.260	"	4.35	0.813	83.2	75-125	5.42	25

Summit Scientific

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

Project: Kristin 1 Wellhead  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
02/04/22 17:42

**Physical Parameters by APHA/ASTM/EPA Methods - Quality Control**

**Summit Scientific**

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

**Batch BFA0072 - General Preparation**

**Duplicate (BFA0072-DUP1)**

**Source: 2201017-01**

**Prepared & Analyzed: 01/05/22**

% Solids	96.2	%		95.3		0.927	20
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Summit Scientific

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

Project: Kristin 1 Wellhead  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
02/04/22 17:42

### 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

# Summit Scientific

---

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

January 10, 2022

Mark Longhurst

PDC Energy

1775 Sherman St. STE. 3000

Denver, CO 80203

RE: Kristin 1 Wellhead

Work Order #2201032

Enclosed are the results of analyses for samples received by Summit Scientific on 01/04/22 17:24. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, reading "Muri Premier", is displayed on a light purple rectangular background.

Muri Premier

Project Manager



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

Project: Kristin 1 Wellhead  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
01/10/22 14:43

#### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	2201032-01	Water	01/04/22 14:32	01/04/22 17:24
BH02	2201032-02	Water	01/04/22 14:38	01/04/22 17:24
BH03	2201032-03	Water	01/04/22 14:44	01/04/22 17:24
BH04	2201032-04	Water	01/04/22 14:30	01/04/22 17:24
BH05	2201032-05	Water	01/04/22 14:23	01/04/22 17:24

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

S<sub>2</sub>

2201032

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

Page 1 of 1

Client: PDC / Tasman Geosciences

Project Manager: Mark Longhurst

Address: 6855 W. 119th Ave.

E-Mail: mark.longhurst@pdc.com

City/State/Zip: Broomfield CO, 80020


Phone: 303-487-1228

Project Name: Kristin 1 Wellhead

Sampler Name: Aaron Otillar

Project Number:

					Preservative				Matrix				Analysis Requested								Special Instructions
ID	Sample Description	Date Sampled	Time Sampled	# of containers	HCl	HNO <sub>3</sub>	None	Other	Water	Soil	Air-Canister #	Other	BTEX	Napthalene	1,3,5 - TMB	1,2,4 - TMB	TDS	Chloride	Sulfate		
1	BH01	1/4/22	1432	3	3				X				X	X	X	X					
2	BH02		1438																		
3	BH03		1444																		
4	BH04		1430																		
5	BH05		1423																		
6																					
7																					
8																					
9																					
10																					

Relinquished by:	Date/Time:	Received by:	Date/Time:	Turn Around Time	(Check)	Notes:
<u>Aaron Otillar</u>	<u>1/4/21 1724</u>	<u>Tasman Lockbox</u>	<u>1/4/21 1724</u>	Same Day	72 hours	
Relinquished by:	Date/Time:	Received by:	Date/Time:	24 hours	Standard	
			<u>1/4/22 1724</u>	48 hours	<u>X</u>	
Relinquished by:	Date/Time:	Received by:	Date/Time:	Sample Integrity:		
				Temperature Upon Receipt: <u>7.3</u>		
				Samples Intact: <u>Yes</u> No		

S<sub>2</sub>

## Sample Receipt Checklist

S2 Work Order# 2201032

Client: Beftusman Client Project ID: Kristian IwellheadShipped Via: H.D./P.U./FedEx/UPS/USPS/Other Airbill #: \_\_\_\_\_Matrix (check all that apply): ☐ Air ☐ Soil/Solid ☒ Water ☐ Other: \_\_\_\_\_  
(Describe)Temp (°C) 7.3

Thermometer ID: G86A9201901378

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature at 4°C +/- 2°C <sup>(1)</sup> ? 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"/>	on ICE
Were all samples received intact <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was adequate sample volume provided <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If custody seals are present, are they intact <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are samples with holding times due within 48 hours sample due within 48 hours present?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Is a chain-of-custody (COC) form present and filled out completely <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is the COC properly relinquished by the client w/ date and time recorded <sup>(1)</sup> ?	<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) <sup>(1)</sup> ? Note the type of preservative in the Comments column – HCl, H <sub>2</sub> SO <sub>4</sub> , NaOH, HNO <sub>3</sub> , etc.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	HCl
If samples are acid preserved for metals, is the pH ≤ 2 <sup>(1)</sup> ? 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):

<sup>(1)</sup> If NO, then contact the client before proceeding with analysis and note in case narrative.R. B. B.  
Custodian Printed Name or Initials1422  
Date/Time





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

Project: Kristin 1 Wellhead  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
01/10/22 14:43

**BH01**  
**2201032-01 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **01/04/22 14:32**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Benzene	ND	1.0	ug/l	1	BFA0077	01/05/22	01/06/22	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: **01/04/22 14:32**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		100 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		102 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.7 %	21-167		"	"	"	"	

Summit Scientific

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

Project: Kristin 1 Wellhead  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
01/10/22 14:43

**BH02**  
**2201032-02 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **01/04/22 14:38**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	BFA0077	01/05/22	01/06/22	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: **01/04/22 14:38**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		101 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		102 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		101 %		21-167		"	"	"	"	

Summit Scientific

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

Project: Kristin 1 Wellhead  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
01/10/22 14:43

**BH03**  
**2201032-03 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **01/04/22 14:44**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	BFA0077	01/05/22	01/06/22	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: **01/04/22 14:44**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		107 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		111 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		101 %		21-167		"	"	"	"	

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

Project: Kristin 1 Wellhead  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
01/10/22 14:43

**BH04**  
**2201032-04 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **01/04/22 14:30**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	BFA0077	01/05/22	01/06/22	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: **01/04/22 14:30**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		119 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		119 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		109 %		21-167		"	"	"	"	

Summit Scientific

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

Project: Kristin 1 Wellhead  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
01/10/22 14:43

**BH05**  
**2201032-05 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **01/04/22 14:23**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	1.0	ug/l	1	BFA0077	01/05/22	01/06/22	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: **01/04/22 14:23**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		107 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		101 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		101 %	21-167		"	"	"	"	

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

Project: Kristin 1 Wellhead  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
01/10/22 14:43

## 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 BFA0077 - EPA 5030 Water MS

##### Blank (BFA0077-BLK1)

Prepared & Analyzed: 01/05/22

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	"							
Surrogate: 1,2-Dichloroethane-d4	13.3		"	13.3		100	23-173			
Surrogate: Toluene-d8	13.2		"	13.3		98.6	20-170			
Surrogate: 4-Bromofluorobenzene	13.8		"	13.3		103	21-167			

##### LCS (BFA0077-BS1)

Prepared & Analyzed: 01/05/22

Benzene	34.8	1.0	ug/l	33.3		104	51-132			
Toluene	37.5	1.0	"	33.3		112	51-138			
Ethylbenzene	37.7	1.0	"	33.3		113	58-146			
m,p-Xylene	84.3	2.0	"	66.7		126	57-144			
o-Xylene	39.8	1.0	"	33.3		119	53-146			
Naphthalene	38.9	1.0	"	33.3		117	70-130			
1,2,4-Trimethylbenzene	30.9	1.0	"	33.3		92.8	70-130			
1,3,5-Trimethylbenzene	33.0	1.0	"	33.3		99.2	70-130			
Surrogate: 1,2-Dichloroethane-d4	14.2		"	13.3		107	23-173			
Surrogate: Toluene-d8	13.6		"	13.3		102	20-170			
Surrogate: 4-Bromofluorobenzene	14.0		"	13.3		105	21-167			

##### Matrix Spike (BFA0077-MS1)

Source: 2112491-01

Prepared & Analyzed: 01/05/22

Benzene	35.3	1.0	ug/l	33.3	ND	106	34-141			
Toluene	38.0	1.0	"	33.3	ND	114	27-151			
Ethylbenzene	38.0	1.0	"	33.3	ND	114	29-160			
m,p-Xylene	85.0	2.0	"	66.7	ND	128	20-166			
o-Xylene	39.6	1.0	"	33.3	ND	119	33-159			
Naphthalene	42.2	1.0	"	33.3	ND	127	70-130			
1,2,4-Trimethylbenzene	31.8	1.0	"	33.3	ND	95.3	70-130			
1,3,5-Trimethylbenzene	33.6	1.0	"	33.3	ND	101	70-130			
Surrogate: 1,2-Dichloroethane-d4	14.4		"	13.3		108	23-173			
Surrogate: Toluene-d8	13.5		"	13.3		101	20-170			
Surrogate: 4-Bromofluorobenzene	14.1		"	13.3		106	21-167			

Summit Scientific

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

Project: Kristin 1 Wellhead  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
01/10/22 14:43

**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 BFA0077 - EPA 5030 Water MS**

Matrix Spike Dup (BFA0077-MSD1)	Source: 2112491-01			Prepared & Analyzed: 01/05/22						
Benzene	35.8	1.0	ug/l	33.3	ND	107	34-141	1.46	30	
Toluene	38.6	1.0	"	33.3	ND	116	27-151	1.59	30	
Ethylbenzene	37.6	1.0	"	33.3	ND	113	29-160	1.24	30	
m,p-Xylene	84.9	2.0	"	66.7	ND	127	20-166	0.188	30	
o-Xylene	39.4	1.0	"	33.3	ND	118	33-159	0.380	30	
Naphthalene	35.4	1.0	"	33.3	ND	106	70-130	17.6	30	
1,2,4-Trimethylbenzene	31.3	1.0	"	33.3	ND	94.0	70-130	1.33	30	
1,3,5-Trimethylbenzene	32.8	1.0	"	33.3	ND	98.3	70-130	2.50	30	
Surrogate: 1,2-Dichloroethane-d4	14.5		"	13.3		109	23-173			
Surrogate: Toluene-d8	13.7		"	13.3		103	20-170			
Surrogate: 4-Bromofluorobenzene	14.1		"	13.3		106	21-167			

Summit Scientific

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

Project: Kristin 1 Wellhead  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
01/10/22 14:43

### 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

## Attachment B



## Borehole Logging Form

BOREHOLE ID: BKG03		SITE NAME: Kristen 1		CLIENT NAME: PDC ENERGY			
Date Started: 12/4/22 <sup>00</sup> 1/4/22		Location: NE of POC					
Date Completed: 1/4/22		Surface Completion: -		DTW: 5'	TD: 6'		
Drilling Company: Tasman		Geologist: David V.		Project Manager: Brock Nelson			
Bit Size 2 3/8"		Type of Drill: Hand Auger					
Well Const. Material: Diameter: - Screen: - Riser: -							
Depth (feet)	Well Completion	Sample Type	% Recovery	PID (ppm)	Laboratory Sample	USCS	Description
1	NA	↑	↑	0.0		SW	Light brown, sand, fine to coarse grain, trace gravel, well graded, moist, no odor
2		↑	↑	0.0			
3		HA	100%	0.1	BKG0203'		↓ As above, saturated
4		↓	↓	0.1	1090		
5		↓	↓	0.0			
6		↓	↓	0.2	BKG0206'	1105	
7							
8							
9							
10							
11							
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14							
15							
16							
17							
18							
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20							
21							
22							
23							
24							
25							



**TASMAN**  
GEOSCIENCES

## Borehole Logging Form

BOREHOLE ID: BKG04		SITE NAME: Kristen 1		CLIENT NAME: PDC ENERGY			
Date Started: 1/4/22		Location: SW of POC					
Date Completed: 1/4/22		Surface Completion: -		DTW: 5'	TD: 6'		
Drilling Company: Tasman		Geologist: David V.		Project Manager: Brock Nelson			
Bit Size 2 3/8"		Type of Drill: Hand Auger					
Well Const. Material: Diameter: - Screen: - Riser: -							
Depth (feet)	Well Completion	Sample Type	% Recovery	PID (ppm)	Laboratory Sample	USCS	Description
1	NA	↑	↑	0.0		SW	Light brown, sand, fine to large coarse grain, trace gravel, well graded, moist, no odor
2		↑	↑	0.0			
3		HA	100%	0.1	BK60303		
4				0.8	1155		
5				1.1		SC	
6				1.8	BK60306 1210		Gray, clayey sand, fine to coarse grain, trace gravel, well graded, low plasticity, saturated, no odor
7							
8							
9							
10							
11							
12							
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