



PDC Energy, Inc.
Fourth Quarter 2020 Groundwater Monitoring Summary

November 3, 2020

Eberle 13-32 CHZ Facility
NESE Section 32 T1N R66W
Remediation # 15999

This groundwater monitoring summary has been prepared by Tasman Geosciences, Inc. for the Eberle 13-32 CHZ Facility. Per the agreement outlined in the Form 2 submitted under Document # 400534181, three monitoring wells (BH01 - BH03) were installed to October 19, 2020, to monitor and protect the alluvial groundwater system. Well construction logs are provided in Attachment A.

On October 23, 2020, groundwater monitoring was conducted at all three monitoring wells (BH01 – BH03). Three groundwater samples were submitted to Summit Scientific Laboratory for analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA Method 8260B.

Fourth quarter 2020 analytical results indicated that BTEX concentrations were below the applicable COGCC Table 910-1 standards in all three monitoring well locations. Sample locations and corresponding analytical results are illustrated on Figure 1. Groundwater elevation data is illustrated on Figure 2. Groundwater analytical results are summarized in Table 1. The laboratory analytical report is included in Attachment B.

Groundwater monitoring was initiated in the fourth quarter 2020 and will continue to be sampled on a quarterly schedule.

First quarter 2021 groundwater sampling will be conducted in January 2021.

← SURFACE DRAINAGE

BH03	
Compound (µg/L)	10/23/2020
Benzene	<1.0
Toluene	<1.0
Ethylbenzene	<1.0
Total Xylenes	<2.0
Depth to Water (ft. bgs)	23.51

BH03

BH01	
Compound (µg/L)	10/23/2020
Benzene	<1.0
Toluene	<1.0
Ethylbenzene	<1.0
Total Xylenes	<2.0
Depth to Water (ft. bgs)	15.19

BH01

BH02	
Compound (µg/L)	10/23/2020
Benzene	<1.0
Toluene	1.2
Ethylbenzene	<1.0
Total Xylenes	<2.0
Depth to Water (ft. bgs)	20.01

BH02

Legend

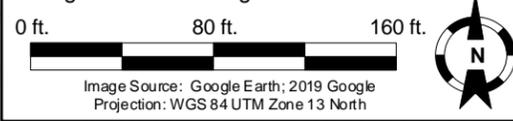
-  Monitoring Well Location (Collected via Trimble GPS)
-  Groundwater Flow Direction (4Q20)

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



DATE:	November 3, 2020
DESIGNED BY:	C. Hamlin
DRAWN BY:	M. Dahlgren



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

PDC Energy, Inc. – DJ Basin
Eberle 13-32 CHZ Facility
 NESE, Section 32, Township 1 North, Range 66 West
 Weld County, Colorado

GROUNDWATER
 ANALYTICAL RESULTS
 MAP

FIGURE
 1



DATE: November 2, 2020

DESIGNED BY: C. Hamlin

DRAWN BY: A. Dahl



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

**PDC Energy, Inc. – DJ Basin
 Eberle 13-32 CHZ Facility**
 NESE, Section 32, Township 1 North, Range 66 West
 Weld County, Colorado

**GROUNDWATER
 ELEVATION CONTOUR
 MAP (10/23/2020)**

**FIGURE
 2**

TABLE 1
EBERLE 13-32 CHZ FACILITY
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⁾ (ft.)	Groundwater Elevation (ft. AMSL)
COGCC Table 910-1 Groundwater Standard (µg/L) ⁽¹⁾		5	560	700	1,400		
BH01	10/23/2020	<1.0	<1.0	<1.0	<2.0	15.19	5007.90
BH02	10/23/2020	<1.0	1.2	<1.0	<2.0	20.01	5003.10
BH03	10/23/2020	<1.0	<1.0	<1.0	<2.0	23.51	4999.27

Notes:

1. Groundwater standards referenced from 2 CCR 404-1, Table 910-1, effective May 1, 2018.
 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.
- 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

Attachment A



Borehole Logging Form

BOREHOLE ID: BH01	SITE NAME: Eberle 12-32 CHZ Facility	CLIENT NAME: PDC ENERGY
Date Completed: 10/19/2020	Location: East of prod. facility	
Drilling Company: Tasman Geosciences	Surface Completion: Flush Mount	DTW: -35' TD: 40'
Type of Drill: Powerprobe 9580 - Solid Stem Auger	Geologist: B. Nelson	Project Manager: C. Hamlin
Bit Size: 4 5/8"	Logging Method: N/A	

Well Const. Material: Diameter: **1"** Screen: **Sch 40 PVC Slotted 0.10** Riser: **Sch 40 PVC Blank**

Depth (feet)	Well Completion	Sample Type	% Recovery	PID (ppm)	Laboratory Sample	USCS	Description
1							<p>Pre-cleared via hand auger -No Geology Logged</p> <p style="text-align: center;">↓</p> <p>Solid Stem Augering -No Geology Logged</p> <p style="text-align: center;">↓</p>
2							
3							
4							
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7							
8							
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21							
22							
23							
24							
25							



Borehole Logging Form

BOREHOLE ID: <u>BH01</u>	SITE NAME: <u>Eberle 12-32 CHZ Facility</u>	CLIENT NAME: <u>PDC ENERGY</u>
Date Completed: <u>10/19/2020</u>	Location: <u>East of prod facility</u>	
Drilling Company: <u>Tasman Geosciences</u>	Surface Completion: <u>Flush Mount</u>	DW: <u>-35'</u> TD: <u>40'</u>
Type of Drill: <u>Powerprobe 9580 - Solid Stem Auger</u>	Geologist: <u>B. Nelson</u>	Project Manager: <u>C. Hamlin</u>
Bit Size: <u>4 5/8"</u>	Logging Method: <u>N/A</u>	

Well Const. Material: Diameter: 1" Screen: Sch 40 PVC Slotted 0.10 Riser: Sch 40 PVC Blank

Depth (feet)	Well Completion	Sample Type	% Recovery	PID (ppm)	Laboratory Sample	USCS	Description
26							Solid Stem Augering - No Geology Logged
27							
28							
29							
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49							
50							



Borehole Logging Form

BOREHOLE ID: BHOZ	SITE NAME: Eberle 12-32 CHZ Facility	CLIENT NAME: PDC ENERGY
Date Completed: 10/19/2020	Location: South of prod. facility	
Drilling Company: Tasman Geosciences	Surface Completion: Flush Mount	DTW: -34' TD: 35'
Type of Drill: Powerprobe 9580 - Solid Stem Auger	Geologist: B. Nelson	Project Manager: C. Hamlin
Bit Size: 4 5/8"	Logging Method: N/A	

Well Const. Material: Diameter: 1" Screen: Sch 40 PVC Slotted 0.10 Riser: Sch 40 PVC Blank		Sample Type	% Recovery	PID (ppm)	Laboratory Sample	USCS	Description	
Depth (feet)	Well Completion							
1							Pre-cleared via hand auger - No Geology Logged	
2								
3								
4								
5								
6								
7								
8								Solid Stem Augering - No Geology Logged
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								



Borehole Logging Form

BOREHOLE ID: <u>BH02</u>	SITE NAME: <u>Eberle 12-32 CHZ Facility</u>	CLIENT NAME: <u>PDC ENERGY</u>
Date Completed: <u>10/19/2020</u>	Location: <u>South of prod facility</u>	
Drilling Company: <u>Tasman Geosciences</u>	Surface Completion: <u>Flush Mount</u>	DTW: <u>~34'</u> TD: <u>35'</u>
Type of Drill: <u>Powerprobe 9580 - Solid Stem Auger</u>	Geologist: <u>B. Nelson</u>	Project Manager: <u>C. Hamlin</u>
Bit Size: <u>4 5/8"</u>	Logging Method: <u>N/A</u>	
Well Const. Material: <u>Diameter: 1"</u>	Screen: <u>Sch 40 PVC Slotted 0.10</u>	Riser: <u>Sch 40 PVC Blank</u>

Depth (feet)	Well Completion	Sample Type	% Recovery	PID (ppm)	Laboratory Sample	USCS	Description
26							Solid Stem Augering -No Geology Logged ↓
27							
28							
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32							
33							
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Borehole Logging Form

BOREHOLE ID: BH03	SITE NAME: Eberle 12-32 CHZ Facility	CLIENT NAME: PDC ENERGY
Date Completed: 10/19/2020	Location: West of prod. facility	
Drilling Company: Tasman Geosciences	Surface Completion: Flush Mount	DTW: ~34' TD: 35'
Type of Drill: Powerprobe 9580 - Solid Stem Auger	Geologist: B. Nelson	Project Manager: C. Hamlin
Bit Size: 4 5/8"	Logging Method: N/A	

Well Const. Material: Diameter: 1" Screen: Sch 40 PVC Slotted 0.10 Riser: Sch 40 PVC Blank

Depth (feet)	Well Completion	Sample Type	% Recovery	PID (ppm)	Laboratory Sample	USCS	Description
1							<p>Pre-cleared via hand auger -No Geology Logged</p> <p style="text-align: center;">↓</p> <p>Solid Stem Augering -No Geology Logged</p> <p style="text-align: center;">↓</p>
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Borehole Logging Form

BOREHOLE ID: BH03	SITE NAME: Eberle 12-32 CHZ Facility	CLIENT NAME: PDC ENERGY
Date Completed: 10/19/2020	Location: West of prod facility	
Drilling Company: Tasman Geosciences	Surface Completion: Flush Mount	DTW: ~34' TD: 35'
Type of Drill: Powerprobe 9580 - Solid Stem Auger	Geologist: B. Nelson	Project Manager: C. Hamlin
Bit Size: 4 5/8"	Logging Method: N/A	
Well Const. Material: Diameter: 1" Screen: Sch 40 PVC Slotted 0.10 Riser: Sch 40 PVC Blank		

Depth (feet)	Well Completion	Sample Type	% Recovery	PID (ppm)	Laboratory Sample	USCS	Description
26							Solid Stem Augering - No Geology Logged ↓
27							
28							
29							
30							
31							
32							
33							
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Attachment B

Summit Scientific

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

October 30, 2020

Mark Longhurst

PDC Energy

1775 Sherman St. STE. 3000

Denver, CO 80203

RE: Eberle 13-32 CHZ Facility

Work Order #2010311

Enclosed are the results of analyses for samples received by Summit Scientific on 10/23/20 17:40. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'P. Shrewsbury', written in a cursive style.

Paul Shrewsbury

President



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

Project: Eberle 13-32 CHZ Facility

Project Number: [none]

Project Manager: Mark Longhurst

Reported:
10/30/20 14:40

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	2010311-01	Water	10/23/20 16:40	10/23/20 17:40
BH02	2010311-02	Water	10/23/20 16:35	10/23/20 17:40
BH03	2010311-03	Water	10/23/20 16:45	10/23/20 17:40

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.

Sample Receipt Checklist

S2 Work Order 2010311

Client: POC/TASMAN

Client Project ID: Charge 13-32 CHE Facility

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

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

Temp (°C)	<u>4.2</u>
-----------	------------

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 samples with holding times due within 48 hours sample due within 48 hours present?				
Is a chain-of-custody (COC) form present and filled out completely ⁽¹⁾ ?	<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.				

TS
Custodian Printed Name or Initials

[Signature]
Signature of Custodian

10/23/2020
Date/Time



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

Project: Eberle 13-32 CHZ Facility

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 10/30/20 14:40

BH01
2010311-01 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/23/20 16:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	BDJ0328	10/26/20	10/27/20	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **10/23/20 16:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		94.4 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		109 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		113 %	21-167		"	"	"	"	

Summit Scientific

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

Project: Eberle 13-32 CHZ Facility

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 10/30/20 14:40

BH02
2010311-02 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/23/20 16:35**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	BDJ0328	10/26/20	10/27/20	EPA 8260B	
Toluene	1.2	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **10/23/20 16:35**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		90.5 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		104 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		112 %		21-167		"	"	"	"	

Summit Scientific

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

Project: Eberle 13-32 CHZ Facility

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 10/30/20 14:40

BH03
2010311-03 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/23/20 16:45**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	BDJ0328	10/26/20	10/27/20	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **10/23/20 16:45**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		84.4 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		101 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		112 %		21-167		"	"	"	"	

Summit Scientific

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

Project: Eberle 13-32 CHZ Facility

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
10/30/20 14:40

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 BDJ0328 - EPA 5030 Water MS

Blank (BDJ0328-BLK1)

Prepared: 10/26/20 Analyzed: 10/27/20

Benzene	ND	1.0	ug/l								
Toluene	ND	1.0	"								
Ethylbenzene	ND	1.0	"								
Xylenes (total)	ND	2.0	"								
Surrogate: 1,2-Dichloroethane-d4	12.3		"	13.3		92.3		23-173			
Surrogate: Toluene-d8	14.2		"	13.3		107		20-170			
Surrogate: 4-Bromofluorobenzene	14.3		"	13.3		108		21-167			

LCS (BDJ0328-BS1)

Prepared: 10/26/20 Analyzed: 10/27/20

Benzene	17.3	1.0	ug/l	33.3		51.8		51-132			
Toluene	30.6	1.0	"	33.3		91.8		51-138			
Ethylbenzene	29.4	1.0	"	33.3		88.1		58-146			
m,p-Xylene	61.4	2.0	"	66.7		92.0		57-144			
o-Xylene	33.6	1.0	"	33.3		101		53-146			
Surrogate: 1,2-Dichloroethane-d4	12.0		"	13.3		89.9		23-173			
Surrogate: Toluene-d8	13.6		"	13.3		102		20-170			
Surrogate: 4-Bromofluorobenzene	14.0		"	13.3		105		21-167			

Matrix Spike (BDJ0328-MS1)

Source: 2010307-01

Prepared: 10/26/20 Analyzed: 10/27/20

Benzene	17.8	1.0	ug/l	33.3	ND	53.5		34-141			
Toluene	33.6	1.0	"	33.3	ND	101		27-151			
Ethylbenzene	32.1	1.0	"	33.3	ND	96.2		29-160			
m,p-Xylene	65.8	2.0	"	66.7	ND	98.7		20-166			
o-Xylene	36.8	1.0	"	33.3	ND	110		33-159			
Surrogate: 1,2-Dichloroethane-d4	11.6		"	13.3		87.2		23-173			
Surrogate: Toluene-d8	14.1		"	13.3		106		20-170			
Surrogate: 4-Bromofluorobenzene	14.7		"	13.3		110		21-167			

Summit Scientific

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

Project: Eberle 13-32 CHZ Facility

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 10/30/20 14:40

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 BDJ0328 - EPA 5030 Water MS

Matrix Spike Dup (BDJ0328-MSD1)

Source: 2010307-01

Prepared: 10/26/20 Analyzed: 10/27/20

Benzene	17.4	1.0	ug/l	33.3	ND	52.2	34-141	2.39	30	
Toluene	32.8	1.0	"	33.3	ND	98.4	27-151	2.53	30	
Ethylbenzene	31.2	1.0	"	33.3	ND	93.7	29-160	2.62	30	
m,p-Xylene	66.2	2.0	"	66.7	ND	99.3	20-166	0.606	30	
o-Xylene	35.3	1.0	"	33.3	ND	106	33-159	4.10	30	
Surrogate: 1,2-Dichloroethane-d4	13.5		"	13.3		101	23-173			
Surrogate: Toluene-d8	14.4		"	13.3		108	20-170			
Surrogate: 4-Bromofluorobenzene	14.7		"	13.3		110	21-167			

Summit Scientific

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

Project: Eberle 13-32 CHZ Facility

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
10/30/20 14:40

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