Methane Mitigation System Operations and Monitoring (O&M) Summary

DWR WATER WELL
PERMIT # 268360

13606 WCR 2 ½
Brighton, Colorado
NWSE S32 T1N R66W

COGCC Remediation # 15469

Prepared by:

TASMAN GEOSCIENCES

6855 WEST 119TH AVENUE
BROOMFIELD, COLORADO 80020

September 23, 2020

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1.0 Introduction

Tasman Geosciences, Inc. (Tasman) has prepared this operations and monitoring (O&M) summary on behalf of PDC Energy, Inc. (PDC) and Great Western Operating Company, LLC (collectively referred to as the Operators) for the methane mitigation system (System) installed at the (Property) associated with the Colorado Division of Water Resources (DWR) Well Permit Number 268360 (Well). The System was designed to mitigate methane concentrations in the Well water.

2.0 Location and Background

The Property is located at 13606 West County Road (WCR) 2 ½ in Brighton, Colorado, within the NWSE Quarter of Section 32, Township 1 North, Range 66 West. The Property coordinates are approximately 40.007457 degrees north latitude and -104.798748 degrees west longitude.

The Well is permitted for domestic use and is completed within the Laramie Fox Hills aquifer. The Well is constructed with a screened interval between 810 and 1,075 feet below ground surface (bgs), with a static water level of 463 feet bgs, according to DWR records. Water from the Well is pumped and conveyed into the basement of the residence, where it either enters the residential supply stream or is conveyed to exterior irrigation spigots.

As a part of an area water well study requested by the Colorado Oil and Gas Conservation Commission (COGCC), PDC retained Olsson Associates (Olsson) on May 8, 2020, to collect a preliminary baseline water sample from the Well in accordance with the COGCC Baseline Water Quality Sampling Program, Rule 318A. Laboratory results indicated that the sample exhibited a methane concentration of 11.6 milligrams per liter (mg/L) [Table 1]. Notification was provided to the COGCC, as the concentration exceeded the maximum reporting threshold of 10 mg/L. Subsequent isotopic and gas compositional analysis indicated that the methane exhibited properties of both thermogenic and biogenic origin.

On June 26, 2020, PDC retained Tasman to collect a supplemental baseline water sample from the Well. Laboratory and isotopic analyses confirmed an elevated methane concentration of 17.4 mg/L, with properties of thermogenic and biogenic origin. Baseline water analytical data is summarized in Table 1 and the laboratory report is provided as Attachment A.

As a result of the elevated methane concentration and properties of thermogenic origin, the Operators obtained consent from the landowners to install the System.

3.0 System Design

The System was designed to mitigate methane concentrations detected in the Well using a two-phased approach. The following sections summarize the design and installation for each component of the

System. A System process and instrumentation diagram (P&ID) is provided as Figure 1. A photographic overview of the System is provided as Attachment B.

3.1 Well Ventilation

The ventilation portion of the System is designed to allow for passive ventilation of methane from the Well casing. A schedule-80 polyvinyl chloride (PVC) pipe stack is constructed directly over the Well, and is sealed with an aluminum screened vent cap (Figure 1).

The Well ventilation stack was installed on August 6, 2020. Following installation, approximately ½-gallon of Clorox® bleach was poured into the Well as a precautionary measure to ensure that no foreign elements were introduced during construction.

3.2 Water Treatment System

The water treatment portion of the System is designed to remove methane dissolved in the Well water using a combination of aeration technology and carbon filtration (Figure 1). All System equipment is housed within the basement of the residence. The water is conveyed from the Well through the existing residential pressure tank and filter into the System for treatment.

Once water enters the System, it is conveyed via 1-inch schedule-40 PVC piping through a screen filter and into an aeration tank equipped with enclosed misters. The process water is sprayed, or atomized, within the tank, thereby volatilizing the dissolved methane. Methane vapors are then transferred from the tank via a small blower through a 3-inch PVC vent stack for discharge outside of the residence. The top of the vent stack is installed on the exterior of the residence, above and away from any windows. Vapor collection and conveyance operate as a closed system to prevent methane accumulation within the basement.

Once treated, process water collects at the bottom of the aeration tank. When the water level in the tank falls below the low liquid level switch (LSL), the switch is engaged thereby opening the solenoid valve and initiating Well pump operation. When the water level in the tank reaches the maximum fill level, the high liquid level switch (LSH) is engaged and the solenoid valve closes.

As water is consumed within the residence, process water is transferred from the aeration tank using an enclosed submersible pump into a small pressure tank. Prior to entering the residential supply stream, process water is conveyed through a granular activated carbon (GAC) filter as a polishing measure.

The shed and water treatment equipment were installed at the Property between August 24 and August 28, 2020. The System became operational on August 28, 2020.

4.0 System Sampling Program

The System sampling program is used to monitor operational efficacy and confirm methane concentrations are reduced below the target level of 10 mg/L. The following sections provide an overview to the sampling program, as well as data for the reporting period.

4.1 Overview

Water samples are collected from the influent and effluent process streams of the System (Figure 1). The effluent sample port (EFF) is located downstream of the aeration tank and GAC filter. The influent sample port (INF) is located upstream of the aeration tank and downstream of existing residential pressure tank.

Effluent water samples are collected following one minute of purging at a rate of 250 to 500 milliliters (mL) per minute (min). Influent water samples are collected following parameter stabilization while purging at a rate of 250 to 500 mL/min, to ensure that samples are representative of formation conditions.

Samples are collected in laboratory-provided unpreserved glass 40-mL vials and designated using the following sample identification nomenclature:

Prefix [INF or EFF] – mmddyy – time [24-hour]

Sample vials are subsequently placed in an ice-filled cooler to maintain a temperature of approximately 4 degrees Celsius during transportation to the laboratory. Samples are submitted to Summit Scientific Laboratory (Summit) under standard chain-of-custody procedures for analysis of dissolved gases (methane, ethane, propane) by Environmental Protection Agency (EPA) Method RSK-175.

4.2 Reporting Period Data

On August 26, 2020, one influent water sample was collected from the exterior irrigation spigot to determine if methane concentrations were reduced following well ventilation installation, prior to installation of the water treatment portion of the System. Analytical results indicated that the methane concentration remained in exceedance of the target level of 10 mg/L (Table 2).

Following full System start-up, process water samples were collected on a weekly basis during the first month of operation. Analytical results indicated that post-treatment methane concentrations were reduced below the target level of 10 mg/L. Analytical results are summarized in Table 2 and the laboratory reports are provided as Attachment A.

5.0 Upcoming Site Activities

Analytical results collected during the reporting period demonstrate System efficacy and compliance with the required methane target level. Based on this information, the System sampling program will be conducted on a quarterly basis.

System maintenance activities will be conducted concurrent with System sampling events. Maintenance will include inspection, cleaning, and replacement of the System components, as needed.

System sampling and maintenance events are scheduled for the third month of each quarter.

TABLES

TABLE 1
DWR WATER WELL PERMIT # 268360
BASELINE WATER ANALYTICAL RESULTS SUMMARY TABLE

	Analyte	CDPHE WQCC MCL in Groundwater [1]	Units	Roland_268360	Roland-Trust Well
				5/8/2020 [2]	6/26/2020 [3]
Organic Compounds	Benzene	0.005	mg/L	<0.00100	<0.00100
	Toluene	0.56	mg/L	<0.00100	<0.00100
	Ethylbenzene	0.70	mg/L	<0.00100	<0.00100
	Total Xylenes	1.4	mg/L	<0.00100	<0.00100
	Gasoline Range Organics	-	mg/L	0.156	<0.100
	Diesel Range Organics	-	mg/L	0.0998	<0.188
Dissolved Gases	Methane	-	mg/L	**11.6**	**17.4**
	Ethane	-	mg/L	3.16	6.08
	Propane	-	mg/L	2.4	3.32
Dissolved Metals	Barium	2.0	mg/L	0.0549	0.0600
	Boron	0.75	mg/L	0.355	0.393
	Calcium	-	mg/L	2.180	2.120
	Iron	0.3	mg/L	0.130	<0.100
	Magnesium	-	mg/L	0.381	0.467
	Manganese	0.05	mg/L	0.0175	0.0131
	Potassium	-	mg/L	1.350	1.380
	Selenium	0.05	mg/L	<0.00500	<0.00500
	Sodium	-	mg/L	337	312
	Strontium	-	mg/L	0.0835	0.0769
General Chemistry	Bromide	-	mg/L	1.10	1.08
	Chloride	250	mg/L	106	107
	Fluoride	4.0	mg/L	2.12	2.20
	Nitrate - Nitrite	10.0	mg/L	<0.100	<0.0200
	Sulfate	250	mg/L	0.152	<0.400
	Total Alkalinity	-	mg/L	543	574
	Bicarbonate Alkalinity	-	mg/L	488	518
	Carbonate	-	mg/L	54.2	56.2
	Total Phosphorus	-	mg/L	0.120	0.158
	Specific Conductivity (EC)	-	µS/cm	1270	1310
	Total Dissolved Solids	500	mg/L	**772**	**664**
	pH	6.5-8.5	units	**8.64**	**8.84**
BART	Iron Related Bacteria		CFU/mL	~ 35000	~ 9000
	Sulfate Reducing Bacteria		CFU/mL	~ 6000	~ 6000
	Slime Forming Bacteria	-	CFU/mL	~ 2500	~ 13000

Notes:

1. Domestic Water Supply - Human Health Standards referenced from Water Quality Control Commission (WQCC) 5 CCR 1002-41, Basic Standards for Groundwater, effective December 30, 2016.
2. Sample collected by Olsson Associates.
3. Sample collected by Tasman Geosciences, Inc.

CDPHE = Colorado Department of Public Health and Environment
mg/L = Milligrams per liter
µS/cm = MicroSiemens per centimeter
CFU/mL = Colony forming unit per milliliter
BART = Biological Activity and Reaction Test
Secondary Standard - Drinking Water

TABLE 1
DWR WATER WELL PERMIT # 268360
BASELINE WATER ANALYTICAL RESULTS SUMMARY TABLE

Agricultural Standard

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

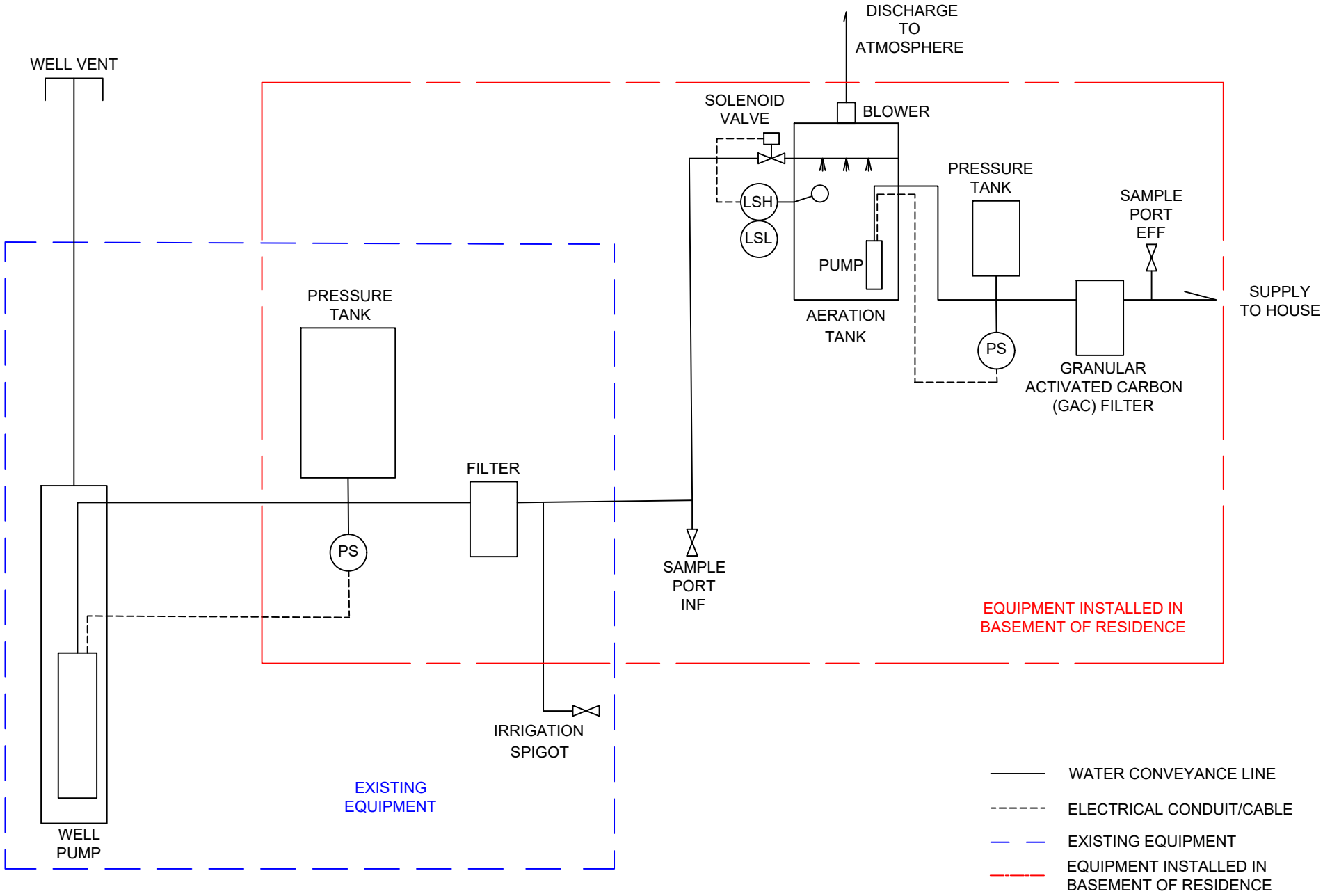
BOLD = Analytical result is in exceedance of applicable standard.

TABLE 2
DWR WATER WELL PERMIT # 268360
SYSTEM PROCESS WATER ANALYTICAL RESULTS SUMMARY TABLE

Sample ID	Date Sampled	Methane (mg/L)	Ethane (mg/L)	Propane (mg/L)
Target Level (mg/L)		**10**	**-**	**-**
EFF-083120-1010	8/31/2020	4.1	2.2	1.2
EFF-090820-0926	9/8/2020	2.9	2.0	1.2
EFF-091420-900	9/14/2020	3.4	1.9	1.2
EFF-092120-0915	9/21/2020	4.0	1.7	0.99
INF-082620-1139	8/26/2020	18	12	3.1
INF-083120-1107	8/31/2020	12	5.1	2.7
INF-090820-1019	9/8/2020	12	5.0	2.8
INF-091420-937	9/14/2020	12	5.2	2.9
INF-092120-1010	9/21/2020	12	5.2	4.1

Notes:
mg/L= Milligrams per liter

FIGURE



No.	Date	Revisions	By	Ckd

Project Manager's name: CHRISTINE HAMLIN
Professional Engineer's No.
State | Date Signed | Project Mgr.: CH
Designed by: DAG | Drawn by: DAG | Checked by: CH

TASMAN GEOSCIENCES

Methane Mitigation System
Process and Instrumentation Diagram

DWR Permit Number 268360

TASMAN GEOSCIENCES PROJECT

Date
AUGUST 31, 2020

TASMAN GEOSCIENCES
BROOMFIELD CO 80020
TELEPHONE NO 303-487-1228

ATTACHMENT A

ORIGINS LABORATORY, INC

July 06, 2020

PDC Energy Inc.

Karen Olson

4000 Burlington Ave.

Evans CO 80620

Project Name - Roland-Trust Methane **Project Number - [none]**

Attached are your analytical results for Roland-Trust Methane received by Origins Laboratory, Inc. June 26, 2020. This project is associated with Origins project number Y006444-01.

The analytical results in the following report were analyzed under the guidelines of EPA Methods. These methods are identified as follows; "SW" are defined in SW-846, "EPA" are defined in 40CFR part 136 and "SM" are defined in the most current revision of Standard Methods For the Examination of Water and Wastewater.

The analytical results apply specifically to the samples and analyses specified per the attached Chain of Custody. As such, this report shall not be reproduced except in full, without the written approval of Origin's laboratory.

Unless otherwise noted, the analytical results for all soil samples are reported on a wet weight basis. All analytical analyses were performed under NELAP guidelines unless noted by a data qualifier.

Any holding time exceedances, deviations from the method specifications or deviations from Origins Laboratory's Standard Operating Procedures are outlined in the case narrative.

Thank you for selecting Origins for your analytical needs. Please contact us with any questions concerning this report, or if we can help with anything at all.

Origins Laboratory, Inc.
303.433.1322
o-squad@oelabinc.com

THE NELAC INSTITUTE

ORIGINS LABORATORY, INC

PDC Energy Inc.
4000 Burlington Ave.
Evans CO 80620

Karen Olson
Project Number: [none]
Project: Roland-Trust Methane

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Roland-Trust Well	Y006444-01	Water	June 26, 2020 14:52	06/26/2020 15:21

Origins Laboratory, Inc.

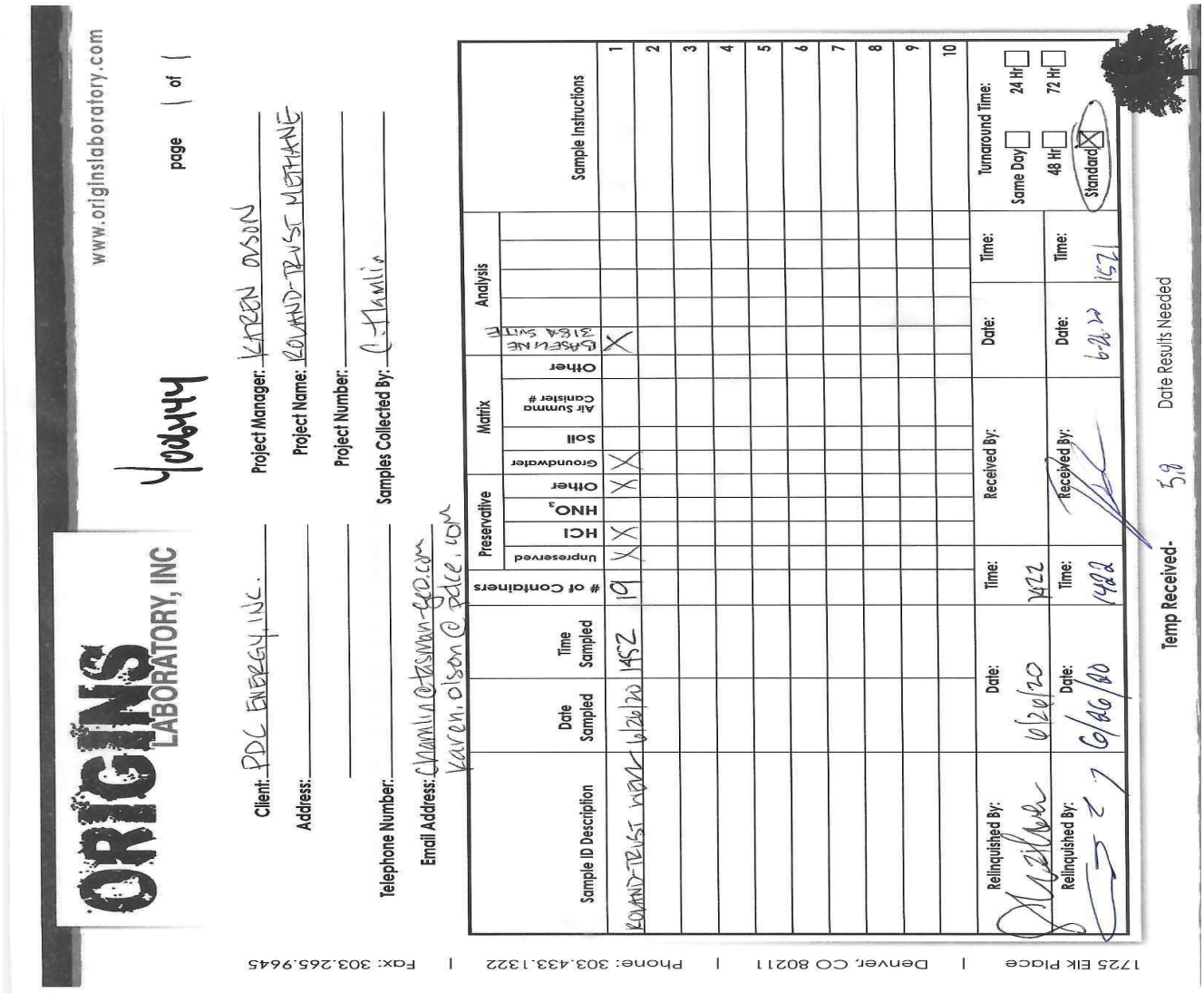
The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Jordan A. Merrill For Jen Pellegrini, Project Manager

ORIGINS LABORATORY, INC

PDC Energy Inc.
4000 Burlington Ave.
Evans CO 80620

Karen Olson
Project Number: [none]
Project: Roland-Trust Methane



Origins Laboratory, Inc.

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.

Jordan A. Merrill For Jen Pellegrini, Project Manager

PDC Energy Inc.
4000 Burlington Ave.
Evans CO 80620

Karen Olson
Project Number: [none]
Project: Roland-Trust Methane

Origins Laboratory

F-012207-01-R1
Effective Date: 01/09/12

Sample Receipt Checklist

Origins Work Order: 1006414 Client: PDC Energy Inc.
Client Project ID: Roland-Trust Methane

Checklist Completed by: Dan Lee Shipped Via: HD
(UPS, FedEx, Hand Delivered, Pick-up, etc.)
Date/time completed: 6-26-20 Airbill #: NA

Matrix(s) Received: (Check all that apply): ____Soil/Solid ✓ Water ____Other: ____
(Describe)

Cooler Number/Temperature: ✓ / 5.2 °C ____/____°C ____/____°C ____/____°C

Thermometer ID: T053

Requirement Description	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature between 0°C to ≤ 6°C[1]?	✓			
Is there ice present (document if blue ice is used)	✓			
Are custody seals present on cooler? (if so, document in comments if they are signed and dated, broken or intact)		✓		
Are custody seals present on each sample container? (if so, document in comments if they are signed and dated, broken or intact)		✓		
Were all samples received intact[1]?	✓			
Was adequate sample volume provided[1]?	✓			
Are short holding time analytes or samples with HTs due within 48 hours present[1]?	✓			pH
Is a chain-of-custody (COC) present and filled out completely[1]?	✓			
Does the COC agree with the number and type of sample bottles received[1]?	✓			
Do the sample IDs on the bottle labels match the COC[1]?	✓			
Is the COC properly relinquished by the client with date and time recorded[1]?	✓			
For volatiles in water – is there headspace (> ¼ inch bubble) present? **If yes, contact client and note in narrative.**		✓		
Are samples preserved that require preservation and was it checked [1]? *(note ID of confirmation instrument used in comments) / (preservation is not confirmed for subcontracted analyses in order to insure sample integrity)/(pH <2 for samples preserved with HNO3, HCL, H2SO4) / (pH >10 for samples preserved with NaAsO2+NaOH, ZnAc+NaOH)*	✓	✓		Nitrate/Nitrite + Total Phos. in H_2SO_4, Preservation was not confirmed
Additional Comments (if any):				

[1]*If NO, then contact the client before proceeding with analysis and note date/time and person contacted as well as the corrective action to in the additional comments (above) and the case narrative.*

Reviewed by (Project Manager) 6-29-20 Date/Time Reviewed

Origins Laboratory, Inc.

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.

Jordan A. Merrill For Jen Pellegrini, Project Manager

ORIGINS LABORATORY, INC

PDC Energy Inc.
4000 Burlington Ave.
Evans CO 80620

Karen Olson
Project Number: [none]
Project: Roland-Trust Methane

Roland-Trust Well
6/26/2020 2:52:00PM

GEL Laboratories, LLC
Y006444-01 (Water)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
Anions by EPA 300.0									
Bromide	**1.08**	0.200	mg/L	1	2015875	LXA2	06/26/2020	06/27/2020	
Chloride	**107**	4.00	"	20	"	LXA2	"	"	
Fluoride	**2.20**	0.100	"	1	"	LXA2	"	"	
Nitrate	ND	0.100	"	"	"	LXA2	"	"	U
Nitrite	ND	0.100	"	"	"	LXA2	"	"	U
Sulfate	ND	0.400	"	"	"	LXA2	"	"	U
Bacterial Activity Reaction Tests									
Iron Related Bacteria	~9000		CFU/mL	1	11111	DJL	"	06/26/2020	
Slime Forming Bacteria	~13000		"	"	"	DJL	"	"	
Sulfate Reducing Bacteria	~6000		"	"	"	DJL	"	"	
BTEX by EPA 8260D									
Benzene	ND	1.00	ug/L	1	B0F3001	KDK	06/30/2020	07/01/2020	Ua
Toluene	ND	1.00	"	"	"	KDK	"	"	Ua
Ethylbenzene	ND	1.00	"	"	"	KDK	"	07/01/2020	Ua
Xylenes, total	ND	1.00	"	"	"	KDK	"	07/01/2020	Ua
Surrogate: 1,2-Dichloroethane-d4	*104 %*		*70-130*		"		"	"	
Surrogate: Toluene-d8	*99.7 %*		*70-130*		"		"	"	
Surrogate: 4-Bromofluorobenzene	*96.5 %*		*70-130*		"		"	"	

Origins Laboratory, Inc.

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Jordan A. Merrill For Jen Pellegrini, Project Manager

PDC Energy Inc.
4000 Burlington Ave.
Evans CO 80620

Karen Olson
Project Number: [none]
Project: Roland-Trust Methane

Roland-Trust Well
6/26/2020 2:52:00PM

Pace Analytical
Y006444-01 (Water)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
Dissolved Gasses by RSK 175									
Ethane	**6080**	10.0	ug/L	1	11111		06/26/2020	06/30/2020	
Methane	**17400**	10.0	"	"	"		"	"	
n-Propane	**3320**	20.0	"	"	"		"	"	
Dissolved Metals by 200.8									
Barium	**60.0**	4.00	ug/L	1	2016322	BAJ	07/01/2020	07/02/2020	
Boron	**393**	150	"	10	"	BAJ	"	"	
Calcium	**2120**	200	"	1	"	BAJ	"	"	
Iron	ND	100	"	"	"	BAJ	"	"	U
Magnesium	**467**	30.0	"	"	"	BAJ	"	"	
Manganese	**13.1**	5.00	"	"	"	BAJ	"	"	
Potassium	**1380**	300	"	"	"	BAJ	"	"	
Selenium	ND	5.00	"	"	"	BAJ	"	"	U
Sodium	**312000**	2500	"	10	"	BAJ	"	"	
Strontium	**76.9**	10.0	"	1	"	BAJ	"	"	
DRO by 8015C									
Diesel Range Organics	ND	188	ug/L	1	2015925	RXC1	06/30/2020	07/01/2020	U
GRO by 8015C									
Gasoline Range Organics	ND	0.100	mg/L	1	2016031	RXY1	06/26/2020	06/30/2020	U

Origins Laboratory, Inc.

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Jordan A. Merrill For Jen Pellegrini, Project Manager

PDC Energy Inc.
4000 Burlington Ave.
Evans CO 80620

Karen Olson
Project Number: [none]
Project: Roland-Trust Methane

Roland-Trust Well
6/26/2020 2:52:00PM

GEL Laboratories, LLC
Y006444-01 (Water)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
Nitrate/Nitrite by EPA 353.2									
Nitrogen, Nitrate/Nitrite	ND	0.0200	mg/L	1	2016218	AXH3	"	07/01/2020	U
pH in Water by EPA 9040C									
pH	**8.84**		pH Units	1	B0F2608	DJL	06/26/2020	06/26/2020	
Specific Conductance by Modified 9050A									
Specific Conductance (EC)	**1310**	5.00	uS/cm	"	B0F2609	DJL	06/26/2020	06/26/2020	
Total Alkalinity by SM 2320B									
Alkalinity, Total as CaCO3	**574**	4.00	mg/L	1	2015565	RXB5	06/26/2020	06/27/2020	
Bicarbonate alkalinity (CaCO3)	**518**	4.00	"	"	"	RXB5	"	"	
Carbonate alkalinity (CaCO3)	**56.2**	4.00	"	"	"	RXB5	"	"	
Total Dissolved Solids by 2540C									
Total Dissolved Solids	**664**	5.00	mg/L	1	B0F3004	KDK	06/30/2020	07/01/2020	
Total Phosphorus by EPA 365.4									
Phosphorus, Total as P	**0.158**	0.0500	mg/L	1	2016171	AXH3	07/01/2020	07/01/2020	

Origins Laboratory, Inc.

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Jordan A. Merrill For Jen Pellegrini, Project Manager

PDC Energy Inc.
4000 Burlington Ave.
Evans CO 80620

Karen Olson
Project Number: [none]
Project: Roland-Trust Methane

Volatile Organic Compounds by GC/MS SW846 8260D - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B0F3001 - EPA 5030B (Water)										
Blank (B0F3001-BLK1)					Prepared: 06/30/2020 Analyzed: 07/01/2020					
Benzene	ND	1.00	ug/L							Ua
Toluene	ND	1.00	"							Ua
Ethylbenzene	ND	1.00	"							Ua
Xylenes, total	ND	1.00	"							Ua
Surrogate: 1,2-Dichloroethane-d4	*67*		*"*	*62.5*		*107*	*70-130*			
Surrogate: Toluene-d8	*62*		*"*	*62.5*		*99.2*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*62*		*"*	*62.5*		*99.1*	*70-130*			

Origins Laboratory, Inc.

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Jordan A. Merrill For Jen Pellegrini, Project Manager

PDC Energy Inc.
4000 Burlington Ave.
Evans CO 80620

Karen Olson
Project Number: [none]
Project: Roland-Trust Methane

Volatile Organic Compounds by GC/MS SW846 8260D - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B0F3001 - EPA 5030B (Water)										
LCS (B0F3001-BS1)					Prepared: 06/30/2020 Analyzed: 07/01/2020					
Benzene	62.4	1.00	ug/L	50.0		125	70-130			
Toluene	62.5	1.00	"	50.0		125	70-130			
Ethylbenzene	63.3	1.00	"	50.0		127	70-130			
m,p-Xylene	129	2.00	"	100		129	70-130			
o-Xylene	61.1	1.00	"	50.0		122	70-130			
Surrogate: 1,2-Dichloroethane-d4	*65*		"	*62.5*		*103*	*70-130*			
Surrogate: Toluene-d8	*63*		"	*62.5*		*102*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*61*		"	*62.5*		*97.1*	*70-130*			

Origins Laboratory, Inc.

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Jordan A. Merrill For Jen Pellegrini, Project Manager

PDC Energy Inc.
4000 Burlington Ave.
Evans CO 80620

Karen Olson
Project Number: [none]
Project: Roland-Trust Methane

Volatile Organic Compounds by GC/MS SW846 8260D - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B0F3001 - EPA 5030B (Water)										
Matrix Spike (B0F3001-MS1)		**Source: Y006466-01**			Prepared: 06/30/2020 Analyzed: 07/01/2020					
Benzene	25.6	1.00	ug/L	25.0	ND	102	70-130			
Toluene	25.4	1.00	"	25.0	ND	102	70-130			
Ethylbenzene	25.3	1.00	"	25.0	ND	101	70-130			
m,p-Xylene	49.9	2.00	"	50.0	0.310	99.3	70-130			
o-Xylene	25.8	1.00	"	25.0	ND	103	70-130			
Surrogate: 1,2-Dichloroethane-d4	*61*		"	*62.5*		*97.0*	*70-130*			
Surrogate: Toluene-d8	*62*		"	*62.5*		*99.5*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*64*		"	*62.5*		*103*	*70-130*			

Origins Laboratory, Inc.

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Jordan A. Merrill For Jen Pellegrini, Project Manager

PDC Energy Inc.
4000 Burlington Ave.
Evans CO 80620

Karen Olson
Project Number: [none]
Project: Roland-Trust Methane

Volatile Organic Compounds by GC/MS SW846 8260D - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B0F3001 - EPA 5030B (Water)										
Matrix Spike Dup (B0F3001-MSD1)		**Source: Y006466-01**			Prepared: 06/30/2020 Analyzed: 07/01/2020					
Benzene	36.6	1.00	ug/L	50.0	ND	73.2	70-130	35.5	20	QR-02
Toluene	36.6	1.00	"	50.0	ND	73.2	70-130	36.2	20	QR-02
Ethylbenzene	36.0	1.00	"	50.0	ND	72.0	70-130	35.1	20	QR-02
m,p-Xylene	71.6	2.00	"	100	0.310	71.2	70-130	35.6	20	QR-02
o-Xylene	36.7	1.00	"	50.0	ND	73.5	70-130	35.1	20	QR-02
Surrogate: 1,2-Dichloroethane-d4	*63*		*"*	*62.5*		*100*	*70-130*			
Surrogate: Toluene-d8	*62*		*"*	*62.5*		*99.9*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*62*		*"*	*62.5*		*98.7*	*70-130*			

Origins Laboratory, Inc.

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Jordan A. Merrill For Jen Pellegrini, Project Manager

PDC Energy Inc.
4000 Burlington Ave.
Evans CO 80620

Karen Olson
Project Number: [none]
Project: Roland-Trust Methane

Volatile Organic Compounds by GC/MS SW846 8260D - Quality Control
Origins Laboratory, Inc.

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

Classical Chemistry Parameters - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B0F2608 - NO PREP										
Duplicate (B0F2608-DUP1)		**Source: Y006444-01**			Prepared: 06/26/2020 Analyzed: 06/26/2020					
pH	8.81		pH Units		8.84			0.340	200	
Batch B0F2609 - NO PREP										
Blank (B0F2609-BLK1)					Prepared: 06/26/2020 Analyzed: 06/26/2020					
Specific Conductance (EC)	2.10	5.00	uS/cm							
Duplicate (B0F2609-DUP1)		**Source: Y006444-01**			Prepared: 06/26/2020 Analyzed: 06/26/2020					
Specific Conductance (EC)	1310	5.00	uS/cm		1310			0.0457	10	
Batch B0F3004 - NO PREP										
Blank (B0F3004-BLK1)					Prepared: 06/30/2020 Analyzed: 07/01/2020					
Total Dissolved Solids	ND	5.00	mg/L							
LCS (B0F3004-BS1)					Prepared: 06/30/2020 Analyzed: 07/01/2020					
Total Dissolved Solids	749	5.00	mg/L	716		105	85-115			
Duplicate (B0F3004-DUP1)		**Source: Y006391-01**			Prepared: 06/30/2020 Analyzed: 07/01/2020					
Total Dissolved Solids	2520	5.00	mg/L		2480			1.64	20	

Origins Laboratory, Inc.

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Jordan A. Merrill For Jen Pellegrini, Project Manager

PDC Energy Inc.
4000 Burlington Ave.
Evans CO 80620

Karen Olson
Project Number: [none]
Project: Roland-Trust Methane

Anions by EPA 300.0 - Quality Control
GEL Laboratories, LLC

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2015875 -										
BLANK (1204587786-BLK)					Prepared: Analyzed: 06/27/2020					
Nitrite	ND	0.100	mg/L				-			U
Nitrate	ND	0.100	"				-			U
Fluoride	ND	0.100	"				-			U
Chloride	ND	0.200	"				-			U
Bromide	ND	0.200	"				-			U
Sulfate	ND	0.400	"				-			U
LCS (1204587787-BKS)					Prepared: Analyzed: 06/27/2020					
Sulfate	10.2	0.400	mg/L	10.0		102	90-110			
Nitrite	2.53	0.100	"	2.50		101	90-110			
Nitrate	2.48	0.100	"	2.50		99.3	90-110			
Fluoride	2.57	0.100	"	2.50		103	90-110			
Chloride	4.96	0.200	"	5.00		99.2	90-110			
Bromide	1.26	0.200	"	1.25		100	90-110			
DUP (1204587792 D)		**Source: Y006444-01**			Prepared: Analyzed: 06/27/2020					
Chloride	107	4.00	mg/L		107		0-20	0.116	20	
Sulfate	ND	0.400	"		0.201		0-20	7.98	20	U
Nitrite	ND	0.100	"		<0.0330		0-20	0	20	U
Fluoride	2.20	0.100	"		2.20		0-20	0.0318	20	
Bromide	1.10	0.200	"		1.08		0-20	1.56	20	
Nitrate	ND	0.100	"		<0.0330		0-20	0	20	U
PS (1204587793 S)		**Source: Y006444-01**			Prepared: Analyzed: 06/27/2020					
Sulfate	10.5	0.400	mg/L	10.0		103	90-110			
Bromide	2.37	0.200	"	1.25		103	90-110			
Chloride	218	4.00	"	5.00		112	90-110			

Origins Laboratory, Inc.

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Jordan A. Merrill For Jen Pellegrini, Project Manager

PDC Energy Inc.
4000 Burlington Ave.
Evans CO 80620

Karen Olson
Project Number: [none]
Project: Roland-Trust Methane

Anions by EPA 300.0 - Quality Control
GEL Laboratories, LLC

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2015875 -										
PS (1204587793 S)		**Source: Y006444-01**			Prepared: Analyzed: 06/27/2020					
Fluoride	4.92	0.100	mg/L	2.50		109	90-110			
Nitrate	2.61	0.100	"	2.50		104	90-110			
Nitrite	2.66	0.100	"	2.50		106	90-110			

Origins Laboratory, Inc.

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Jordan A. Merrill For Jen Pellegrini, Project Manager

PDC Energy Inc.
4000 Burlington Ave.
Evans CO 80620

Karen Olson
Project Number: [none]
Project: Roland-Trust Methane

Dissolved Metals by 200.8 - Quality Control
GEL Laboratories, LLC

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2016322 -										
FLTB (1204588723-BLK)					Prepared: 07/01/2020 Analyzed: 07/02/2020					
Strontium	ND	10.0	ug/L				-			U
Calcium	ND	200	"				-			U
Boron	ND	15.0	"				-			U
Barium	ND	4.00	"				-			U
Magnesium	ND	30.0	"				-			U
Manganese	ND	5.00	"				-			U
Potassium	ND	300	"				-			U
Selenium	ND	5.00	"				-			U
Iron	ND	100	"				-			U
Sodium	ND	250	"				-			U
BLANK (1204588842-BLK)					Prepared: 07/01/2020 Analyzed: 07/02/2020					
Sodium	ND	250	ug/L				-			U
Boron	ND	15.0	"				-			U
Calcium	ND	200	"				-			U
Iron	ND	100	"				-			U
Magnesium	ND	30.0	"				-			U
Manganese	ND	5.00	"				-			U
Potassium	ND	300	"				-			U
Selenium	ND	5.00	"				-			U
Strontium	ND	10.0	"				-			U
Barium	ND	4.00	"				-			U
LCS (1204588843-BKS)					Prepared: 07/01/2020 Analyzed: 07/02/2020					
Sodium	2140	250	ug/L	2000		107	85-115			
Barium	53.0	4.00	"	50.0		106	85-115			
Strontium	52.1	10.0	"	50.0		104	85-115			

Origins Laboratory, Inc.

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Jordan A. Merrill For Jen Pellegrini, Project Manager

PDC Energy Inc.
4000 Burlington Ave.
Evans CO 80620

Karen Olson
Project Number: [none]
Project: Roland-Trust Methane

Dissolved Metals by 200.8 - Quality Control
GEL Laboratories, LLC

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2016322 - EPA 200.2										
LCS (1204588843-BKS)					Prepared: 07/01/2020 Analyzed: 07/02/2020					
Selenium	55.1	5.00	ug/L	50.0		110	85-115			
Potassium	1910	300	"	2000		95.6	85-115			
Manganese	49.4	5.00	"	50.0		98.9	85-115			
Magnesium	2030	30.0	"	2000		102	85-115			
Iron	2040	100	"	2000		102	85-115			
Calcium	2140	200	"	2000		107	85-115			
Boron	100	15.0	"	100		100	85-115			
DUP (1204588844 D)		**Source: Y006444-01**			Prepared: 07/01/2020 Analyzed: 07/02/2020					
Iron	ND	100	ug/L		55.9		0-20	6.17	20	U
Strontium	75.8	10.0	"		76.9		0-20	1.49	20	
Sodium	306000	2500	"		312000		0-20	2.03	20	
Selenium	ND	5.00	"		<2.00		0-20	NR	20	U
Potassium	1380	300	"		1380		0-20	0.00441	20	
Barium	57.6	4.00	"		60.0		0-20	4.07	20	
Magnesium	470	30.0	"		467		0-20	0.589	20	
Calcium	2130	200	"		2120		0-20	0.187	20	
Boron	383	150	"		393		0-20	2.72	20	
Manganese	13.2	5.00	"		13.1		0-20	0.51	20	
MS (1204588845 S)		**Source: Y006444-01**			Prepared: 07/01/2020 Analyzed: 07/02/2020					
Strontium	125	10.0	ug/L	50.0	76.9	97.1	75-125			
Sodium	309000	2500	"	2000	312000	0	75-125			
Selenium	46.9	5.00	"	50.0	<2.00	93.4	75-125			
Potassium	3220	300	"	2000	1380	91.8	75-125			
Manganese	59.8	5.00	"	50.0	13.1	93.3	75-125			
Magnesium	2280	30.0	"	2000	467	90.7	75-125			

Origins Laboratory, Inc.

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Jordan A. Merrill For Jen Pellegrini, Project Manager

PDC Energy Inc.
4000 Burlington Ave.
Evans CO 80620

Karen Olson
Project Number: [none]
Project: Roland-Trust Methane

Dissolved Metals by 200.8 - Quality Control
GEL Laboratories, LLC

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2016322 - EPA 200.2										
MS (1204588845 S)		**Source: Y006444-01**			Prepared: 07/01/2020 Analyzed: 07/02/2020					
Iron	1920	100	ug/L	2000	55.9	93.4	75-125			
Calcium	4070	200	"	2000	2120	97.7	75-125			
Boron	499	150	"	100	393	106	75-125			
Barium	106	4.00	"	50.0	60.0	91.3	75-125			

Origins Laboratory, Inc.

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Jordan A. Merrill For Jen Pellegrini, Project Manager

PDC Energy Inc.
4000 Burlington Ave.
Evans CO 80620

Karen Olson
Project Number: [none]
Project: Roland-Trust Methane

DRO by 8015C - Quality Control
GEL Laboratories, LLC

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2015925 - SW846 3535A										
BLANK (1204587904-BLK)					Prepared: 06/30/2020 Analyzed: 06/30/2020					
Diesel Range Organics	ND	200	ug/L				-			U
LCS (1204587905-BKS)					Prepared: 06/30/2020 Analyzed: 06/30/2020					
Diesel Range Organics	821	200	ug/L	1000		82	45-119			
MS (1204587906 S)		**Source: 514459005**			Prepared: 06/30/2020 Analyzed: 07/01/2020					
Diesel Range Organics	814	200	ug/L	1000	<75.0	81	41-118			
MSD (1204587907 SD)		**Source: 514459005**			Prepared: 06/30/2020 Analyzed: 07/01/2020					
Diesel Range Organics	643	200	ug/L	1000	<75.0	64	41-118	23	20	

Origins Laboratory, Inc.

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Jordan A. Merrill For Jen Pellegrini, Project Manager

PDC Energy Inc.
4000 Burlington Ave.
Evans CO 80620

Karen Olson
Project Number: [none]
Project: Roland-Trust Methane

GRO by 8015C - Quality Control
GEL Laboratories, LLC

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2016031 -										
BLANK (1204588194-BLK)					Prepared: Analyzed: 06/30/2020					
Gasoline Range Organics	ND	0.100	mg/L				-			U
LCS (1204588195-BKS)					Prepared: Analyzed: 06/30/2020					
Gasoline Range Organics	0.573	0.100	mg/L	0.500		115	80-120			
PS (1204588196 S)		**Source: Y006444-01**			Prepared: Analyzed: 06/30/2020					
Gasoline Range Organics	0.591	0.100	mg/L	0.500		99	68-127			
PSD (1204588197 SD)		**Source: Y006444-01**			Prepared: Analyzed: 06/30/2020					
Gasoline Range Organics	0.524	0.100	mg/L	0.500		86	68-127	12	30	

Origins Laboratory, Inc.

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Jordan A. Merrill For Jen Pellegrini, Project Manager

PDC Energy Inc.
4000 Burlington Ave.
Evans CO 80620

Karen Olson
Project Number: [none]
Project: Roland-Trust Methane

Nitrate/Nitrite by EPA 353.2 - Quality Control
GEL Laboratories, LLC

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2016218 -										
BLANK (1204588679-BLK)					Prepared:	Analyzed: 07/01/2020				
Nitrogen, Nitrate/Nitrite	ND	0.0200	mg/L				-			U
LCS (1204588680-BKS)					Prepared:	Analyzed: 07/01/2020				
Nitrogen, Nitrate/Nitrite	1.07	0.0200	mg/L	1.00		107	90-110			
DUP (1204588681 D)		**Source: Y006444-01**			Prepared:	Analyzed: 07/01/2020				
Nitrogen, Nitrate/Nitrite	ND	0.0200	mg/L		<0.00700		0-20	57.6	20	U
PS (1204588682 S)		**Source: Y006444-01**			Prepared:	Analyzed: 07/01/2020				
Nitrogen, Nitrate/Nitrite	1.03	0.0200	mg/L	1.00		103	90-110			

Origins Laboratory, Inc.

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Jordan A. Merrill For Jen Pellegrini, Project Manager

PDC Energy Inc.
4000 Burlington Ave.
Evans CO 80620

Karen Olson
Project Number: [none]
Project: Roland-Trust Methane

Total Alkalinity by SM 2320B - Quality Control
GEL Laboratories, LLC

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2015565 -										
LCS (1204587241-BKS)					Prepared:	Analyzed: 06/27/2020				
Alkalinity, Total as CaCO3	104	4.00	mg/L	100		104	90-110			
DUP (1204587242 D)		**Source: 514219001**			Prepared:	Analyzed: 06/27/2020				
Carbonate alkalinity (CaCO3)	ND	4.00	mg/L		<1.45		0-20	0	20	U
Bicarbonate alkalinity (CaCO3)	78.2	4.00	"		82.2		0-20	5	20	
Alkalinity, Total as CaCO3	78.2	4.00	"		82.2		0-20	5	20	
MS (1204587243 S)		**Source: 514219001**			Prepared:	Analyzed: 06/27/2020				
Alkalinity, Total as CaCO3	184	4.00	mg/L	100	82.2	101	80-120			

Origins Laboratory, Inc.

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Jordan A. Merrill For Jen Pellegrini, Project Manager

PDC Energy Inc.
4000 Burlington Ave.
Evans CO 80620

Karen Olson
Project Number: [none]
Project: Roland-Trust Methane

Total Phosphorus by EPA 365.4 - Quality Control
GEL Laboratories, LLC

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2016171 - EPA 365.4 Prep										
BLANK (1204588549-BLK)					Prepared: 07/01/2020 Analyzed: 07/01/2020					
Phosphorus, Total as P	ND	0.0500	mg/L				-			U
LCS (1204588550-BKS)					Prepared: 07/01/2020 Analyzed: 07/01/2020					
Phosphorus, Total as P	0.880	0.0500	mg/L	1.00		88	80-124			
DUP (1204588593 D)		**Source: 514452001**			Prepared: 07/01/2020 Analyzed: 07/01/2020					
Phosphorus, Total as P	0.109	0.0500	mg/L		0.111		0-41	1.82	41	
MS (1204588594 S)		**Source: 514452001**			Prepared: 07/01/2020 Analyzed: 07/01/2020					
Phosphorus, Total as P	0.969	0.0500	mg/L	1.00	0.111	85.8	70-136			

Origins Laboratory, Inc.

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Jordan A. Merrill For Jen Pellegrini, Project Manager

PDC Energy Inc.
4000 Burlington Ave.
Evans CO 80620

Karen Olson
Project Number: [none]
Project: Roland-Trust Methane

Notes and Definitions

Ua	Sample is Non-Detect.
U	Result not detected above the detection limit
QR-02	The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC batch were accepted based on percent recoveries and completeness of QC data.
~9000	~9000
~6000	~6000
~13000	~13000
ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference

All soil results are reported at a wet weight basis.

Origins Laboratory, Inc.

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Jordan A. Merrill For Jen Pellegrini, Project Manager

Summit Scientific

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

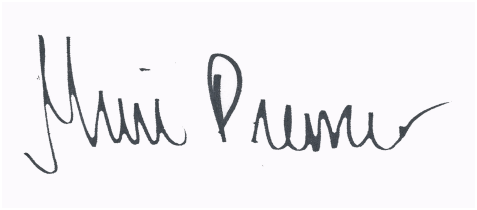
August 27, 2020

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

RE: DWR Permit #268360
Work Order #2008239

Enclosed are the results of analyses for samples received by Summit Scientific on 08/26/20 16:58. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Muri Premer For Paul Shrewsbury
President

S2

PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #268360 Project Number: AFE # EX-000335 Project Manager: Karen Olson	**Reported:** 08/27/20 16:12

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
INF-082620-1139	2008239-01	Water	08/26/20 11:39	08/26/20 16:58

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.

2008239

Summit Scientific

S_2

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

Client: PDC Energy / Tasman
Address: 6855 W. 119th Ave.
City/State/Zip: Broomfield / CO / 80020
Phone: 303-487-1228
Sampler Name: Brock Nelson

Project Manager: Karen Olson
E-Mail: Karen.Olson@pdce.com; chamlin@tasman-geo.com
Project Name: DWR Permit # 268360
Project Number: AFE # EX-000335

					Preservative				Matrix				Analysis Requested								Special Instructions
ID	Sample Description	Date Sampled	Time Sampled	# of containers	HCl	HNO3	None	Other ___	Water	Soil	Air-Canister #	Other ___	RSK-175 (Dissolved Gases)								
1	INF-082620-1139	8/26/20	1139	3			X		X				X								
2																					
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					

Relinquished by: Date/Time: 8/26/20 1240
Received by: Tasman Lock Box Date/Time: 8/26/20 1240

Relinquished by: Date/Time: 08/26/2020 1700
Received by: Date/Time: 08/26/2020 1700

Relinquished by: Date/Time:
Received by: Date/Time:

Turn Around Time (Check)
Same Day ___ 72 hours ___
24 hours X Standard ___
48 hours ___

Sample Integrity:
Temperature Upon Receipt: 3.6
Samples Intact: Yes No

Notes:

Sample Receipt Checklist

S2 Work Order 2008235

Client: POC / TASMAN Client Project ID: DWR PERMIT # 268360

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

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

Temp (°C)	3.6

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.	X			
Were all samples received intact (1)?	X			
Was adequate sample volume provided (1)?	X			
If custody seals are present, are they intact (1)?			X	
Are samples with holding times due within 48 hours sample due within 48 hours present?	X			24 HOUR TAT
Is a chain-of-custody (COC) form present and filled out completely (1)?	X			
Does the COC agree with the number and type of sample bottles received (1)?	X			
Do the sample IDs on the bottle labels match the COC (1)?	X			
Is the COC properly relinquished by the client w/ date and time recorded (1)?	X			
For volatiles in water – is there headspace present? **If yes, contact client and note in narrative.**		X		
Are samples preserved that require preservation **(excluding cooling)** (1)? Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect			X	
If samples are acid preserved for metals, is the pH ≤ 2(1)? Record the pH in Comments.			X	
If dissolved metals are requested, were samples field filtered?			X	
Additional Comments (if any):				

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

Custodian Printed Name or Initials	Signature of Custodian	Date/Time
TG		08/26/2020

S2

PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #268360 Project Number: AFE # EX-000335 Project Manager: Karen Olson	**Reported:** 08/27/20 16:12

INF-082620-1139

2008239-01 (Water)

Summit Scientific

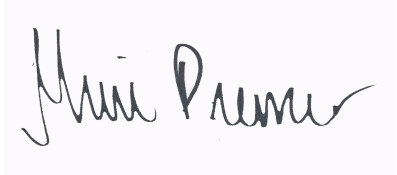
Dissolved Gases by RSK-175

Date Sampled: **08/26/20 11:39**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Methane	**18**	1.0	mg/L	100	2008270	08/26/20	08/27/20	RSK-175 mod	
Ethane	**12**	1.0	"	"	"	"	"	"	
Propane	**3.1**	0.10	"	10	"	"	"	"	

Date Sampled: **08/26/20 11:39**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: Ethene		*115 %*	*70-130*		"	"	"	"	



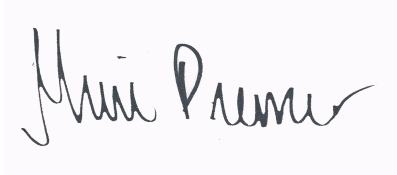
S2

PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #268360 Project Number: AFE # EX-000335 Project Manager: Karen Olson	**Reported:** 08/27/20 16:12

Dissolved Gases by RSK-175 - Quality Control

Summit Scientific

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2008270 - GC										
Blank (2008270-BLK1)				Prepared: 08/26/20 Analyzed: 08/27/20						
Methane	ND	0.010	mg/L							
Ethane	ND	0.010	"							
Propane	ND	0.010	"							
Surrogate: Ethene	*0.0397*		*"*	*0.0364*		*109*	*70-130*			
LCS (2008270-BS1)				Prepared: 08/26/20 Analyzed: 08/27/20						
Methane	0.036	0.010	mg/L	0.0428		84.4	70-130			
Ethane	0.10	0.010	"	0.0798		129	70-130			
Propane	0.15	0.010	"	0.139		109	70-130			
Surrogate: Ethene	*0.0916*		*"*	*0.0728*		*126*	*70-130*			
Duplicate (2008270-DUP1)		**Source: 2008239-01**		Prepared: 08/26/20 Analyzed: 08/27/20						
Methane	10	1.0	mg/L		18			53.7	30	QR-03
Ethane	4.6	1.0	"		12			88.1	30	QR-03
Propane	2.3	1.0	"		3.1			27.8	30	
Surrogate: Ethene	*0.0398*		*"*	*0.0364*		*109*	*70-130*			
Matrix Spike (2008270-MS1)		**Source: 2008239-01**		Prepared: 08/26/20 Analyzed: 08/27/20						
Methane	11	1.0	mg/L	0.0428	18	NR	70-130			QR-03
Ethane	4.9	1.0	"	0.0798	12	NR	70-130			QR-03
Propane	2.5	1.0	"	0.139	3.1	NR	70-130			QR-03
Surrogate: Ethene	*0.0773*		*"*	*0.0728*		*106*	*70-130*			



PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #268360 Project Number: AFE # EX-000335 Project Manager: Karen Olson	**Reported:** 08/27/20 16:12

Notes and Definitions

QR-03	The RPD value for the sample duplicate or MS/MSD was outside of QC acceptance limits due to matrix interference. QC batch accepted based on LCS and/or LCSD recovery and/or RPD values.
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

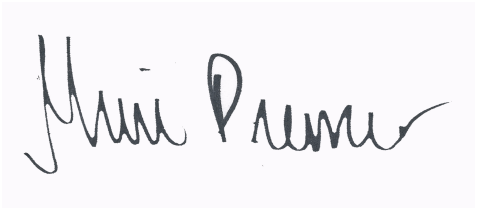
September 01, 2020

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

RE: DWR Permit #268360
Work Order #2008288

Enclosed are the results of analyses for samples received by Summit Scientific on 08/31/20 17:45. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Muri Premer For Paul Shrewsbury
President

S2

PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #268360 Project Number: AFE # EX-000335 Project Manager: Karen Olson	**Reported:** 09/01/20 16:10

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
EFF-083120-1010	2008288-01	Water	08/31/20 10:10	08/31/20 17:45
INF-083120-1107	2008288-02	Water	08/31/20 11:07	08/31/20 17:45

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.

2008288

Summit Scientific

S2

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

Client:	PDC Energy / Tasman	Project Manager:	Karen Olson
Address:	6855 W. 119th Ave.	E-Mail:	Karen.Olson@pdce.com; chamlin@tasman-geo.com
City/State/Zip:	Broomfield / CO / 80020		
Phone:	303-487-1228	Project Name:	DWR Permit # 268360
Sampler Name:	Brock Nelson / Christine Hamlin	Project Number:	AFE # EX-000335

					Preservative				Matrix				Analysis Requested								Special Instructions
ID	Sample Description	Date Sampled	Time Sampled	# of containers	HCl	HNO3	None	Other ___	Water	Soil	Air-Canister #	Other ___	RSK-175 (Dissolved Gases)								
1	EFF-083120-1010	8/31/20	1010	3			X		X				X								
2	INF-083120-1107	8/31/20	1107	3			X		X				X								
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					

Relinquished by:	Date/Time: 8/31/20 1715	Received by: Tasman Lock Box	Date/Time: 8/31/20 1215
Relinquished by: Tasman Lock Box	Date/Time: 08/31/2020 1730	Received by:	Date/Time: 08/31/2020 1730
Relinquished by:	Date/Time:	Received by:	Date/Time:

Turn Around Time (Check)

Same Day	___	72 hours	___
24 hours	X	Standard	___
48 hours	___		

Sample Integrity:

Temperature Upon Receipt: 5.2

Samples Intact: (Yes) No

Notes:

Sample Receipt Checklist

S2 Work Order 2008288

Client: PDC / TASMAN Client Project ID: DWP PERMIT #26836

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

☐ ☒ ☐ ☐ ☐

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

Temp (°C)	5.2

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.	X			
Were all samples received intact (1)?	X			
Was adequate sample volume provided (1)?	X			
If custody seals are present, are they intact (1)?			X	
Are samples with holding times due within 48 hours sample due within 48 hours present?	X			24 Hour TAT
Is a chain-of-custody (COC) form present and filled out completely (1)?	X			
Does the COC agree with the number and type of sample bottles received (1)?	X			
Do the sample IDs on the bottle labels match the COC (1)?	X			
Is the COC properly relinquished by the client w/ date and time recorded (1)?	X			
For volatiles in water – is there headspace present? **If yes, contact client and note in narrative.**		X		
Are samples preserved that require preservation **(excluding cooling)** (1)? Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect			X	
If samples are acid preserved for metals, is the pH ≤ 2(1)? Record the pH in Comments.			X	
If dissolved metals are requested, were samples field filtered?			X	
Additional Comments (if any):				

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

KC — **Custodian Printed Name or Initials**

Signature of Custodian

08/31/2020 — **Date/Time**

S2

PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #268360 Project Number: AFE # EX-000335 Project Manager: Karen Olson	**Reported:** 09/01/20 16:10

EFF-083120-1010

2008288-01 (Water)

Summit Scientific

Dissolved Gases by RSK-175

Date Sampled: **08/31/20 10:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Methane	**4.1**	1.0	mg/L	100	2008322	08/31/20	09/01/20	RSK-175 mod	
Ethane	**2.2**	0.10	"	10	"	"	"	"	
Propane	**1.2**	0.10	"	"	"	"	"	"	

Date Sampled: **08/31/20 10:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: Ethene		*151 %*	*70-130*		"	"	"	"	*S-02*

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.

S2

PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #268360 Project Number: AFE # EX-000335 Project Manager: Karen Olson	**Reported:** 09/01/20 16:10

INF-083120-1107

2008288-02 (Water)

Summit Scientific

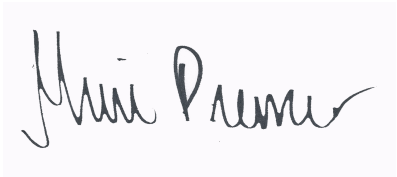
Dissolved Gases by RSK-175

Date Sampled: **08/31/20 11:07**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Methane	**12**	1.0	mg/L	100	2008322	08/31/20	09/01/20	RSK-175 mod	
Ethane	**5.1**	1.0	"	"	"	"	"	"	
Propane	**2.7**	1.0	"	"	"	"	"	"	

Date Sampled: **08/31/20 11:07**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: Ethene		*82.4 %*	*70-130*		"	"	"	"	



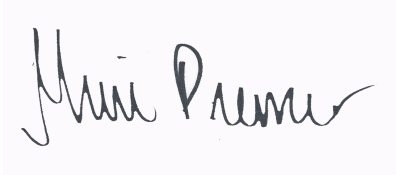
S2

PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #268360 Project Number: AFE # EX-000335 Project Manager: Karen Olson	**Reported:** 09/01/20 16:10

Dissolved Gases by RSK-175 - Quality Control

Summit Scientific

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2008322 - GC										
Blank (2008322-BLK1)				Prepared: 08/31/20 Analyzed: 09/01/20						
Methane	ND	0.010	mg/L							
Ethane	ND	0.010	"							
Propane	ND	0.010	"							
Surrogate: Ethene	*0.0468*		*"*	*0.0364*		*129*	*70-130*			
LCS (2008322-BS1)				Prepared: 08/31/20 Analyzed: 09/01/20						
Methane	0.033	0.010	mg/L	0.0428		76.9	70-130			
Ethane	0.095	0.010	"	0.0798		119	70-130			
Propane	0.14	0.010	"	0.139		100	70-130			
Surrogate: Ethene	*0.0924*		*"*	*0.0728*		*127*	*70-130*			
Duplicate (2008322-DUP1)	**Source: 2008288-01**			Prepared: 08/31/20 Analyzed: 09/01/20						
Methane	4.4	1.0	mg/L		4.1			7.57	30	
Ethane	2.4	1.0	"		2.2			11.6	30	
Propane	1.4	1.0	"		1.2			15.5	30	
Surrogate: Ethene	*0.0500*		*"*	*0.0364*		*137*	*70-130*			*S-02*
Matrix Spike (2008322-MS1)	**Source: 2008288-01**			Prepared: 08/31/20 Analyzed: 09/01/20						
Methane	3.6	1.0	mg/L	0.0428	4.1	NR	70-130			QM-02
Ethane	2.0	0.10	"	0.0798	2.2	NR	70-130			QM-02
Propane	1.2	0.10	"	0.139	1.2	NR	70-130			QM-02
Surrogate: Ethene	*0.0710*		*"*	*0.0728*		*97.5*	*70-130*			



PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #268360 Project Number: AFE # EX-000335 Project Manager: Karen Olson	**Reported:** 09/01/20 16:10

Notes and Definitions

S-02	The surrogate recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample extract.
QM-02	The RPD and/or percent recovery for this QC spike sample cannot be accurately calculated due to the high concentration of analyte inherent in the sample.
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

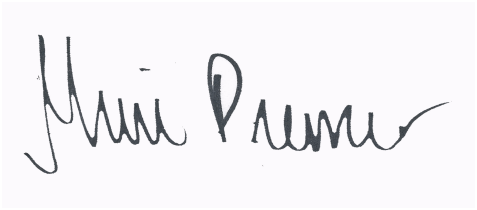
September 09, 2020

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

RE: DWR Permit #268360
Work Order #2009069

Enclosed are the results of analyses for samples received by Summit Scientific on 09/08/20 17:23. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Muri Premer For Paul Shrewsbury
President

S2

PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #268360 Project Number: AFE # EX-000335 Project Manager: Karen Olson	**Reported:** 09/09/20 17:56

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
EFF-090820-0926	2009069-01	Water	09/08/20 09:26	09/08/20 17:23
INF-090820-1019	2009069-02	Water	09/08/20 10:19	09/08/20 17:23

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

2009069

S_2

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

Client:	PDC Energy / Tasman	Project Manager:	Karen Olson
Address:	6855 W. 119th Ave.	E-Mail:	Karen.Olson@pdce.com; chamlin@tasman-geo.com
City/State/Zip:	Broomfield / CO / 80020		
Phone:	303-487-1228	Project Name:	DWR Permit # 268360
Sampler Name:	Brock Nelson	Project Number:	AFE # EX-000335

					Preservative				Matrix				Analysis Requested								Special Instructions
ID	Sample Description	Date Sampled	Time Sampled	# of containers	HCl	HNO3	None	Other ___	Water	Soil	Air-Canister #	Other ___	RSK-175 (Dissolved Gases)								
1	EFF-090820-0926	9/8/20	9:26	3			X		X				X								
2	INF-090820-1019	9/8/20	10:19	3			X		X				X								
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					

Relinquished by:	Date/Time:	Received by:	Date/Time:
[signature]	9/8/20 11:30	Tasman Lockbox	9/8/20 11:30
Tasman Lockbox	09/08/2020 1715	[signature]	09/08/2020 1715
Relinquished by:	Date/Time:	Received by:	Date/Time:

Turn Around Time (Check)

Same Day	___	72 hours	___
24 hours	X	Standard	___
48 hours	___		

Sample Integrity:

Temperature Upon Receipt: 4.6

Samples Intact: (Yes) No

Notes:

Sample Receipt Checklist

S2 Work Order 2009067

Client: DOC / TASMAN Client Project ID: DWR Permit #26836

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

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

Temp (°C)	4.6

Thermometer ID: 61857155-K

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature at 4°C +/- 2°C [1]? NOTE: If samples are delivered the same day of sampling, this requirement is met provided that there is evidence that cooling has begun.	✓			
Were all samples received intact [1]?	✓			
Was adequate sample volume provided [1]?	✓			
If custody seals are present, are they intact [1]?			✓	
Are samples with holding times due within 48 hours sample due within 48 hours present?	✓			24 HOUR TAT
Is a chain-of-custody (COC) form present and filled out completely [1]?	✓			
Does the COC agree with the number and type of sample bottles received [1]?	✓			
Do the sample IDs on the bottle labels match the COC [1]?	✓			
Is the COC properly relinquished by the client w/ date and time recorded [1]?	✓			
For volatiles in water – is there headspace present? **If yes, contact client and note in narrative.**		✓		
Are samples preserved that require preservation **(excluding cooling)** [1]? Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect			✓	
If samples are acid preserved for metals, is the pH ≤ 2[1]? Record the pH in Comments.			✓	
If dissolved metals are requested, were samples field filtered?			✓	
Additional Comments (if any):				

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

Custodian Printed Name or Initials	Signature of Custodian	Date/Time
KC		09/08/2020

S2

PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #268360 Project Number: AFE # EX-000335 Project Manager: Karen Olson	**Reported:** 09/09/20 17:56

EFF-090820-0926

2009069-01 (Water)

Summit Scientific

Dissolved Gases by RSK-175

Date Sampled: **09/08/20 09:26**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Methane	**2.9**	1.0	mg/L	100	2009075	09/08/20	09/09/20	RSK-175 mod	
Ethane	**2.0**	0.10	"	10	"	"	"	"	
Propane	**1.2**	0.10	"	"	"	"	"	"	

Date Sampled: **09/08/20 09:26**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: Ethene		*137 %*	*70-130*		"	"	"	"	*S-06*

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.

S2

PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #268360 Project Number: AFE # EX-000335 Project Manager: Karen Olson	**Reported:** 09/09/20 17:56

INF-090820-1019

2009069-02 (Water)

Summit Scientific

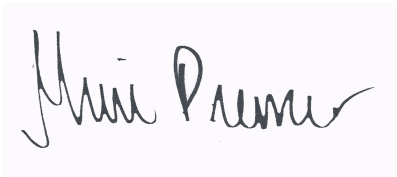
Dissolved Gases by RSK-175

Date Sampled: **09/08/20 10:19**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Methane	**12**	1.0	mg/L	100	2009075	09/08/20	09/09/20	RSK-175 mod	
Ethane	**5.0**	1.0	"	"	"	"	"	"	
Propane	**2.8**	1.0	"	"	"	"	"	"	

Date Sampled: **09/08/20 10:19**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: Ethene		*137 %*	*70-130*		"	"	"	"	*S-06*



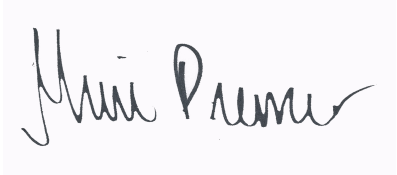
S2

PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #268360 Project Number: AFE # EX-000335 Project Manager: Karen Olson	**Reported:** 09/09/20 17:56

Dissolved Gases by RSK-175 - Quality Control

Summit Scientific

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2009075 - GC										
Blank (2009075-BLK1)				Prepared: 09/08/20 Analyzed: 09/09/20						
Methane	ND	0.010	mg/L							
Ethane	ND	0.010	"							
Propane	ND	0.010	"							
Surrogate: Ethene	*0.0467*		*"*	*0.0364*		*128*	*70-130*			
LCS (2009075-BS1)				Prepared: 09/08/20 Analyzed: 09/09/20						
Methane	0.033	0.010	mg/L	0.0428		78.1	70-130			
Ethane	0.097	0.010	"	0.0798		121	70-130			
Propane	0.14	0.010	"	0.139		102	70-130			
Surrogate: Ethene	*0.0942*		*"*	*0.0728*		*129*	*70-130*			
Duplicate (2009075-DUP1)		**Source: 2009069-01**		Prepared: 09/08/20 Analyzed: 09/09/20						**QR-04**
Methane	2.6	1.0	mg/L		2.9			10.9	30	
Ethane	2.3	0.10	"		2.0			11.6	30	
Propane	0.13	0.010	"		1.2			159	30	
Surrogate: Ethene	*0.0590*		*"*	*0.0364*		*162*	*70-130*			*S-06*
Matrix Spike (2009075-MS1)		**Source: 2009069-01**		Prepared: 09/08/20 Analyzed: 09/09/20						
Methane	3.0	1.0	mg/L	0.0428	2.9	164	70-130			QM-02
Ethane	2.1	0.10	"	0.0798	2.0	48.9	70-130			QM-02
Propane	1.3	0.10	"	0.139	1.2	87.1	70-130			
Surrogate: Ethene	*0.0940*		*"*	*0.0728*		*129*	*70-130*			



PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #268360 Project Number: AFE # EX-000335 Project Manager: Karen Olson	**Reported:** 09/09/20 17:56

Notes and Definitions

S-06	The recovery of this surrogate is outside control limits due to sample dilution required from high analyte concentration and/or matrix interferences.
QR-04	The RPD value for the sample duplicate or MS/MSD was outside of QC acceptance. QC batch accepted based on LCS and/or LCSD recovery and/or RPD values.
QM-02	The RPD and/or percent recovery for this QC spike sample cannot be accurately calculated due to the high concentration of analyte inherent in the sample.
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

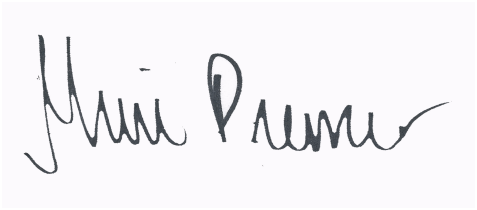
September 15, 2020

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

RE: DWR Permit #268360
Work Order #2009141

Enclosed are the results of analyses for samples received by Summit Scientific on 09/14/20 17:45. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Muri Premer For Paul Shrewsbury
President

S2

PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #268360 Project Number: AFE # EX-000335 Project Manager: Karen Olson	**Reported:** 09/15/20 16:56

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
EFF-091420-900	2009141-01	Water	09/14/20 09:00	09/14/20 17:45
INF-091420-937	2009141-02	Water	09/14/20 09:37	09/14/20 17:45

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

2009141

S_2

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

Client:	PDC Energy / Tasman	Project Manager:	Karen Olson
Address:	6855 W. 119th Ave.	E-Mail:	Karen.Olson@pdce.com; chamlin@tasman-geo.com
City/State/Zip:	Broomfield / CO / 80020		
Phone:	303-487-1228	Project Name:	DWR Permit # 268360
Sampler Name:	C. Hamlin	Project Number:	AFE # EX-000335

					Preservative				Matrix				Analysis Requested								Special Instructions
ID	Sample Description	Date Sampled	Time Sampled	# of containers	HCl	HNO3	None	Other ___	Water	Soil	Air-Canister #	Other ___	RSK-175 (Dissolved Gases)								
1	EFF-091420-900	9/14/20	900	3			X		X				X								
2	INF-091470-937	9/14/20	937	3			X		X				X								
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					

Relinquished by:	Date/Time: 9/14/20 1025	Received by: Tasman Lock Box	Date/Time: 09/14/2020 1025
Relinquished by: Tasman Lock Box	Date/Time: 09/14/2020 1730	Received by:	Date/Time: 09/14/2020 1730
Relinquished by:	Date/Time:	Received by:	Date/Time:

Turn Around Time (Check)

Same Day ___ 72 hours ___

24 hours X Standard ___

48 hours ___

Sample Integrity:

Temperature Upon Receipt: 3.7

Samples Intact: (Yes) No

Notes:

2009141

Sample Receipt Checklist

S2 Work Order 2009141

Client: TAETMAN Client Project ID: DWR PERMIT #26836

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

Matrix (check all that apply): _____Air _____Soil/Solid __X__Water ____Other:_____
(Describe)

Temp (°C)	3.7

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.	X			
Were all samples received intact [1]?	X			
Was adequate sample volume provided [1]?	X			
If custody seals are present, are they intact [1]?			X	
Are samples with holding times due within 48 hours sample due within 48 hours present?	X			24 HOUR TAT
Is a chain-of-custody (COC) form present and filled out completely [1]?	X			
Does the COC agree with the number and type of sample bottles received [1]?	X			
Do the sample IDs on the bottle labels match the COC [1]?	X			
Is the COC properly relinquished by the client w/ date and time recorded [1]?	X			
For volatiles in water – is there headspace present? **If yes, contact client and note in narrative.**		X		
Are samples preserved that require preservation **(excluding cooling)** [1]? Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect			X	
If samples are acid preserved for metals, is the pH ≤ 2[1]? Record the pH in Comments.			X	
If dissolved metals are requested, were samples field filtered?			X	
Additional Comments (if any):				

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

Custodian Printed Name or Initials	Signature of Custodian	Date/Time
RC		09/14/2020

S2

PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #268360 Project Number: AFE # EX-000335 Project Manager: Karen Olson	**Reported:** 09/15/20 16:56

EFF-091420-900

2009141-01 (Water)

Summit Scientific

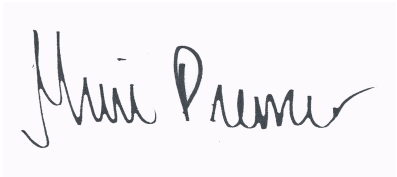
Dissolved Gases by RSK-175

Date Sampled: **09/14/20 09:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Methane	**3.4**	1.0	mg/L	100	2009158	09/14/20	09/15/20	RSK-175 mod	
Ethane	**1.9**	0.10	"	10	"	"	"	"	
Propane	**1.2**	0.10	"	"	"	"	"	"	

Date Sampled: **09/14/20 09:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: Ethene		*121 %*	*70-130*		"	"	"	"	



S2

PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #268360 Project Number: AFE # EX-000335 Project Manager: Karen Olson	**Reported:** 09/15/20 16:56

INF-091420-937

2009141-02 (Water)

Summit Scientific

Dissolved Gases by RSK-175

Date Sampled: **09/14/20 09:37**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Methane	**12**	1.0	mg/L	100	2009158	09/14/20	09/15/20	RSK-175 mod	
Ethane	**5.2**	1.0	"	"	"	"	"	"	
Propane	**2.9**	1.0	"	"	"	"	"	"	

Date Sampled: **09/14/20 09:37**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: Ethene		*110 %*	*70-130*		"	"	"	"	

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.

S2

PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #268360 Project Number: AFE # EX-000335 Project Manager: Karen Olson	**Reported:** 09/15/20 16:56

Dissolved Gases by RSK-175 - Quality Control

Summit Scientific

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2009158 - GC										
Blank (2009158-BLK1)				Prepared: 09/14/20 Analyzed: 09/15/20						
Methane	ND	0.010	mg/L							
Ethane	ND	0.010	"							
Propane	ND	0.010	"							
Surrogate: Ethene	*0.0445*		*"*	*0.0364*		*122*	*70-130*			
LCS (2009158-BS1)				Prepared: 09/14/20 Analyzed: 09/15/20						
Methane	0.032	0.010	mg/L	0.0428		75.5	70-130			
Ethane	0.092	0.010	"	0.0798		115	70-130			
Propane	0.14	0.010	"	0.139		98.9	70-130			
Surrogate: Ethene	*0.0897*		*"*	*0.0728*		*123*	*70-130*			
Duplicate (2009158-DUP1)	**Source: 2009141-01**			Prepared: 09/14/20 Analyzed: 09/15/20						
Methane	3.8	1.0	mg/L		3.4			11.0	30	
Ethane	1.7	0.10	"		1.9			10.7	30	
Propane	1.1	0.10	"		1.2			11.1	30	
Surrogate: Ethene	*0.0330*		*"*	*0.0364*		*90.7*	*70-130*			
Matrix Spike (2009158-MS1)	**Source: 2009141-01**			Prepared: 09/14/20 Analyzed: 09/15/20						
Methane	3.5	1.0	mg/L	0.0428	3.4	257	70-130			QM-05
Ethane	1.8	0.10	"	0.0798	1.9	NR	70-130			QM-05
Propane	1.2	0.10	"	0.139	1.2	13.7	70-130			QM-05
Surrogate: Ethene	*0.0850*		*"*	*0.0728*		*117*	*70-130*			

PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #268360 Project Number: AFE # EX-000335 Project Manager: Karen Olson	**Reported:** 09/15/20 16:56

Notes and Definitions

QM-05	The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The associated LCS and/or LCSD were within acceptance limits, therefore the data are considered valid.
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

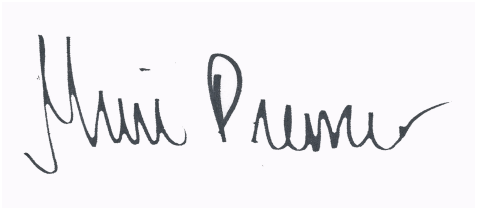
September 22, 2020

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

RE: DWR Permit #268360
Work Order #2009220

Enclosed are the results of analyses for samples received by Summit Scientific on 09/21/20 17:50. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Muri Premer For Paul Shrewsbury
President

S2

PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #268360 Project Number: AFE # EX-000335 Project Manager: Karen Olson	**Reported:** 09/22/20 16:37

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
EFF-092120-0915	2009220-01	Water	09/21/20 09:15	09/21/20 17:50
INF-092120-1010	2009220-02	Water	09/21/20 10:10	09/21/20 17:50

Summit Scientific

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

2009220

Summit Scientific

S_2

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

Client:	PDC Energy / Tasman	Project Manager:	Karen Olson
Address:	6855 W. 119th Ave.	E-Mail:	Karen.Olson@pdce.com; chamlin@tasman-geo.com
City/State/Zip:	Broomfield / CO / 80020		
Phone:	303-487-1228	Project Name:	DWR Permit # 268360
Sampler Name:	C Hamlin	Project Number:	AFE # EX-000335

					Preservative				Matrix				Analysis Requested								Special Instructions
ID	Sample Description	Date Sampled	Time Sampled	# of containers	HCl	HNO3	None	Other ___	Water	Soil	Air-Canister #	Other ___	RSK-175 (Dissolved Gases)								
1	EFF-092120-0915	9/21/20	915	3			X		X				X								
2	INF 092120-1010	9/21/20	1010	3			X		X				X								
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					

Relinquished by:	Date/Time:	Received by:	Date/Time:
[signature]	9/21/20 1109	Tasman Lock Box	9/21/20 09 1109
Tasman Lock Box	09/21/2020 1730	[signature]	09/25/2020 1730
Relinquished by:	Date/Time:	Received by:	Date/Time:
		[signature]	

Turn Around Time (Check)

Same Day ___ 72 hours ___
24 hours X Standard ___
48 hours ___

Sample Integrity:

~~Temperature Upon Receipt:~~ 5.3

Samples Intact: Yes No

Notes:

Sample Receipt Checklist

S2 Work Order 2009220

Client: PBC HARMAN Client Project ID: DWR PERMIT # 26886

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

☐ ☒ ☐ ☐ ☐

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

Temp (°C)	5.3

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.	X			
Were all samples received intact (1)?	X			
Was adequate sample volume provided (1)?	X			
If custody seals are present, are they intact (1)?			X	
Are samples with holding times due within 48 hours sample due within 48 hours present?	X			
Is a chain-of-custody (COC) form present and filled out completely (1)?	X			
Does the COC agree with the number and type of sample bottles received (1)?	X			
Do the sample IDs on the bottle labels match the COC (1)?	X			
Is the COC properly relinquished by the client w/ date and time recorded (1)?	X			
For volatiles in water – is there headspace present? **If yes, contact client and note in narrative.**		X		
Are samples preserved that require preservation **(excluding cooling)** (1)? Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect			X	
If samples are acid preserved for metals, is the pH ≤ 2(1)? Record the pH in Comments.			X	
If dissolved metals are requested, were samples field filtered?			X	
Additional Comments (if any):				

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

Custodian Printed Name or Initials	Signature of Custodian	Date/Time
[illegible]	[illegible]	09/21/2020

S2

PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #268360 Project Number: AFE # EX-000335 Project Manager: Karen Olson	**Reported:** 09/22/20 16:37

EFF-092120-0915

2009220-01 (Water)

Summit Scientific

Dissolved Gases by RSK-175

Date Sampled: **09/21/20 09:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Methane	**4.0**	1.0	mg/L	100	2009235	09/21/20	09/22/20	RSK-175 mod	
Ethane	**1.7**	0.10	"	10	"	"	"	"	
Propane	**0.99**	0.10	"	"	"	"	"	"	

Date Sampled: **09/21/20 09:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: Ethene		*154 %*	*70-130*		"	"	"	"	*S-02*

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.

S2

PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #268360 Project Number: AFE # EX-000335 Project Manager: Karen Olson	**Reported:** 09/22/20 16:37

INF-092120-1010

2009220-02 (Water)

Summit Scientific

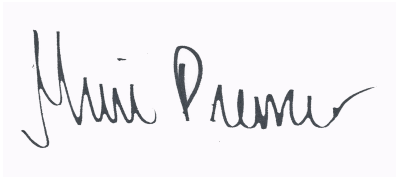
Dissolved Gases by RSK-175

Date Sampled: **09/21/20 10:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Methane	**12**	1.0	mg/L	100	2009235	09/21/20	09/22/20	RSK-175 mod	
Ethane	**5.2**	1.0	"	"	"	"	"	"	
Propane	**4.1**	0.10	"	10	"	"	"	"	

Date Sampled: **09/21/20 10:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: Ethene		*118 %*	*70-130*		"	"	"	"	



S2

PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #268360 Project Number: AFE # EX-000335 Project Manager: Karen Olson	**Reported:** 09/22/20 16:37

Dissolved Gases by RSK-175 - Quality Control

Summit Scientific

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2009235 - GC										
Blank (2009235-BLK1)				Prepared: 09/21/20 Analyzed: 09/22/20						
Methane	ND	0.010	mg/L							
Ethane	ND	0.010	"							
Propane	ND	0.010	"							
Surrogate: Ethene	*0.0430*		*"*	*0.0364*		*118*	*70-130*			
LCS (2009235-BS1)				Prepared: 09/21/20 Analyzed: 09/22/20						
Methane	0.032	0.010	mg/L	0.0428		74.8	70-130			
Ethane	0.092	0.010	"	0.0798		115	70-130			
Propane	0.13	0.010	"	0.139		96.6	70-130			
Surrogate: Ethene	*0.0909*		*"*	*0.0728*		*125*	*70-130*			
Duplicate (2009235-DUP1)		**Source: 2009215-01**		Prepared: 09/21/20 Analyzed: 09/22/20						
Methane	0.13	0.10	mg/L		0.13			1.55	30	
Ethane	0.24	0.10	"		0.24			0.826	30	
Propane	0.61	0.10	"		0.57			6.44	30	
Surrogate: Ethene	*0.0590*		*"*	*0.0364*		*162*	*70-130*			*S-02*
Matrix Spike (2009235-MS1)		**Source: 2009215-01**		Prepared: 09/21/20 Analyzed: 09/22/20						
Methane	0.16	0.10	mg/L	0.0428	0.13	81.8	70-130			
Ethane	0.35	0.10	"	0.0798	0.24	130	70-130			
Propane	0.73	0.10	"	0.139	0.57	115	70-130			
Surrogate: Ethene	*0.127*		*"*	*0.0728*		*174*	*70-130*			*S-02*

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.

S2

PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #268360 Project Number: AFE # EX-000335 Project Manager: Karen Olson	**Reported:** 09/22/20 16:37

Notes and Definitions

S-02	The surrogate recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample extract.
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

DWR WATER WELL PERMIT # 268360
Methane Mitigation System
Photographic Overview

Well Ventilation

Water Treatment System