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

DWR WATER WELL
PERMIT # 137465

13646 WCR 2 ½
Brighton, Colorado
NWSE S32 T1N R66W

COGCC Remediation # 15469

Prepared by:

TASMAN GEOSCIENCES

6855 WEST 119TH AVENUE
BROOMFIELD, COLORADO 80020

September 4, 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 (Property) associated with the Colorado Division of Water Resources (DWR) Well Permit Number 137465 (Well). The System was designed to mitigate methane concentrations in the Well water.

2.0 Location and Background

The Property is located at 13646 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 40.007168 degrees north latitude and -104.798050 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 825 and 1,056 feet below ground surface (bgs), with a static water level of 374 feet bgs, according to the Pump Installation Report filed with the DWR in September 1985. Water from the Well is pumped and conveyed to an outdoor hydrant and the residential water system, located within an exterior cellar.

In response to a landowner request, PDC retained Olsson Associates (Olsson) on March 11, 2020, to collect a preliminary baseline water sample from the Well in accordance with the Colorado Oil and Gas Conservation Commission (COGCC) Baseline Water Quality Sampling Program, Rule 318A. Laboratory results indicated that the sample exhibited a methane concentration of 26 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.

Based on the results of the preliminary water sample, the COGCC directed the Operators to conduct an area water well study. In accordance with this study, PDC retained Tasman to collect a supplemental baseline water sample from the Well on May 6, 2020. Laboratory and isotopic analyses confirmed an elevated methane concentration of 22.7 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 July 10, 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 a custom shed constructed above the existing cellar (Figure 2). The water is conveyed from the Well through the existing residential pressure tanks, 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 to atmosphere. The vent stack is installed above the shed roof and away from the windows of the residence. Vapor collection and conveyance operate as a closed system to prevent methane accumulation within the shed.

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 July 21 and August 5, 2020. The System became operational on August 6, 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 tanks.

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

During the first month of System operation, water samples were collected on a weekly basis. 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 second month of each quarter.

TABLES

TABLE 1
DWR WATER WELL PERMIT # 137465
BASELINE WATER ANALYTICAL RESULTS SUMMARY TABLE

	Analyte	CDPHE WQCC MCL in Groundwater [1]	Units	Morales0248601	Casias-Morales Well
				3/11/2020 [2]	5/6/2020 [3]
Organic Compounds	Benzene	0.005	mg/L	<0.001	<0.001
	Toluene	0.56	mg/L	<0.001	<0.001
	Ethylbenzene	0.70	mg/L	<0.001	<0.001
	Total Xylenes	1.4	mg/L	<0.001	<0.001
	Gasoline Range Organics	-	mg/L	0.468	0.302
	Diesel Range Organics	-	mg/L	<0.2	<0.19
Dissolved Gases	Methane	-	mg/L	**26.0**	**22.7**
	Ethane	-	mg/L	8.11	6.52
	Propane	-	mg/L	4.91	3.93
Dissolved Metals	Barium	2.0	mg/L	0.0485	0.0523
	Boron	0.75	mg/L	0.393	0.410
	Calcium	0.005	mg/L	**1.7**	**1.72**
	Iron	0.3	mg/L	0.212	0.221
	Magnesium	-	mg/L	0.394	0.414
	Manganese	0.05	mg/L	0.017	0.0121
	Potassium	-	mg/L	1.68	1.49
	Selenium	0.05	mg/L	<0.005	<0.005
	Sodium	-	mg/L	308	340
	Strontium	-	mg/L	0.0745	0.0755
General Chemistry	Bromide	-	mg/L	1.07	1.16
	Chloride	250	mg/L	109	105
	Fluoride	4.0	mg/L	2.28	2.19
	Nitrate - Nitrite	10.0	mg/L	<0.0200	<0.100
	Sulfate	250	mg/L	0.540	<0.400
	Total Alkalinity	-	mg/L	538	541
	Bicarbonate Alkalinity	-	mg/L	491	490
	Carbonate	-	mg/L	46.2	50.2
	Total Phosphorus	-	mg/L	0.124	0.116
	Specific Conductivity (EC)	-	µS/cm	1310	1300
	Total Dissolved Solids	500	mg/L	**740**	**748**
	pH	6.5-8.5	units	8.47	8.48
BART	Iron Related Bacteria		CFU/mL	~ 35000	~ 9000
	Sulfate Reducing Bacteria		CFU/mL	~ 67000	~ 100
	Slime Forming Bacteria	-	CFU/mL	~ 27000	~ 1400

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

TABLE 1
DWR WATER WELL PERMIT # 137465
BASELINE WATER ANALYTICAL RESULTS SUMMARY TABLE

Secondary Standard - Drinking Water
Agricultural Standard

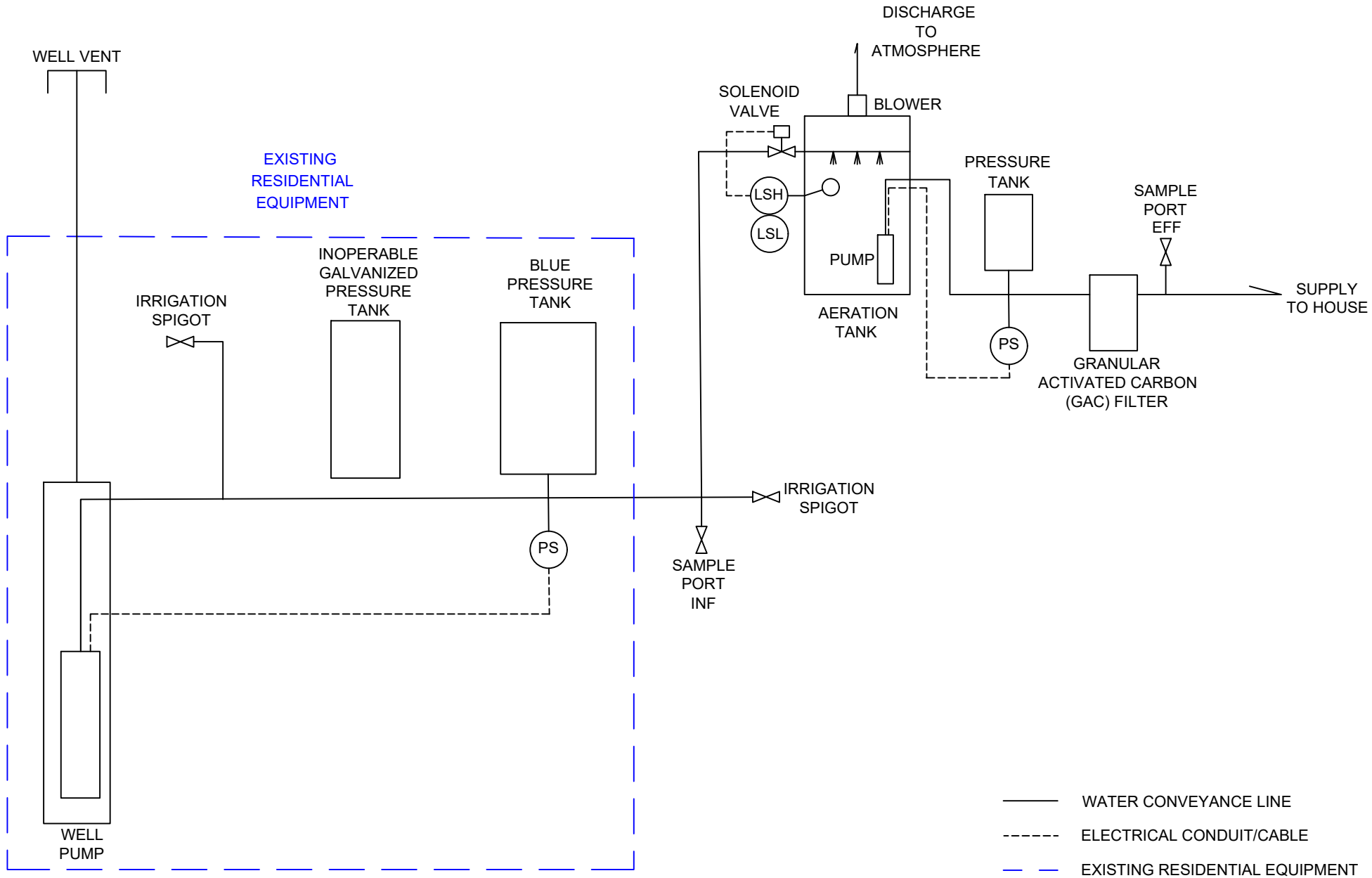
(<) = Analytical result is less than the indicated laboratory reporting limit.
BOLD = Analytical result is in exceedance of applicable standard.

TABLE 2
DWR WATER WELL PERMIT # 137465
SYSTEM PROCESS WATER ANALYTICAL RESULTS SUMMARY TABLE

Sample ID	Date Sampled	Methane [1] (mg/L)	Ethane (mg/L)	Propane (mg/L)
Target Level (mg/L)		**10**	**-**	**-**
EFF-080720-1100	8/7/2020	7.8	1.18	0.488
EFF-081220-0832	8/12/2020	3.3	0.95	0.46
EFF-081920-0855	8/19/2020	2.2	1.2	0.75
EFF-082620-0921	8/26/2020	2.9	0.99	0.65
INF-080720-1145	8/7/2020	38.6	6.79	4.03
INF-081220-0927	8/12/2020	10	2.8	2.4
INF-081920-0956	8/19/2020	12	3.9	2.8
INF-082620-1013	8/26/2020	11	3.7	2.0

Notes:
mg/L= Milligrams per liter

FIGURES



No.	Date	Revisions	By	Ckd

THIS DRAWING IS THE PROPERTY OF THE USA ENTITY IDENTIFIED IN THE TITLE BLOCK AND MAY NOT BE REPRODUCED OR ALTERED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF SAME.

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

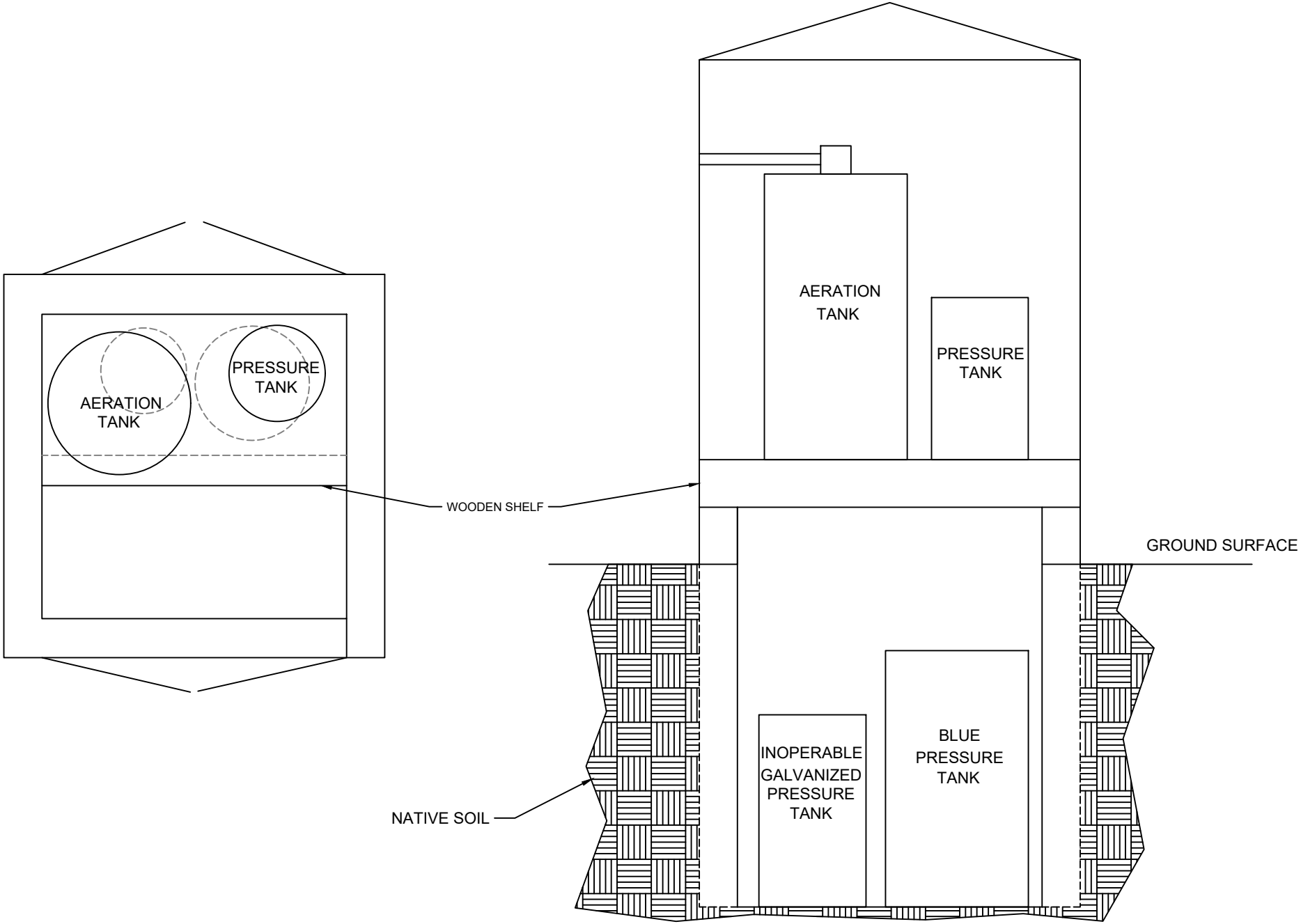
TASMAN GEOSCIENCES

Methane Mitigation System
Process and Instrumentation Diagram

DWR Permit Number 137465

TASMAN GEOSCIENCES PROJECT
Date June 2020
TASMAN GEOSCIENCES
BROOMFIELD CO 80020
TELEPHONE NO 303-487-1228

Figure 1



No.	Date	Revisions	By	Ckd

Project Manager's name: TRAVIS JOHANSEN
Professional Engineer's No.:
State | Date Signed | Project Mgr.: TJ
Designed by: DAG | Drawn by: DAG | Checked by: TJ

TASMAN GEOSCIENCES

Methane Mitigation System
System Enclosure Layout

DWR Permit Number 137465

TASMAN GEOSCIENCES PROJECT

Date
June 2020

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

Figure 2

ATTACHMENT A

ORIGINS LABORATORY, INC

May 15, 2020

Tasman Geosciences

Christine Hamlin

6855 West 119th Avenue

Broomfield CO 80020

Project Name - PDC - Morales Methane Investigation

Project Number - [none]

Attached are your analytical results for PDC - Morales Methane Investigation received by Origins Laboratory, Inc. May 06, 2020. This project is associated with Origins project number Y005081-01.

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

Tasman Geosciences
6855 West 119th Avenue
Broomfield CO 80020

Christine Hamlin
Project Number: [none]
Project: PDC - Morales Methane Investigation

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Casias-Morales Well	Y005081-01	Water	May 6, 2020 14:55	05/06/2020 16:45

Origins Laboratory, Inc.

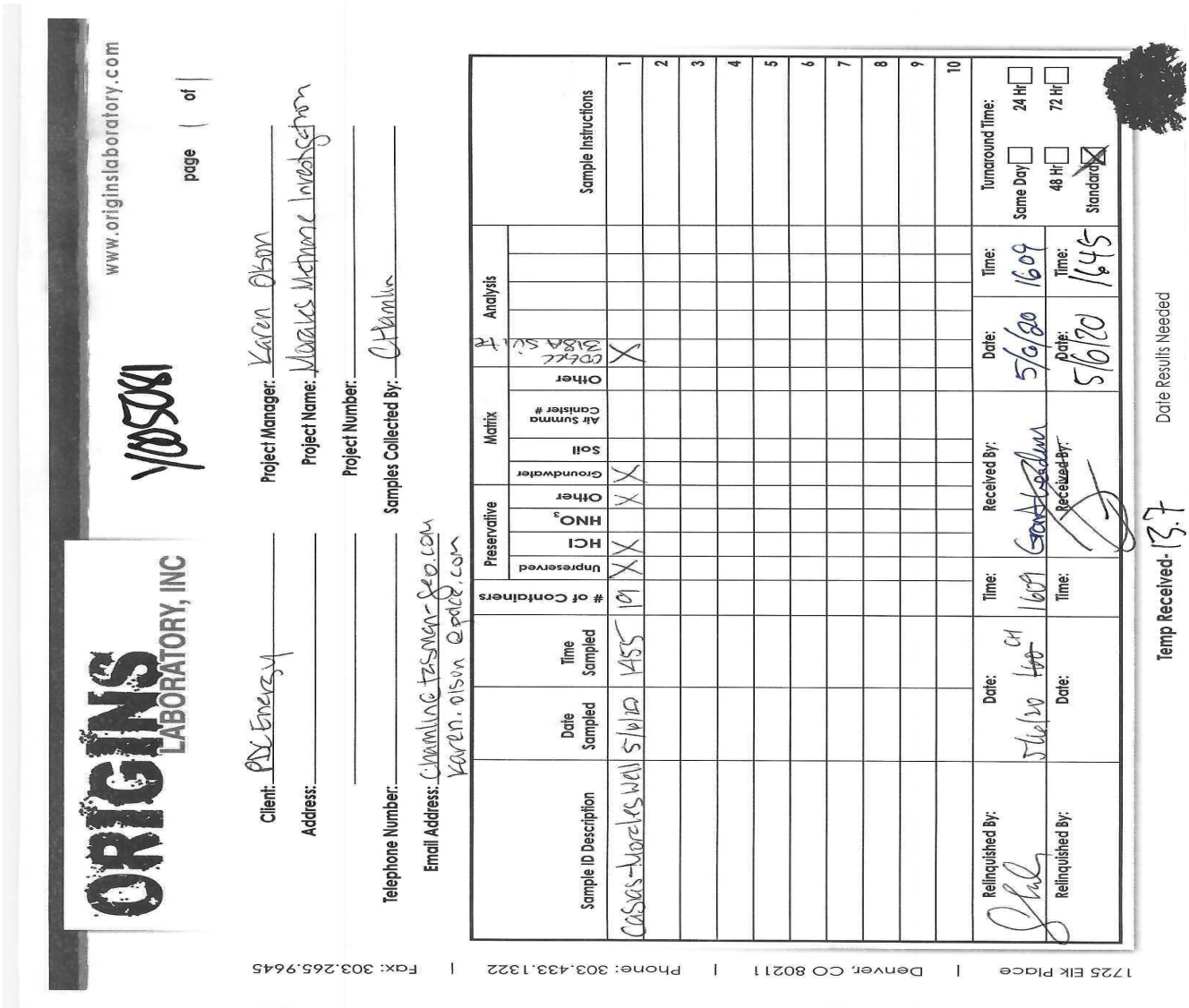
The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Jordan A. Merrill For Noelle Doyle Mathis, President

ORIGINS LABORATORY, INC

Tasman Geosciences
6855 West 119th Avenue
Broomfield CO 80020

Christine Hamlin
Project Number: [none]
Project: PDC - Morales Methane Investigation



Origins Laboratory, Inc.

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Jordan A. Merrill For Noelle Doyle Mathis, President

Tasman Geosciences
6855 West 119th Avenue
Broomfield CO 80020

Christine Hamlin
Project Number: [none]
Project: PDC - Morales Methane Investigation

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: Y005081

Client: Tasman
Client Project ID: Morales Methane Investigati

Checklist Completed by: JG
Date/time completed: 5 / 7 / 2020

Shipped Via: HD (UPS, FedEx, Hand Delivered, Pick-up, etc.)
Airbill #: N/A

Matrix(s) Received: (Check all that apply): ____Soil/Solid __X__Water ____Other:____

Cooler Number/Temperature: 1 / 13.7 °C ____/____ °C ____/____ °C ____/____ °C (Describe)

Thermometer ID: T003

Requirement Description	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature between 0°C to ≤ 6°C[1]?		✓		Same Day
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]?		✓		
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)*		✓		
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.

JM
Reviewed by (Project Manager)

5-8-20
Date/Time Reviewed

Origins Laboratory, Inc.

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Jordan A. Merrill For Noelle Doyle Mathis, President

Tasman Geosciences
6855 West 119th Avenue
Broomfield CO 80020

Christine Hamlin
Project Number: [none]
Project: PDC - Morales Methane Investigation

Casias-Morales Well
5/6/2020 2:55:00PM

GEL Laboratories, LLC
Y005081-01 (Water)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
Anions by EPA 300.0									
Bromide	**1.16**	0.800	mg/L	4	1995945	JLD1	05/06/2020	05/08/2020	
Chloride	**105**	5.00	"	25	"	JLD1	"	05/11/2020	
Fluoride	**2.19**	0.100	"	1	"	JLD1	"	05/08/2020	
Nitrate	ND	0.100	"	"	"	JLD1	"	"	U
Nitrite	ND	0.100	"	"	"	JLD1	"	"	U
Sulfate	ND	0.400	"	"	"	JLD1	"	"	U
Bacterial Activity Reaction Tests									
Iron Related Bacteria	~9000		CFU/mL	1	11111	ARB	"	05/06/2020	
Slime Forming Bacteria	~100		"	"	"	ARB	"	"	
Sulfate Reducing Bacteria	~1400		"	"	"	ARB	"	"	
BTEX by EPA 8260D									
Benzene	ND	1.00	ug/L	1	B0E0702	ZZZ	05/07/2020	05/07/2020	Ua
Toluene	ND	1.00	"	"	"	ZZZ	"	"	Ua
Ethylbenzene	ND	1.00	"	"	"	ZZZ	"	"	Ua
Xylenes, total	ND	1.00	"	"	"	ZZZ	"	"	Ua
Surrogate: 1,2-Dichloroethane-d4	*116 %*		*70-130*		"		"	"	
Surrogate: Toluene-d8	*101 %*		*70-130*		"		"	"	
Surrogate: 4-Bromofluorobenzene	*80.4 %*		*70-130*		"		"	"	

Origins Laboratory, Inc.

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Jordan A. Merrill For Noelle Doyle Mathis, President

Tasman Geosciences
6855 West 119th Avenue
Broomfield CO 80020

Christine Hamlin
Project Number: [none]
Project: PDC - Morales Methane Investigation

Casias-Morales Well
5/6/2020 2:55:00PM

Pace Analytical
Y005081-01 (Water)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
Dissolved Gasses by RSK 175									
Ethane	**6520**	10.0	ug/L	1	11111		05/06/2020	05/11/2020	
Methane	**22700**	10.0	"	"	"		"	"	
n-Propane	**3930**	20.0	"	"	"		"	"	
Dissolved Metals by 200.8									
Barium	**52.3**	4.00	ug/L	1	1996144	BAJ	05/11/2020	05/13/2020	
Boron	**410**	150	"	10	"	BAJ	"	"	
Calcium	**1720**	200	"	1	"	PRB	"	"	
Iron	**221**	100	"	"	"	BAJ	"	"	
Magnesium	**414**	30.0	"	"	"	PRB	"	"	
Manganese	**12.1**	5.00	"	"	"	BAJ	"	"	
Potassium	**1490**	300	"	"	"	PRB	"	"	
Selenium	ND	5.00	"	"	"	BAJ	"	"	U
Sodium	**340000**	2500	"	10	"	PRB	"	"	
Strontium	**75.5**	10.0	"	1	"	BAJ	"	"	
DRO by 8015C									
Diesel Range Organics	ND	190	ug/L	1	1995841	RXC1	"	05/11/2020	U
Surrogate: o-Terphenyl	*74 %*	*40-109*			"		"	"	
GRO by 8015C									

Origins Laboratory, Inc.

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Jordan A. Merrill For Noelle Doyle Mathis, President

Tasman Geosciences
6855 West 119th Avenue
Broomfield CO 80020

Christine Hamlin
Project Number: [none]
Project: PDC - Morales Methane Investigation

Casias-Morales Well
5/6/2020 2:55:00PM

GEL Laboratories, LLC
Y005081-01 (Water)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
GRO by 8015C									
Gasoline Range Organics	**0.302**	0.100	mg/L	1	1996289	RXY1	05/06/2020	05/11/2020	
Surrogate: Bromofluorobenzene	*91 %*	*75-127*			"		"	"	
Nitrate/Nitrite by EPA 353.2									
Nitrogen, Nitrate/Nitrite	ND	0.100	mg/L	5	1995314	KLP1	"	05/13/2020	U
pH in Water by EPA 9040C									
pH	**8.48**		pH Units	1	B0E0609	DJL	05/06/2020	05/07/2020	
Specific Conductance by Modified 9050A									
Specific Conductance (EC)	**1300**	5.00	uS/cm	"	B0E0610	DJL	05/06/2020	05/07/2020	
Total Alkalinity by 2320B									
Alkalinity, Total as CaCO3	**541**	4.00	mg/L	1	1995925	RXB5	05/06/2020	05/11/2020	
Bicarbonate alkalinity (CaCO3)	**490**	4.00	"	"	"	RXB5	"	"	
Carbonate alkalinity (CaCO3)	**50.2**	4.00	"	"	"	RXB5	"	"	
Total Dissolved Solids by 2540C									
Total Dissolved Solids	**748**	5.00	mg/L	1	B0E0801	DJL	05/08/2020	05/12/2020	

Origins Laboratory, Inc.

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Tasman Geosciences
6855 West 119th Avenue
Broomfield CO 80020

Christine Hamlin
Project Number: [none]
Project: PDC - Morales Methane Investigation

Casias-Morales Well
5/6/2020 2:55:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes

Origins Laboratory, Inc.

Y005081-01 (Water)

Total Phosphorus by EPA 365.4

Phosphorus, Total as P	**0.116**	0.0500	mg/L	1	1995313	KLP1	05/11/2020	05/12/2020	

Origins Laboratory, Inc.

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Tasman Geosciences
6855 West 119th Avenue
Broomfield CO 80020

Christine Hamlin
Project Number: [none]
Project: PDC - Morales Methane Investigation

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 B0E0702 - EPA 5030B (Water)										
Blank (B0E0702-BLK1)					Prepared: 05/07/2020 Analyzed: 05/07/2020					
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	*62*		*"*	*62.5*		*98.7*	*70-130*			
Surrogate: Toluene-d8	*66*		*"*	*62.5*		*106*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*53*		*"*	*62.5*		*85.5*	*70-130*			

Origins Laboratory, Inc.

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Tasman Geosciences
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Broomfield CO 80020

Christine Hamlin
Project Number: [none]
Project: PDC - Morales Methane Investigation

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 B0E0702 - EPA 5030B (Water)										
LCS (B0E0702-BS1)					Prepared: 05/07/2020 Analyzed: 05/07/2020					
Benzene	49.4	1.00	ug/L	50.0		98.8	70-130			
Toluene	51.3	1.00	"	50.0		103	70-130			
Ethylbenzene	54.2	1.00	"	50.0		108	70-130			
m,p-Xylene	107	2.00	"	100		107	70-130			
o-Xylene	51.6	1.00	"	50.0		103	70-130			
Surrogate: 1,2-Dichloroethane-d4	*63*		"	*62.5*		*102*	*70-130*			
Surrogate: Toluene-d8	*64*		"	*62.5*		*103*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*55*		"	*62.5*		*88.0*	*70-130*			

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Jordan A. Merrill For Noelle Doyle Mathis, President

Tasman Geosciences
6855 West 119th Avenue
Broomfield CO 80020

Christine Hamlin
Project Number: [none]
Project: PDC - Morales Methane Investigation

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 B0E0702 - EPA 5030B (Water)										
Matrix Spike (B0E0702-MS1)		**Source: Y005074-21**			Prepared: 05/07/2020 Analyzed: 05/07/2020					
Benzene	43.8	1.00	ug/L	50.0	ND	87.5	70-130			
Toluene	46.4	1.00	"	50.0	ND	92.8	70-130			
Ethylbenzene	49.1	1.00	"	50.0	ND	98.3	70-130			
m,p-Xylene	101	2.00	"	100	ND	101	70-130			
o-Xylene	50.1	1.00	"	50.0	ND	100	70-130			
Surrogate: 1,2-Dichloroethane-d4	*69*		*"*	*62.5*		*111*	*70-130*			
Surrogate: Toluene-d8	*64*		*"*	*62.5*		*102*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*53*		*"*	*62.5*		*84.8*	*70-130*			

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Christine Hamlin
Project Number: [none]
Project: PDC - Morales Methane Investigation

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 B0E0702 - EPA 5030B (Water)										
Matrix Spike Dup (B0E0702-MSD1)		**Source: Y005074-21**			Prepared: 05/07/2020 Analyzed: 05/07/2020					
Benzene	43.3	1.00	ug/L	50.0	ND	86.7	70-130	0.965	20	
Toluene	47.1	1.00	"	50.0	ND	94.2	70-130	1.45	20	
Ethylbenzene	49.8	1.00	"	50.0	ND	99.7	70-130	1.39	20	
m,p-Xylene	100	2.00	"	100	ND	100	70-130	0.408	20	
o-Xylene	50.4	1.00	"	50.0	ND	101	70-130	0.577	20	
Surrogate: 1,2-Dichloroethane-d4	*68*		*"*	*62.5*		*108*	*70-130*			
Surrogate: Toluene-d8	*64*		*"*	*62.5*		*103*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*53*		*"*	*62.5*		*85.0*	*70-130*			

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Christine Hamlin
Project Number: [none]
Project: PDC - Morales Methane Investigation

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 B0E0609 - NO PREP										
Duplicate (B0E0609-DUP1)		**Source: Y005054-01**			Prepared: 05/06/2020 Analyzed: 05/07/2020					
pH	7.50		pH Units		7.65			1.98	200	
Batch B0E0610 - NO PREP										
Blank (B0E0610-BLK1)					Prepared: 05/06/2020 Analyzed: 05/07/2020					
Specific Conductance (EC)	2.80	5.00	uS/cm							
Duplicate (B0E0610-DUP1)		**Source: Y005054-01**			Prepared: 05/06/2020 Analyzed: 05/07/2020					
Specific Conductance (EC)	4790	5.00	uS/cm		4780			0.161	10	
Batch B0E0801 - NO PREP										
Blank (B0E0801-BLK1)					Prepared: 05/08/2020 Analyzed: 05/12/2020					
Total Dissolved Solids	ND	5.00	mg/L							
LCS (B0E0801-BS1)					Prepared: 05/08/2020 Analyzed: 05/12/2020					
Total Dissolved Solids	732	5.00	mg/L	716		102	85-115			
Duplicate (B0E0801-DUP1)		**Source: Y005081-01**			Prepared: 05/08/2020 Analyzed: 05/12/2020					
Total Dissolved Solids	750	5.00	mg/L		748			0.214	20	

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Broomfield CO 80020

Christine Hamlin
Project Number: [none]
Project: PDC - Morales Methane Investigation

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 1995945 -										
BLANK (1204558529-BLK)					Prepared: Analyzed: 05/08/2020					
Nitrate	ND	0.100	mg/L				-			U
Nitrite	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 (1204558530-BKS)					Prepared: Analyzed: 05/08/2020					
Bromide	1.20	0.200	mg/L	1.25		96	90-110			
Chloride	4.60	0.200	"	5.00		91.9	90-110			
Fluoride	2.41	0.100	"	2.50		96.4	90-110			
Nitrate	2.33	0.100	"	2.50		93.2	90-110			
Nitrite	2.37	0.100	"	2.50		94.9	90-110			
Sulfate	9.46	0.400	"	10.0		94.6	90-110			
DUP (1204558531 D)		**Source: Y005081-01**			Prepared: Analyzed: 05/08/2020					
Sulfate	ND	0.400	mg/L		<0.133		0-20	0	20	U
Bromide	1.10	0.800	"		1.16		0-20	4.49	20	
Chloride	105	5.00	"		105		0-20	0.36	20	
Nitrite	ND	0.100	"		<0.0330		0-20	0	20	U
Nitrate	ND	0.100	"		<0.0330		0-20	0	20	U
Fluoride	2.18	0.100	"		2.19		0-20	0.445	20	
PS (1204558532 S)		**Source: Y005081-01**			Prepared: Analyzed: 05/08/2020					
Fluoride	4.67	0.100	mg/L	2.50		99.2	90-110			
Chloride	238	5.00	"	5.00		106	90-110			
Nitrate	2.31	0.100	"	2.50		92.3	90-110			

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Broomfield CO 80020

Christine Hamlin
Project Number: [none]
Project: PDC - Morales Methane Investigation

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 1995945 -										
PS (1204558532 S)		**Source: Y005081-01**			Prepared: Analyzed: 05/08/2020					
Nitrite	2.62	0.100	mg/L	2.50		105	90-110			
Sulfate	9.63	0.400	"	10.0		96.3	90-110			
Bromide	6.08	0.800	"	1.25		98.5	90-110			

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Tasman Geosciences
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Broomfield CO 80020

Christine Hamlin
Project Number: [none]
Project: PDC - Morales Methane Investigation

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 1996144 -										
FLTB (1204558570-BLK)					Prepared: 05/11/2020 Analyzed: 05/13/2020					
Sodium	ND	250	ug/L				-			U
Selenium	ND	5.00	"				-			U
Potassium	ND	300	"				-			U
Boron	ND	15.0	"				-			U
Manganese	ND	5.00	"				-			U
Magnesium	ND	30.0	"				-			U
Iron	ND	100	"				-			U
Calcium	ND	200	"				-			U
Barium	ND	4.00	"				-			U
Strontium	ND	10.0	"				-			U
BLANK (1204558920-BLK)					Prepared: 05/11/2020 Analyzed: 05/13/2020					
Sodium	ND	250	ug/L				-			U
Iron	ND	100	"				-			U
Strontium	ND	10.0	"				-			U
Selenium	ND	5.00	"				-			U
Potassium	ND	300	"				-			U
Manganese	ND	5.00	"				-			U
Magnesium	ND	30.0	"				-			U
Boron	ND	15.0	"				-			U
Barium	ND	4.00	"				-			U
Calcium	ND	200	"				-			U
LCS (1204558921-BKS)					Prepared: 05/11/2020 Analyzed: 05/13/2020					
Strontium	55.3	10.0	ug/L	50.0		111	85-115			
Boron	108	15.0	"	100		108	85-115			
Calcium	2170	200	"	2000		108	85-115			

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Tasman Geosciences
6855 West 119th Avenue
Broomfield CO 80020

Christine Hamlin
Project Number: [none]
Project: PDC - Morales Methane Investigation

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 1996144 - EPA 200.2										
LCS (1204558921-BKS)					Prepared: 05/11/2020 Analyzed: 05/13/2020					
Iron	2300	100	ug/L	2000		115	85-115			
Magnesium	2120	30.0	"	2000		106	85-115			
Manganese	56.5	5.00	"	50.0		113	85-115			
Potassium	2140	300	"	2000		107	85-115			
Barium	55.3	4.00	"	50.0		111	85-115			
Sodium	2180	250	"	2000		109	85-115			
Selenium	56.4	5.00	"	50.0		113	85-115			
DUP (1204558922 D)		**Source: Y005081-01**			Prepared: 05/11/2020 Analyzed: 05/13/2020					
Selenium	ND	5.00	ug/L		<2.00		0-20	57.1	20	U
Barium	51.5	4.00	"		52.3		0-20	1.47	20	
Boron	430	150	"		410		0-20	4.8	20	
Calcium	1770	200	"		1720		0-20	2.74	20	
Iron	214	100	"		221		0-20	3.35	20	
Magnesium	404	30.0	"		414		0-20	2.3	20	
Manganese	11.8	5.00	"		12.1		0-20	2.86	20	
Sodium	344000	2500	"		340000		0-20	1.16	20	
Strontium	77.3	10.0	"		75.5		0-20	2.31	20	
Potassium	1480	300	"		1490		0-20	0.876	20	
MS (1204558923 S)		**Source: Y005081-01**			Prepared: 05/11/2020 Analyzed: 05/13/2020					
Strontium	137	10.0	ug/L	50.0	75.5	123	75-125			
Calcium	3920	200	"	2000	1720	110	75-125			
Iron	2270	100	"	2000	221	103	75-125			
Magnesium	2450	30.0	"	2000	414	102	75-125			
Boron	537	150	"	100	410	0	75-125			
Manganese	64.6	5.00	"	50.0	12.1	105	75-125			

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Broomfield CO 80020

Christine Hamlin
Project Number: [none]
Project: PDC - Morales Methane Investigation

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 1996144 - EPA 200.2										
MS (1204558923 S)		**Source: Y005081-01**			Prepared: 05/11/2020 Analyzed: 05/13/2020					
Sodium	350000	2500	ug/L	2000	340000	0	75-125			
Selenium	53.9	5.00	"	50.0	<2.00	107	75-125			
Potassium	3590	300	"	2000	1490	105	75-125			
Barium	105	4.00	"	50.0	52.3	105	75-125			

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Broomfield CO 80020

Christine Hamlin
Project Number: [none]
Project: PDC - Morales Methane Investigation

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 1995841 - SW846 3535A										
BLANK (1204558277-BLK)					Prepared: 05/11/2020 Analyzed: 05/11/2020					
Diesel Range Organics	ND	200	ug/L				-			U
Surrogate: o-Terphenyl	*13.6*		*"*	*20.0*		*68*	*40-109*			
LCS (1204558278-BKS)					Prepared: 05/11/2020 Analyzed: 05/11/2020					
Diesel Range Organics	913	200	ug/L	1000		91	45-119			
Surrogate: o-Terphenyl	*18.9*		*"*	*20.0*		*94*	*40-109*			
MS (1204558588 S)		**Source: 510909001**			Prepared: 05/11/2020 Analyzed: 05/11/2020					
Diesel Range Organics	3400	1000	ug/L	5000	<375	68	41-118			
Surrogate: o-Terphenyl	*72.8*		*"*	*100*	*59.0*	*73*	*40-109*			
MSD (1204558589 SD)		**Source: 510909001**			Prepared: 05/11/2020 Analyzed: 05/11/2020					
Diesel Range Organics	3070	1000	ug/L	5000	<375	61	41-118	10	20	
Surrogate: o-Terphenyl	*59.8*		*"*	*100*	*59.0*	*60*	*40-109*			

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Broomfield CO 80020

Christine Hamlin
Project Number: [none]
Project: PDC - Morales Methane Investigation

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 1996289 -										
BLANK (1204559292-BLK)					Prepared: Analyzed: 05/11/2020					
Gasoline Range Organics	ND	0.100	mg/L				-			U
Surrogate: Bromofluorobenzene	*0.0464*		*"*	*0.0500*		*93*	*75-127*			
LCS (1204559293-BKS)					Prepared: Analyzed: 05/11/2020					
Gasoline Range Organics	0.447	0.100	mg/L	0.500		89	80-120			
Surrogate: Bromofluorobenzene	*0.0476*		*"*	*0.0500*		*95*	*75-127*			
PS (1204559294 S)		**Source: 510982001**			Prepared: Analyzed: 05/11/2020					
Gasoline Range Organics	0.530	0.100	mg/L	0.500		75	68-127			
Surrogate: Bromofluorobenzene	*0.0407*		*"*	*0.0500*		*81*	*75-127*			
PSD (1204559295 SD)		**Source: 510982001**			Prepared: Analyzed: 05/11/2020					
Gasoline Range Organics	0.503	0.100	mg/L	0.500		69	68-127	5	30	
Surrogate: Bromofluorobenzene	*0.0475*		*"*	*0.0500*		*95*	*75-127*			

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Project Number: [none]
Project: PDC - Morales Methane Investigation

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 1995314 -										
BLANK (1204557298-BLK)					Prepared: Analyzed: 05/13/2020					
Nitrogen, Nitrate/Nitrite	ND	0.0200	mg/L				-			U
LCS (1204557299-BKS)					Prepared: Analyzed: 05/13/2020					
Nitrogen, Nitrate/Nitrite	1.02	0.0200	mg/L	1.00		102	90-110			
DUP (1204557300 D)		**Source: 510564001**			Prepared: Analyzed: 05/13/2020					
Nitrogen, Nitrate/Nitrite	0.0260	0.0200	mg/L		0.0279		0-20	7.05	20	
PS (1204557302 S)		**Source: 510564001**			Prepared: Analyzed: 05/13/2020					
Nitrogen, Nitrate/Nitrite	0.970	0.0200	mg/L	1.00		94.2	90-110			

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Christine Hamlin
Project Number: [none]
Project: PDC - Morales Methane Investigation

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1995925 -										
LCS (1204558468-BKS)					Prepared: Analyzed: 05/11/2020					
Alkalinity, Total as CaCO3	106	4.00	mg/L	100		106	90-110			
DUP (1204558469 D)		**Source: 510982001**			Prepared: Analyzed: 05/11/2020					
Alkalinity, Total as CaCO3	553	4.00	mg/L		543		0-20	1.83	20	
Bicarbonate alkalinity (CaCO3)	492	4.00	"		488		0-20	0.818	20	
Carbonate alkalinity (CaCO3)	60.2	4.00	"		54.2		0-20	10.5	20	
MS (1204558470 S)		**Source: 510982001**			Prepared: Analyzed: 05/11/2020					
Alkalinity, Total as CaCO3	660	4.00	mg/L	100	543	0	80-120			

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Christine Hamlin
Project Number: [none]
Project: PDC - Morales Methane Investigation

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 1995313 - EPA 365.4 Prep										
BLANK (1204557290-BLK)					Prepared: 05/11/2020 Analyzed: 05/12/2020					
Phosphorus, Total as P	ND	0.0500	mg/L				-			U
LCS (1204557291-BKS)					Prepared: 05/11/2020 Analyzed: 05/12/2020					
Phosphorus, Total as P	1.07	0.0500	mg/L	1.00		107	80-124			
DUP (1204557294 D)		**Source: 510569001**			Prepared: 05/11/2020 Analyzed: 05/12/2020					
Phosphorus, Total as P	0.103	0.0500	mg/L		0.0861		0-41	17.9	41	
MS (1204557295 S)		**Source: 510569001**			Prepared: 05/11/2020 Analyzed: 05/12/2020					
Phosphorus, Total as P	1.11	0.0500	mg/L	1.00	0.0861	102	70-136			

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Jordan A. Merrill For Noelle Doyle Mathis, President

ORIGINS LABORATORY, INC

August 17, 2020

PDC Energy Inc.

Karen Olson

4000 Burlington Ave.

Evans CO 80620

Project Name - DWR Permit #137465 **Project Number - AFE#EX000335**

Attached are your analytical results for DWR Permit #137465 received by Origins Laboratory, Inc. August 07, 2020. This project is associated with Origins project number Y008106-01.

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.
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THE NELAC INSTITUTE

ACCREDITED
TESTING CERT # 3494.01

ORIGINS LABORATORY, INC

PDC Energy Inc.
4000 Burlington Ave.
Evans CO 80620

Karen Olson
Project Number: AFE#EX000335
Project: DWR Permit #137465

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
EFF-080720-1100	Y008106-01	Water	August 7, 2020 11:00	08/07/2020 13:22
INF-080720-1145	Y008106-02	Water	August 7, 2020 11:45	08/07/2020 13:22

Origins Laboratory, Inc.

Jen Pellegrini, Project Manager

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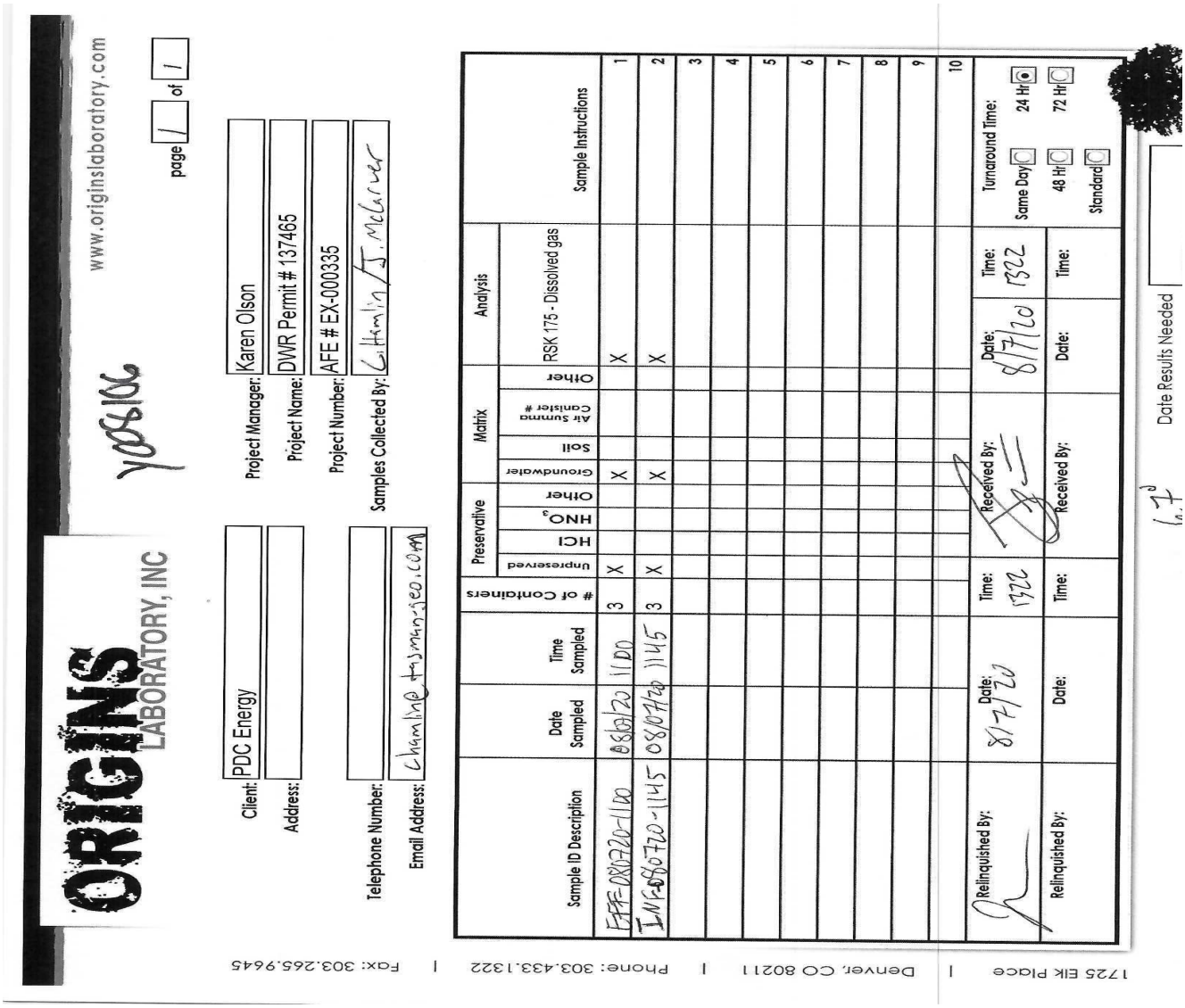
ORIGINS LABORATORY, INC

PDC Energy Inc.
4000 Burlington Ave.
Evans CO 80620

Karen Olson
Project Number: AFE#EX000335
Project: DWR Permit #137465



Origins Laboratory, Inc.

Jen Pellegrini, Project Manager

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.

ORIGINS LABORATORY, INC

PDC Energy Inc.
4000 Burlington Ave.
Evans CO 80620

Karen Olson
Project Number: AFE#EX000335
Project: DWR Permit #137465

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: 1008106
Client: PDC Energy
Client Project ID: DWR Permit #137465
Checklist Completed by: JG
Shipped Via: HD (UPS, FedEx, Hand Delivered, Pick-up, etc.)
Date/time completed: 8/7/20
Airbill #: N/A
Matrix(s) Received: (Check all that apply): ____Soil/Solid X Water ____Other: ____
Cooler Number/Temperature: 1 / 6.7 °c ____/____°c ____/____°c ____/____°c (Describe)
Thermometer ID: 5003

Requirement Description	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature between 0°C to ≤ 6°C[1]?		✓		Some Dry
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]?		✓		
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)*		✓		
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.

JM
Reviewed by (Project Manager)

8-10-20
Date/Time Reviewed

Origins Laboratory, Inc.

Jen Pellegrini

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Jen Pellegrini, Project Manager

PDC Energy Inc.
4000 Burlington Ave.
Evans CO 80620

Karen Olson
Project Number: AFE#EX000335
Project: DWR Permit #137465

EFF-080720-1100
8/7/2020 11:00:00AM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes

Pace Analytical

Y008106-01 (Water)

Dissolved Gasses by RSK 175

Ethane	**1180**	**4.07**	13.0	ug/L	1	11111	08/07/2020	08/13/2020
Methane	**7800**	**29.1**	100	"	10	"	"	08/14/2020
n-Propane	**488**	**5.48**	18.6	"	1	"	"	08/13/2020

Origins Laboratory, Inc.

Jen Pellegrini, Project Manager

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ORIGINS LABORATORY, INC

PDC Energy Inc.
4000 Burlington Ave.
Evans CO 80620

Karen Olson
Project Number: AFE#EX000335
Project: DWR Permit #137465

INF-080720-1145
8/7/2020 11:45:00AM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes

Pace Analytical

Y008106-02 (Water)

Dissolved Gasses by RSK 175

Ethane	**6790**	**4.07**	13.0	ug/L	1	11111	08/07/2020	08/13/2020
Methane	**38600**	**29.1**	100	"	10	"	"	08/14/2020
n-Propane	**4030**	**5.48**	18.6	"	1	"	"	08/13/2020

Origins Laboratory, Inc.

Jen Pellegrini, Project Manager

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ORIGINS LABORATORY, INC

PDC Energy Inc.
4000 Burlington Ave.
Evans CO 80620

Karen Olson
Project Number: AFE#EX000335
Project: DWR Permit #137465

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

Origins Laboratory, Inc.

Jen Pellegrini, Project Manager

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ORIGINS LABORATORY, INC

PDC Energy Inc.
4000 Burlington Ave.
Evans CO 80620

Karen Olson
Project Number: AFE#EX000335
Project: DWR Permit #137465

Notes and Definitions

ND Analyte NOT DETECTED at or above the reporting limit

RPD Relative Percent Difference

All soil results are reported on a wet weight basis.

Origins Laboratory, Inc.

Jen Pellegrini, Project Manager

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.

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

August 17, 2020

Jennifer Pellegrini
Origins Laboratory, Inc
1725 Elk Place
Denver, CO 80211

RE: Project: Y008106
Pace Project No.: 10527768

Dear Jennifer Pellegrini:

Enclosed are the analytical results for sample(s) received by the laboratory on August 08, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Linda Eshelman
linda.eshelman@pacelabs.com
(612)607-1700
Project Manager

Enclosures

cc: Jordan Merrill, Origins Laboratory, Inc.

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: Y008106
Pace Project No.: 10527768

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10527768001	**Y008106-01**	Water	08/07/20 11:00	08/08/20 11:10
10527768002	**Y008106-02**	Water	08/07/20 11:45	08/08/20 11:10

Your Lab's letterhead here...
Address City, St. Zip Phone/Fax

SUBCONTRACT ORDER

Sending Laboratory:

Origins Laboratory, Inc.
1725 West Elk Place
Denver, CO 80211
Phone: 303.433.1322
Fax: 303.265.9645

Project Manager: Jen Pellegrini

Subcontracted Laboratory:

Pace Analytical
1700 Elm St, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6436
Fax: -

Work Order: Y008106

Analysis	Due	Expires	Comments
Sample ID: Y008106-01 ***Water Sampled: 08/07/2020 11:00***			
Methane, Ethane, and Propane by RSK 175	08/12/2020	08/21/2020 11:00	01
Containers Supplied:			
Sample ID: Y008106-02 ***Water Sampled: 08/07/2020 11:45***			
Methane, Ethane, and Propane by RSK 175	08/12/2020	08/21/2020 11:45	02
Containers Supplied:			

Released By 8/7/20 Date

Received By Date 8/8/20 1110

T=2.3

Pace Analytical®	Document Name: **Sample Condition Upon Receipt (SCUR) - MN**	Document Revised: 27Mar2020 **Page 1 of 1**
	Document No.: **ENV-FRM-MIN4-0150 Rev.00**	Pace Analytical Services - **Minneapolis**

Sample Condition Upon Receipt **Client Name:** Origin **Project #:** **WO#: 10527768**

PM: LLE Due Date: 08/14/20
CLIENT: ORIGINS LAB

Courier: ☒Fed Ex ☐UPS ☐USPS ☐Client ☐Pace ☐SpeeDee ☐Commercial **See Exceptions** ☐

Tracking Number: 7712 1005 3539

Custody Seal on Cooler/Box Present? ☐Yes ☒No **Seals Intact?** ☐Yes ☒No **Biological Tissue Frozen?** ☐Yes ☐No ☒N/A

Packing Material: ☒Bubble Wrap ☒Bubble Bags ☐None ☐Other:_____ **Temp Blank?** ☒Yes ☐No

Thermometer: ☐T1(0461) ☒T2(1336) ☐T3(0459) ☐T4(0254) ☐T5(0489) **Type of Ice:** ☒Wet ☐Blue ☐None ☐Dry ☐Melted

Did Samples Originate in West Virginia? ☐Yes ☒No **Were All Container Temps Taken?** ☐Yes ☐No ☒N/A

Temp should be above freezing to 6°C **Cooler Temp Read w/temp blank:** 2.5 °C **Average Corrected Temp (no temp blank only):** ☐See Exceptions _____ °C ☐1 Container

Correction Factor: -0.2 **Cooler Temp Corrected w/temp blank:** 2.3 °C

USDA Regulated Soil: (☒ N/A, water sample/Other:_____) **Date/Initials of Person Examining Contents:** CEG 8/8/20

Did samples originate in a quarantine zone within the United States: AL, AR, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐Yes ☐No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐Yes ☐No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present and Filled Out?	☒Yes	☐No		1.
Chain of Custody Relinquished?	☒Yes	☐No		2.
Sampler Name and/or Signature on COC?	☐Yes	☒No	☐N/A	3.
Samples Arrived within Hold Time?	☒Yes	☐No		4.
Short Hold Time Analysis (<72 hr)?	☐Yes	☒No		5. ☐Fecal Coliform ☐HPC ☐Total Coliform/E coli ☐BOD/cBOD ☐Hex Chrome ☐Turbidity ☐Nitrate ☐Nitrite ☐Orthophos ☐Other_____
Rush Turn Around Time Requested?	☒Yes	☐No		6.
Sufficient Volume?	☒Yes	☐No		7.
Correct Containers Used?	☒Yes	☐No		8.
-Pace Containers Used?	☐Yes	☒No		
Containers Intact?	☒Yes	☐No		9.
Field Filtered Volume Received for Dissolved Tests?	☐Yes	☐No	☒N/A	10. Is sediment visible in the dissolved container? ☐Yes ☐No
Is sufficient information available to reconcile the samples to the COC?	☒Yes	☐No		11. **If no, write ID/ Date/Time on Container Below:** **See Exception** ☐
Matrix: ☒Water ☐Soil ☐Oil ☐Other_____				
All containers needing acid/base preservation have been checked?	☐Yes	☐No	☒N/A	12. Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, <2pH, NaOH >9 Sulfide, NaOH>12 Cyanide)	☐Yes	☐No	☒N/A	☐ NaOH ☐ HNO_3 ☐ H_2SO_4 ☐ Zinc Acetate
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxin/PFAS	☐Yes	☐No	☒N/A	Positive for Res. Chlorine? ☐Yes ☐No **pH Paper Lot#** **See Exception** ☐
				Res. Chlorine | 0-6 Roll | 0-6 Strip | 0-14 Strip
Extra labels present on soil VOA or WIDRO containers?	☐Yes	☐No	☒N/A	13. **See Exception** ☐
Headspace in VOA Vials (greater than 6mm)?	☐Yes	☐No	☒N/A	
Trip Blank Present?	☐Yes	☐No	☒N/A	14.
Trip Blank Custody Seals Present?	☐Yes	☐No	☒N/A	Pace Trip Blank Lot # (if purchased):_____

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐Yes ☐No

Person Contacted:_____ Date/Time:_____

Comments/Resolution:_____

Project Manager Review: _____ **Date:** 8/10/2020

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers).

Labeled by: CEG (2)

ANALYTICAL REPORT

August 15, 2020

Pace Analytical - Minnesota

Sample Delivery Group:	L1249399
Samples Received:	08/12/2020
Project Number:	10527768
Description:	Y008106
Site:	001
Report To:	Linda Eshelman 1700 Elm Street Suite 200 Minneapolis, MN 55414

Entire Report Reviewed By:

Nancy McLain
Project Manager

Y008106-01 L1249399-01 GW

Collected by	Collected date/time	Received date/time
	08/07/20 11:00	08/12/20 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC) by Method RSK175	WG1525159	1	08/13/20 16:19	08/13/20 16:19	DAH	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method RSK175	WG1525815	10	08/14/20 12:36	08/14/20 12:36	DAH	Mt. Juliet, TN

Y008106-02 L1249399-02 GW

Collected by	Collected date/time	Received date/time
	08/07/20 11:45	08/12/20 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC) by Method RSK175	WG1525159	1	08/13/20 16:22	08/13/20 16:22	DAH	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method RSK175	WG1525815	10	08/14/20 12:38	08/14/20 12:38	DAH	Mt. Juliet, TN

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Nancy F. McLain

Nancy McLain
Project Manager

Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Methane	7800		29.1	100	10	08/14/2020 12:36	WG1525815
Ethane	1180		4.07	13.0	1	08/13/2020 16:19	WG1525159
Propane	488		5.48	18.6	1	08/13/2020 16:19	WG1525159

Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Methane	38600		29.1	100	10	08/14/2020 12:38	WG1525815
Ethane	6790		4.07	13.0	1	08/13/2020 16:22	WG1525159
Propane	4030		5.48	18.6	1	08/13/2020 16:22	WG1525159

Method Blank (MB)

(MB) R3559554-2 08/13/20 15:04

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	ug/l		ug/l	ug/l
Ethane	U		4.07	13.0
Propane	U		5.48	18.6

L1247769-16 Original Sample (OS) • Duplicate (DUP)

(OS) L1247769-16 08/13/20 15:23 • (DUP) R3559554-3 08/13/20 15:45

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	ug/l	ug/l		%		%
Ethane	U	U	1	0.000		20
Propane	U	U	1	0.000		20

L1248875-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1248875-01 08/13/20 16:07 • (DUP) R3559554-4 08/13/20 16:24

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	ug/l	ug/l		%		%
Ethane	U	U	1	0.000		20
Propane	U	U	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3559554-1 08/13/20 14:56 • (LCSD) R3559554-7 08/13/20 16:31

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	%	%	%			%	%
Ethane	129	123	123	95.3	95.3	85.0-115			0.000	20
Propane	186	175	177	94.1	95.2	85.0-115			1.14	20

L1247769-21 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1247769-21 08/13/20 15:41 • (MS) R3559554-5 08/13/20 16:27 • (MSD) R3559554-6 08/13/20 16:29

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	ug/l	%	%		%			%	%
Ethane	129	31.9	152	149	93.1	90.8	1	85.0-115			1.99	20
Propane	186	U	172	174	92.5	93.5	1	85.0-115			1.16	20

Method Blank (MB)

(MB) R3559843-2 08/14/20 10:35

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	ug/l		ug/l	ug/l
Methane	U		2.91	10.0

L1247826-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1247826-01 08/14/20 10:53 • (DUP) R3559843-3 08/14/20 12:07

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	ug/l	ug/l		%		%
Methane	U	U	1	0.000		20

L1247846-08 Original Sample (OS) • Duplicate (DUP)

(OS) L1247846-08 08/14/20 12:10 • (DUP) R3559843-4 08/14/20 12:41

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	ug/l	ug/l		%		%
Methane	U	U	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3559843-1 08/14/20 10:29 • (LCSD) R3559843-5 08/14/20 12:43

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	%	%	%			%	%
Methane	67.8	66.3	68.7	97.8	101	85.0-115			3.56	20

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier Description

The remainder of this page intentionally left blank, there are no qualifiers applied to this SDG.

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO00356
Kentucky [1 6]	90010	South Carolina	84004
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana [1]	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

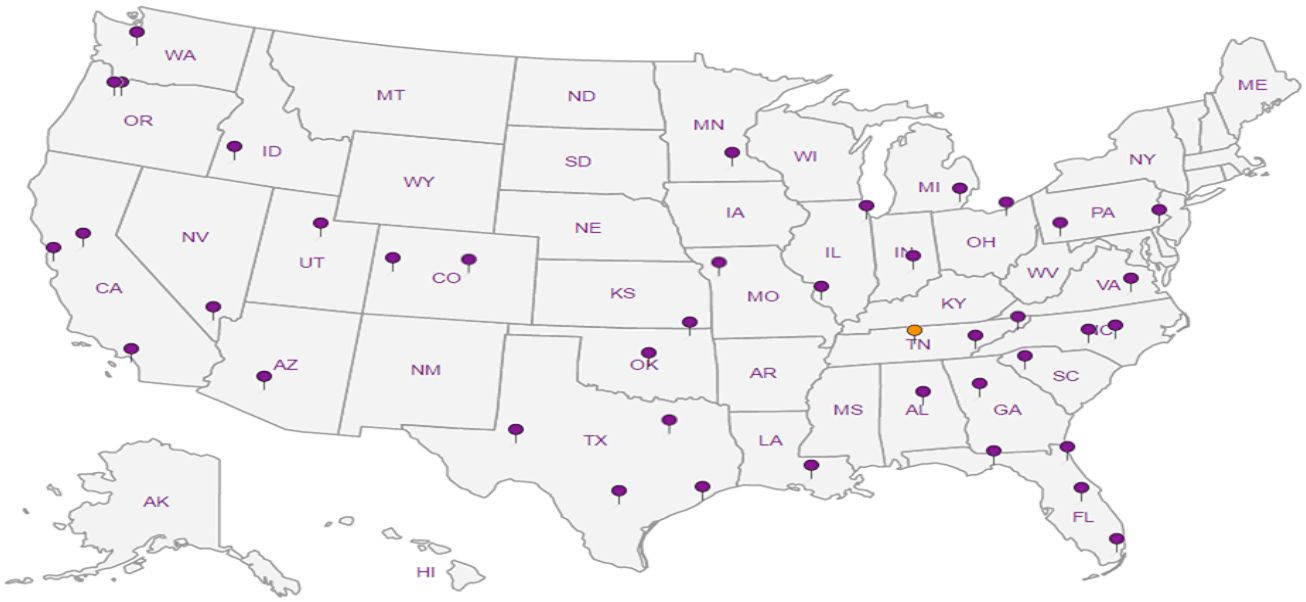
Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



Internal Transfer Chain of Custody

Pace Analytical®
www.pacelabs.com

☐ Samples Pre-Logged into eCOC.

State Of Origin: CO
Cert. Needed: ☐ Yes ☐ No
Owner Received Date: 8/8/2020
Results Requested By: ~~8/10/2020~~ 8/14/2020

Workorder: 10527768 **Workorder Name:** Y008106

Report To	Subcontract To
Linda Eshelman Pace Analytical Minnesota 1700 Elm Street Suite 200 Minneapolis, MN 55414 Phone (612)607-1700	Pace Analytical National 12065 Lebanon Rd Mt. Juliet, TN 37122 Phone (615)758-5858

L1249399
D068

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers HCLVG9A	RSK 175 - Methane,Ethane,n-Propane	LAB USE ONLY
1	Y008106-01	PS	8/7/2020 11:00	10527768001	Water	3	X	-01
2	Y008106-02	PS	8/7/2020 11:45	10527768002	Water	3	X	-02
3								
4								
5								

Transfers	Released By	Date/Time	Received By	Date/Time
1	[illegible] Pace	8/11/20 1440		
2				
3				8-12-20 0845

Comments

RUSH due 8/14/2020 OK

Cooler Temperature on Receipt 2.1 °C	Custody Seal (Y) or N	Received on Ice (Y) or N	Samples Intact (Y) or N

***In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document. This chain of custody is considered complete as is since this information is available in the owner laboratory.

MP#2
2.2-.1=2.1

RAD SCREEN: <0.5 mR/hr

L1249359

Pace Analytical®	Document Name: Sample Condition Upon Receipt (SCUR) - MN	Document Revised: 27Mar2020 Page 1 of 1
	Document No.: ENV-FRM-MIN4-0150 Rev.00	Pace Analytical Services - Minneapolis

Sample Condition Upon Receipt

Client Name: Origin

Project #: WO# : 10527768

PM: LLE Due Date: 08/14/20

CLIENT: ORIGINS LAB

Courier: [X] Fed Ex [ ] UPS [ ] USPS [ ] Client [ ] Pace [ ] SpeeDee [ ] Commercial See Exceptions [ ]

Tracking Number: 7712 1005 3539

Custody Seal on Cooler/Box Present? [ ] Yes [X] No **Seals Intact?** [ ] Yes [X] No **Biological Tissue Frozen?** [ ] Yes [ ] No [X] N/A

Packing Material: [X] Bubble Wrap [X] Bubble Bags [ ] None [ ] Other: _____ **Temp Blank?** [X] Yes [ ] No

Thermometer: [ ] T1(0461) [X] T2(1336) [ ] T3(0459) [ ] T4(0254) [ ] T5(0489) **Type of Ice:** [X] Wet [ ] Blue [ ] None [ ] Dry [ ] Melted

Did Samples Originate in West Virginia? [ ] Yes [X] No **Were All Container Temps Taken?** [ ] Yes [ ] No [X] N/A

Temp should be above freezing to 6°C **Cooler Temp Read w/temp blank:** 2.5 °C **Average Corrected Temp (no temp blank only):** [ ] See Exceptions [ ] 1 Container

Correction Factor: -0.2 **Cooler Temp Corrected w/temp blank:** 2.3 °C

Date/Initials of Person Examining Contents: CEG 8/8/20

USDA Regulated Soil: ([X] N/A, water sample/Other: _____) Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? [ ] Yes [ ] No

Did samples originate in a quarantine zone within the United States: AL, AR, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? [ ] Yes [ ] No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present and Filled Out?	[X] Yes	[ ] No		1.
Chain of Custody Relinquished?	[X] Yes	[ ] No		2.
Sampler Name and/or Signature on COC?	[ ] Yes	[X] No	[ ] N/A	3.
Samples Arrived within Hold Time?	[X] Yes	[ ] No		4.
Short Hold Time Analysis (<72 hr)?	[ ] Yes	[X] No		5. [ ] Fecal Coliform [ ] HPC [ ] Total Coliform/E coli [ ] BOD/cBOD [ ] Hex Chrome [ ] Turbidity [ ] Nitrate [ ] Nitrite [ ] Orthophos [ ] Other _____
Rush Turn Around Time Requested?	[X] Yes	[ ] No		6.
Sufficient Volume?	[X] Yes	[ ] No		7.
Correct Containers Used?	[X] Yes	[ ] No		8.
-Pace Containers Used?	[ ] Yes	[X] No		
Containers Intact?	[X] Yes	[ ] No		9.
Field Filtered Volume Received for Dissolved Tests?	[ ] Yes	[ ] No	[X] N/A	10. Is sediment visible in the dissolved container? [ ] Yes [ ] No
Is sufficient information available to reconcile the samples to the COC?	[X] Yes	[ ] No		11. **If no, write ID/ Date/Time on Container Below:** **See Exception** [ ]
Matrix: [X] Water [ ] Soil [ ] Oil [ ] Other _____				
All containers needing acid/base preservation have been checked?	[ ] Yes	[ ] No	[X] N/A	12. Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, <2pH, NaOH >9 Sulfide, NaOH>12 Cyanide)	[ ] Yes	[ ] No	[X] N/A	[ ] NaOH [ ] HNO_3 [ ] H_2SO_4 [ ] Zinc Acetate
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxin/PFAS	[ ] Yes	[ ] No	[X] N/A	Positive for Res. Chlorine? [ ] Yes [ ] No **pH Paper Lot#** **See Exception** [ ]
				Res. Chlorine | 0-6 Roll | 0-6 Strip | 0-14 Strip
Extra labels present on soil VOA or WIDRO containers?	[ ] Yes	[ ] No	[X] N/A	13. **See Exception** [ ]
Headspace in VOA Vials (greater than 6mm)?	[ ] Yes	[ ] No	[X] N/A	
Trip Blank Present?	[ ] Yes	[ ] No	[X] N/A	14.
Trip Blank Custody Seals Present?	[ ] Yes	[ ] No	[X] N/A	Pace Trip Blank Lot # (if purchased): _____

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** [ ] Yes [ ] No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Project Manager Review: _____ **Date:** 8/10/2020

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers).

Labeled by: CEG

Pace Analytical National Center for Testing & Innovation
Cooler Receipt Form

Client: PACEMN		L1249799
Cooler Received/Opened On: 8 / 11 / 20	Temperature:	2.4
Received By: joey brent		
Signature:		

Receipt Check List	NP	Yes	No
COC Seal Present / Intact?		✓	
COC Signed / Accurate?		✓	
Bottles arrive intact?		✓	
Correct bottles used?		✓	
Sufficient volume sent?		✓	
If Applicable			
VOA Zero headspace?		✓	
Preservation Correct / Checked?			

TH 1320 7523 6893

Tasman Geosciences
6855 West 119th Avenue
Broomfield CO 80020

Christine Hamlin
Project Number: [none]
Project: PDC - Morales Methane Investigation

Notes and Definitions

Ua	Sample is Non-Detect.
U	Result not detected above the detection limit
~9000	~9000
~1400	~1400
~100	~100
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.

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 Noelle Doyle Mathis, President

Summit Scientific

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

August 13, 2020

Karen Olson

PDC Energy

1775 Sherman St. STE. 3000

Denver, CO 80203

RE: DWR Permit #137465

Work Order # 2008082

Enclosed are the results of analyses for samples received by Summit Scientific on 08/12/20 11:54. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Paul Shrewsbury

President

PDC Energy	Project: DWR Permit #137465	
1775 Sherman St. STE. 3000	Project Number: AFE #EX-000335	**Reported:**
Denver CO, 80203	Project Manager: Karen Olson	08/13/20 12:11

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
EFF-081220-0832	2008082-01	Water	08/12/20 08:32	08/12/20 11:54
INF-081220-0927	2008082-02	Water	08/12/20 09:27	08/12/20 11:54

Summit Scientific

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

Summit Scientific

S_2

2008082

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 # 137465
Sampler Name:		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-081220-0832	08/12/20	0832	3			X		X				X								
2	INF-081220-0927	08/12/20	0927	3			X		X				X								
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					

Relinquished by:	Date/Time: 8/11/20 1154	Received by: Bill Gonzales	Date/Time: 8-12-20 11:54
Relinquished by:	Date/Time:	Received by:	Date/Time:
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: 10.2

Samples Intact: (Yes) No

Notes:

on ice

Sample Receipt Checklist

S2 Work Order 2008082

DWR Permit #137465

Client: PDC Energy / Tasman Client Project ID: 2008082

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

Matrix (check all that apply): _____Air _____Soil/Solid _____Water X Other:_____ (Describe)

Temp (°C)	10.2

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.				
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 hr turn
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.

BG — **Custodian Printed Name or Initials**

Bill Gonzales — **Signature of Custodian**

8-12-20 11:54 — **Date/Time**

PDC Energy	Project: DWR Permit #137465	
1775 Sherman St. STE. 3000	Project Number: AFE #EX-000335	**Reported:**
Denver CO, 80203	Project Manager: Karen Olson	08/13/20 12:11

EFF-081220-0832

2008082-01 (Water)

Summit Scientific

Dissolved Gases by RSK-175

Date Sampled: **08/12/20 08:32**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Methane	**3.3**	1.0	mg/L	100	2008114	08/12/20	08/13/20	RSK-175 mod	
Ethane	**0.95**	0.10	"	10	"	"	"	"	
Propane	**0.46**	0.010	"	1	"	"	"	"	

Date Sampled: **08/12/20 08:32**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: Ethene		*111 %*	*70-130*		"	"	"	"	

PDC Energy	Project: DWR Permit #137465	
1775 Sherman St. STE. 3000	Project Number: AFE #EX-000335	**Reported:**
Denver CO, 80203	Project Manager: Karen Olson	08/13/20 12:11

INF-081220-0927

2008082-02 (Water)

Summit Scientific

Dissolved Gases by RSK-175

Date Sampled: **08/12/20 09:27**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Methane	**10**	1.0	mg/L	100	2008114	08/12/20	08/13/20	RSK-175 mod	
Ethane	**2.8**	1.0	"	"	"	"	"	"	
Propane	**2.4**	0.10	"	10	"	"	"	"	

Date Sampled: **08/12/20 09:27**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: Ethene		*126 %*	*70-130*		"	"	"	"	

S2

PDC Energy	Project: DWR Permit #137465	
1775 Sherman St. STE. 3000	Project Number: AFE #EX-000335	**Reported:**
Denver CO, 80203	Project Manager: Karen Olson	08/13/20 12:11

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 2008114 - GC										
Blank (2008114-BLK1)				Prepared: 08/12/20 Analyzed: 08/13/20						
Methane	ND	0.010	mg/L							
Ethane	ND	0.010	"							
Propane	ND	0.010	"							
Surrogate: Ethene	*0.0436*		*"*	*0.0364*		*120*	*70-130*			
LCS (2008114-BS1)				Prepared: 08/12/20 Analyzed: 08/13/20						
Methane	0.037	0.010	mg/L	0.0428		85.8	70-130			
Ethane	0.10	0.010	"	0.0798		130	70-130			
Propane	0.15	0.010	"	0.139		110	70-130			
Surrogate: Ethene	*0.0885*		*"*	*0.0728*		*122*	*70-130*			
LCS Dup (2008114-BSD1)				Prepared: 08/12/20 Analyzed: 08/13/20						
Methane	0.037	0.010	mg/L	0.0428		86.0	70-130	0.272	200	
Ethane	0.10	0.010	"	0.0798		126	70-130	3.04	200	
Propane	0.16	0.010	"	0.139		115	70-130	4.43	200	
Surrogate: Ethene	*0.0928*		*"*	*0.0728*		*127*	*70-130*			
Duplicate (2008114-DUP1)	**Source: 2008082-01**			Prepared: 08/12/20 Analyzed: 08/13/20						
Methane	2.1	1.0	mg/L		3.3			46.3	30	QR-04
Ethane	0.97	0.10	"		0.95			1.87	30	
Propane	0.45	0.010	"		0.46			0.528	30	
Surrogate: Ethene	*0.0412*		*"*	*0.0364*		*113*	*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.

PDC Energy	Project: DWR Permit #137465	
1775 Sherman St. STE. 3000	Project Number: AFE #EX-000335	**Reported:**
Denver CO, 80203	Project Manager: Karen Olson	08/13/20 12:11

Notes and Definitions

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.
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

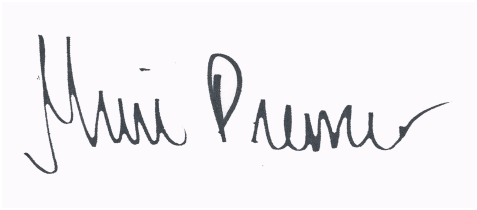
August 20, 2020

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

RE: DWR Permit #137465
Work Order #2008172

Enclosed are the results of analyses for samples received by Summit Scientific on 08/19/20 17:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Muri Premer For Paul Shrewsbury
President

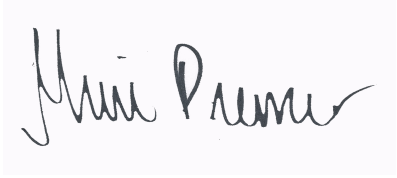
S2

PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #137465 Project Number: AFE #EX-000335 Project Manager: Karen Olson	**Reported:** 08/20/20 16:00

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
EFF-081920-0855	2008172-01	Water	08/19/20 08:55	08/19/20 17:30
INF-081920-0956	2008172-02	Water	08/19/20 09:56	08/19/20 17:30

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.

2008172

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 Nielsen

Project Manager: Karen Olson
E-Mail: Karen.Olson@pdce.com; chamlin@tasman-geo.com
Project Name: DWR Permit # 137465
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-081920-0855	8/19/20	855	3			X		X				X								
2	INF-081920-0956	8/19/20	956	3			X		X				X								
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					

Relinquished by: Date/Time: 8/19/20 11.00
Received by: Tasman Lock Box Date/Time: 8/19/20 11:00

Relinquished by: Tasman Lock Box Date/Time: 08/19/2020 1730
Received by: Date/Time:

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: 4.8
Samples Intact: (Yes) No

Notes:

Sample Receipt Checklist

S2 Work Order 2008172

Client: POC | TASMAN Client Project ID: DLOR PERMIT # 137465

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

[ ] [X] [ ] [ ] [ ]

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

Temp (°C)	4.8

Thermometer ID: 61857155-K

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature at 4°C +/- 2°C (1)? NOTE: If samples are delivered the same day of sampling, this requirement is met provided that there is evidence that cooling has begun.	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.**				

TC

Custodian Printed Name or Initials

Signature of Custodian

08/19/2020

Date/Time

S2

PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #137465 Project Number: AFE #EX-000335 Project Manager: Karen Olson	**Reported:** 08/20/20 16:00

EFF-081920-0855

2008172-01 (Water)

Summit Scientific

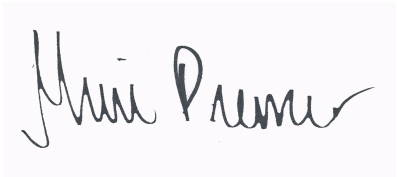
Dissolved Gases by RSK-175

Date Sampled: **08/19/20 08:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Methane	**2.2**	1.0	mg/L	100	2008206	08/19/20	08/20/20	RSK-175 mod	
Ethane	**1.2**	0.10	"	10	"	"	"	"	
Propane	**0.75**	0.10	"	"	"	"	"	"	

Date Sampled: **08/19/20 08:55**

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 #137465 Project Number: AFE #EX-000335 Project Manager: Karen Olson	**Reported:** 08/20/20 16:00

INF-081920-0956

2008172-02 (Water)

Summit Scientific

Dissolved Gases by RSK-175

Date Sampled: **08/19/20 09:56**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Methane	**12**	1.0	mg/L	100	2008206	08/19/20	08/20/20	RSK-175 mod	
Ethane	**3.9**	1.0	"	"	"	"	"	"	
Propane	**2.8**	0.10	"	10	"	"	"	"	

Date Sampled: **08/19/20 09:56**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: Ethene		*126 %*	*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.

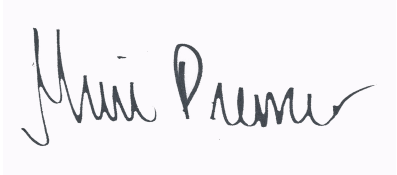
S2

PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #137465 Project Number: AFE #EX-000335 Project Manager: Karen Olson	**Reported:** 08/20/20 16:00

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 2008206 - GC										
Blank (2008206-BLK1)				Prepared: 08/19/20 Analyzed: 08/20/20						
Methane	ND	0.010	mg/L							
Ethane	ND	0.010	"							
Propane	ND	0.010	"							
Surrogate: Ethene	*0.0468*		*"*	*0.0364*		*129*	*70-130*			
LCS (2008206-BS1)				Prepared: 08/19/20 Analyzed: 08/20/20						
Methane	0.036	0.010	mg/L	0.0428		83.2	70-130			
Ethane	0.10	0.010	"	0.0798		127	70-130			
Propane	0.15	0.010	"	0.139		108	70-130			
Surrogate: Ethene	*0.0887*		*"*	*0.0728*		*122*	*70-130*			
Duplicate (2008206-DUP1)		**Source: 2008172-01**		Prepared: 08/19/20 Analyzed: 08/20/20						
Methane	2.3	1.0	mg/L		2.2			1.79	30	
Ethane	1.0	0.10	"		1.2			9.28	30	
Propane	0.68	0.10	"		0.75			10.0	30	
Surrogate: Ethene	*0.0410*		*"*	*0.0364*		*113*	*70-130*			
Matrix Spike (2008206-MS1)		**Source: 2008172-01**		Prepared: 08/19/20 Analyzed: 08/20/20						**QM-02**
Methane	2.7	1.0	mg/L	0.0428	2.2	NR	70-130			
Ethane	1.2	1.0	"	0.0798	1.2	60.1	70-130			
Propane	0.77	1.0	"	0.139	0.75	12.2	70-130			S-03
Surrogate: Ethene	*0.103*		*"*	*0.0728*		*141*	*70-130*			



PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #137465 Project Number: AFE #EX-000335 Project Manager: Karen Olson	**Reported:** 08/20/20 16:00

Notes and Definitions

S-03	The surrogate recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS/LCSD recovery.
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

August 28, 2020

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

RE: DWR Permit #137465
Work Order #2008240

Enclosed are the results of analyses for samples received by Summit Scientific on 08/26/20 16:59. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Paul Shrewsbury
President

S2

PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #137465 Project Number: AFE #EX-000335 Project Manager: Karen Olson	**Reported:** 08/28/20 08:53

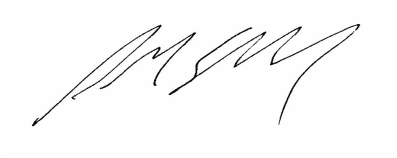
ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
EFF-082620-0921	2008240-01	Water	08/26/20 09:21	08/26/20 16:59
INF-082620-1013	2008240-02	Water	08/26/20 10:13	08/26/20 16:59

CASE NARRATIVE

The sample IDs were changed per request by BN. The sample times were added to the end of the ID.

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.

2008240

Summit Scientific

S2

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 # 137465
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-082620-	8/26/20	921	3			X		X				X								
2	INF-082620-	8/26/20	1013	3			X		X				X								
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					

Relinquished by:	Date/Time:	Received by:	Date/Time:
	8/26/20 1240	Tasman Lock Box	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 2008740

Client: PDC / TASMAN Client Project ID: DWR PERMIT # 13745

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	[signature]	08/26/2020

PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #137465 Project Number: AFE #EX-000335 Project Manager: Karen Olson	**Reported:** 08/28/20 08:53

EFF-082620-0921

2008240-01 (Water)

Summit Scientific

Dissolved Gases by RSK-175

Date Sampled: **08/26/20 09:21**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Methane	**2.9**	1.0	mg/L	100	2008270	08/26/20	08/27/20	RSK-175 mod	
Ethane	**0.99**	0.10	"	10	"	"	"	"	
Propane	**0.65**	0.10	"	"	"	"	"	"	

Date Sampled: **08/26/20 09:21**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: Ethene		*113 %*	*70-130*		"	"	"	"	

PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #137465 Project Number: AFE #EX-000335 Project Manager: Karen Olson	**Reported:** 08/28/20 08:53

INF-082620-1013

2008240-02 (Water)

Summit Scientific

Dissolved Gases by RSK-175

Date Sampled: **08/26/20 10:13**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Methane	**11**	1.0	mg/L	100	2008270	08/26/20	08/27/20	RSK-175 mod	
Ethane	**3.7**	1.0	"	"	"	"	"	"	
Propane	**2.0**	1.0	"	"	"	"	"	"	

Date Sampled: **08/26/20 10:13**

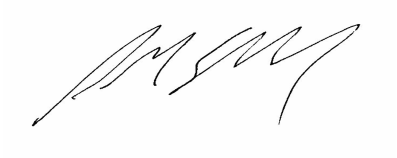
Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: Ethene		*110 %*	*70-130*		"	"	"	"	

PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #137465 Project Number: AFE #EX-000335 Project Manager: Karen Olson	**Reported:** 08/28/20 08:53

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 #137465 Project Number: AFE #EX-000335 Project Manager: Karen Olson	**Reported:** 08/28/20 08:53

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

ATTACHMENT B

DWR WATER WELL PERMIT # 137465
Methane Mitigation System
Photographic Overview

Well Ventilation

Water Treatment System