Methane Mitigation System
Quarterly 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

6855 WEST 119TH AVENUE
BROOMFIELD, COLORADO 80020

January 25, 2022

Table of Contents

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.

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. Following the initial system start-up sampling procedures, the sampling program will be conducted on a quarterly schedule and sampled within the second month of every quarter. 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. Additionally, one sample is collected from the system influent in a laboratory-provided 750-mL IsoFlask™ and submitted to Dolan Integration Group (DIG) for isotopic and gas compositional analysis, per COGCC directive.

4.2 Quarterly Reporting Data

Quarterly sampling was conducted in the second month of the quarter on November 9, 2021. Analytical results indicated that post-treatment methane concentrations were reduced below the target level of 10 mg/L. Isotopic analyses completed by DIG confirmed that the elevated methane concentrations were thermogenic and biogenic in origin. Analytical results are summarized in Table 1 and the combined laboratory report is provided as Attachment A.

5.0 Upcoming Site Activities

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

First quarter 2022 System sampling and maintenance will be conducted in February 2022.

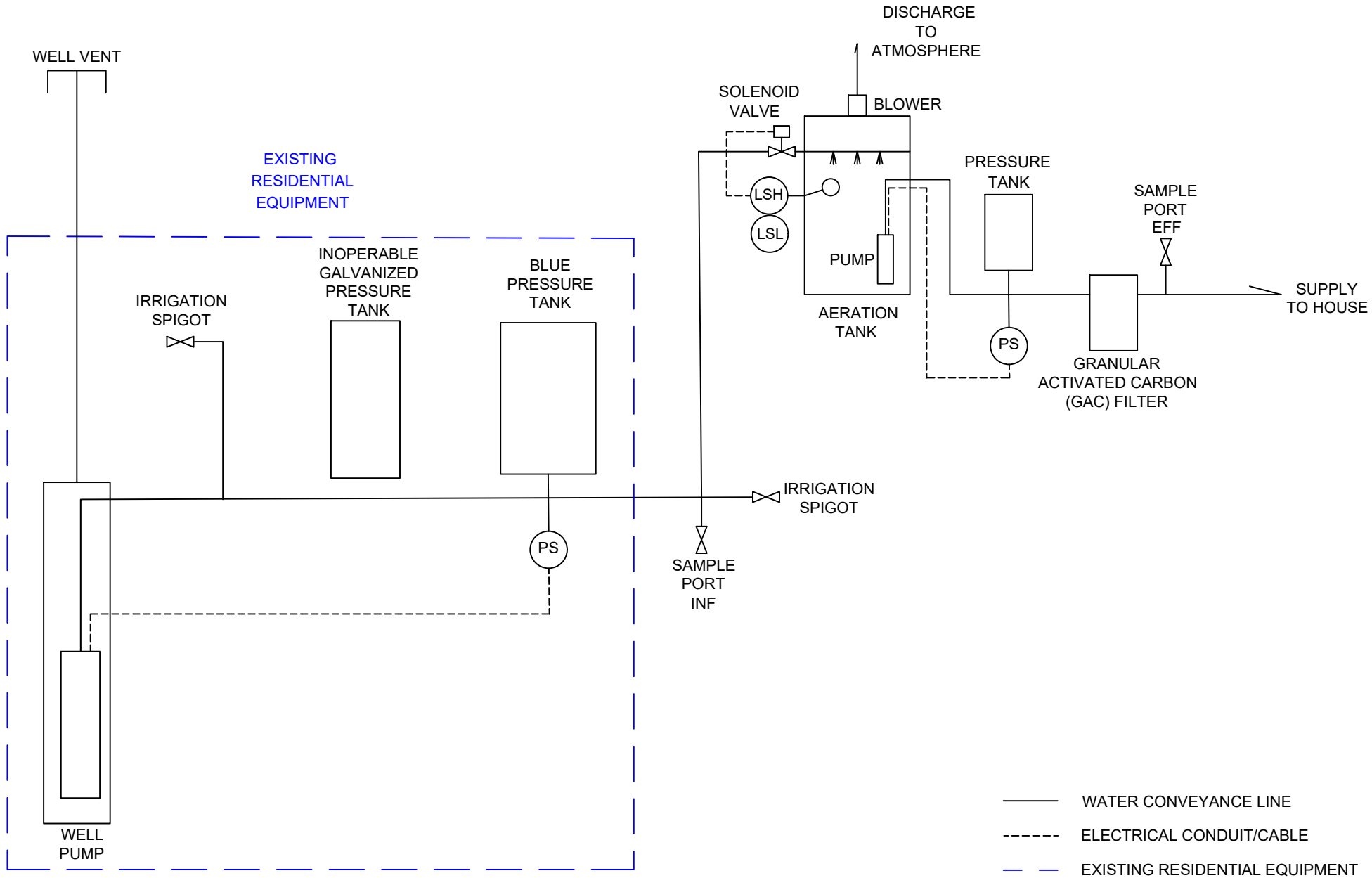
TABLE

TABLE 1
DWR WATER WELL PERMIT # 137465
SYSTEM PROCESS WATER ANALYTICAL RESULTS SUMMARY TABLE

Sample ID	Date Sampled	Methane (mg/L)	Ethane (mg/L)	Propane (mg/L)
Target Level (mg/L)		**10**	**-**	**-**
EFF-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
EFF-110520-1026	11/5/2020	4.4	2.7	1.9
EFF-020921-1102	2/9/2021	3.6	3.4	2.0
EFF-053121-1255	5/13/2021	3.4	2.6	1.5
EFF-082421-1042	8/24/2021	3.4	1.0	0.37
EFF-110921-1304	11/9/2021	2.1	<0.10	<1.0
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
INF-110520-1107	11/5/2020	11	3.5	2.4
INF-020921-1137	2/9/2021	13	6.9	4.3
INF-051321-1355	5/13/2021	12	4.9	2.6
INF-082421-1125	8/24/2021	12	3.9	2.1
INF-110921-1329	11/9/2021	12	3.9	3.9

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

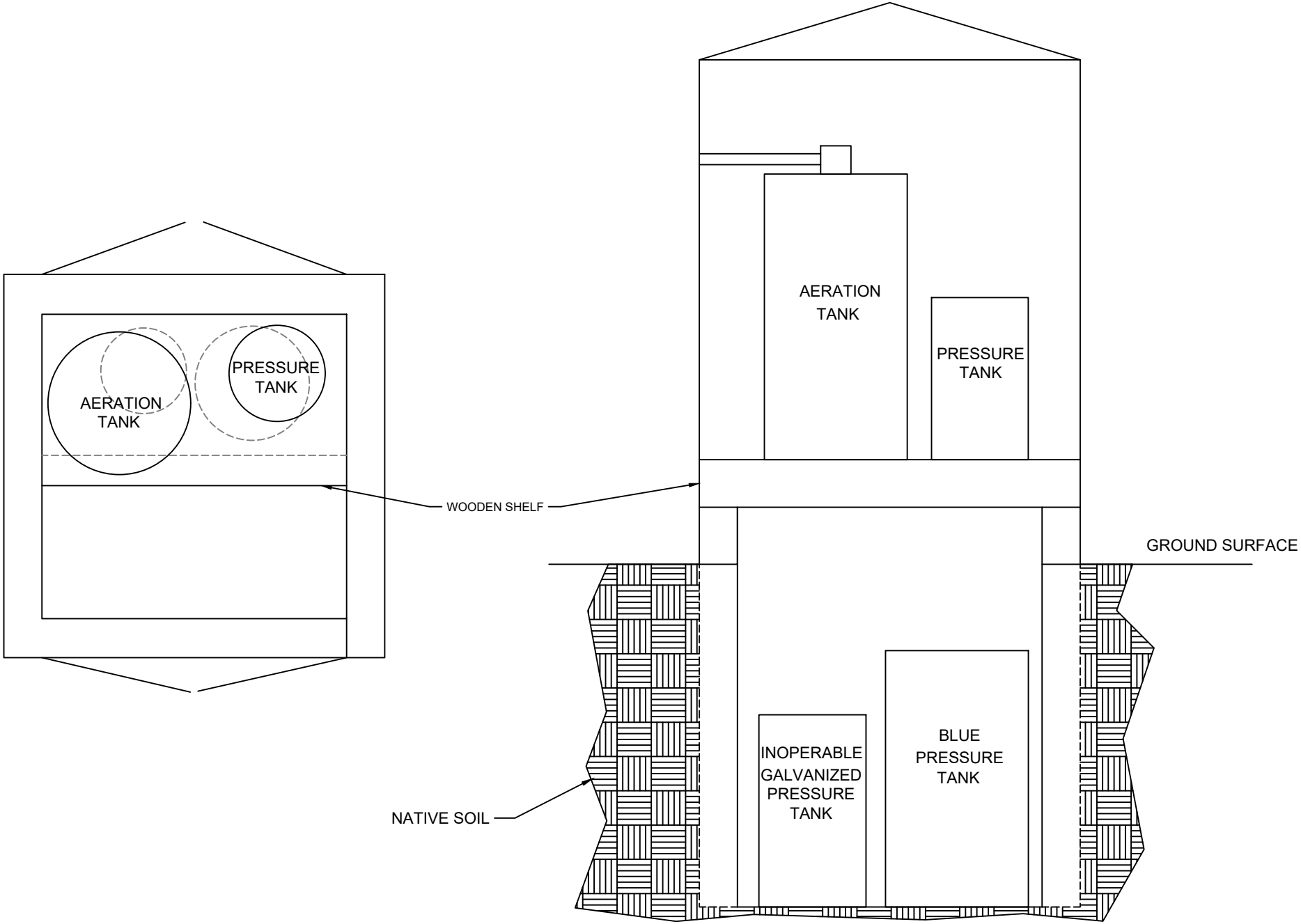
TASMAN GEOSCIENCES

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

Summit Scientific

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

November 15, 2021

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

RE: DWR Permit #137465
Work Order #2111170

Enclosed are the results of analyses for samples received by Summit Scientific on 11/09/21 15:32. 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:** 11/15/21 15:19

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
EFF-110921-1304	2111170-01	Water	11/09/21 13:04	11/09/21 15:32
INF-110921-1329	2111170-02	Water	11/09/21 13:29	11/09/21 15:32

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

2111170

S_2

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

Client:	PDC Energy / Tasman Geosciences	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:	Brock Nelson	Project Number:	AFE # EX-000335

					Preservative				Matrix				Analysis Requested								Special Instructions
ID	Sample Description	Date Sampled	Time Sampled	# of containers	HCl	HNO3	None	Other ____	Water	Soil	Air-Canister #	Other ____	RSK-175 (Dissolved Gases)		DIG Gas Composition	DIG Methane (carbon)	DIG Methane (Hydrogen)				
1	EFF-110921-1304	11/9/21	1304	3			X		X				X								
2	INF-110921-1329	11/9/21	1329	4			X		X				X		X	X	X				4th container for INF-110921-1329 is ISO-FLASK S/N FOG 5R
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					

Relinquished by:	Date/Time: 11/9/21 1532	Received by: Tasman Lock Box	Date/Time: 11/9/21 1532
Relinquished by: Tasman Lock Box	Date/Time: 11.9.21 1532	Received by:	Date/Time: 11.9.21 1532
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: 3.9

Samples Intact: (Yes) No

Notes:

Please provide data in PDF and COGCC EDD formats.

COGCC Facility No.: 765500

S2

Sample Receipt Checklist

S2 Work Order# 211170

Client: PDC Energy/Tasman Client Project ID: DWR Permit #1374605

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

☐ ☑ ☐ ☐ ☐

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

Temp (°C)	3.9

Thermometer ID: G86A9201901378

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

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

Custodian Printed Name or Initials

11.9.21
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	11/15/21 15:19

EFF-110921-1304

2111170-01 (Water)

Summit Scientific

Dissolved Gases by RSK-175

Date Sampled: **11/09/21 13:04**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Methane	**2.1**	1.0	mg/L	100	BEK0241	11/10/21	11/15/21	RSK-175 mod	
Ethane	ND	0.10	"	10	"	"	"	"	R-01
Propane	ND	1.0	"	100	"	"	"	"	R-01

Date Sampled: **11/09/21 13:04**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: Ethene		*54.9 %*	*70-130*		*"*	*"*	*"*	*"*	*S-04*

PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #137465 Project Number: AFE #EX-000335 Project Manager: Karen Olson	**Reported:** 11/15/21 15:19

INF-110921-1329

2111170-02 (Water)

Summit Scientific

Dissolved Gases by RSK-175

Date Sampled: **11/09/21 13:29**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Methane	**12**	1.0	mg/L	100	BEK0241	11/10/21	11/15/21	RSK-175 mod	
Ethane	**3.9**	1.0	"	"	"	"	"	"	
Propane	**3.9**	0.10	"	10	"	"	"	"	

Date Sampled: **11/09/21 13:29**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: Ethene		*110 %*	*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	11/15/21 15:19

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 BEK0241 - GC										
Blank (BEK0241-BLK1)				Prepared: 11/10/21 Analyzed: 11/15/21						
Methane	ND	0.010	mg/L							
Ethane	ND	0.010	"							
Propane	ND	0.010	"							
Surrogate: Ethene	*0.0453*		*"*	*0.0364*		*124*	*70-130*			
LCS (BEK0241-BS1)				Prepared: 11/10/21 Analyzed: 11/15/21						
Methane	0.031	0.010	mg/L	0.0428		72.3	70-130			
Ethane	0.078	0.010	"	0.0798		97.2	70-130			
Propane	0.12	0.010	"	0.139		85.3	70-130			
Surrogate: Ethene	*0.0705*		*"*	*0.0728*		*96.8*	*70-130*			
Duplicate (BEK0241-DUP1)		**Source: 2111170-01**		Prepared: 11/10/21 Analyzed: 11/15/21						
Methane	1.9	1.0	mg/L		2.1			9.09	30	
Ethane	0.12	1.0	"		0.089			29.7	30	R-01
Propane	2.0	1.0	"		0.43			129	30	QR-03
Surrogate: Ethene	*0.0100*		*"*	*0.0364*		*27.5*	*70-130*			*S-04*
Matrix Spike (BEK0241-MS1)		**Source: 2111170-01**		Prepared: 11/10/21 Analyzed: 11/15/21						
Methane	4.3	1.0	mg/L	0.0428	2.1	NR	70-130			QM-02
Ethane	0.96	0.10	"	0.0798	0.089	NR	70-130			QM-02
Propane	0.19	0.10	"	0.139	0.43	NR	70-130			QM-02
Surrogate: Ethene	*0.102*		*"*	*0.0728*		*140*	*70-130*			*QM-02*

Dolan Integration Group
Geochemistry for Energy
11025 Dover Street Unit 800
Westminster, CO 80021
p: 303.531.2030

Hydrocarbon Gas Composition and Stable Isotopes
Data and Interpretation

Job #:	**21116702**
Lab #:	**DIG-026672**
Client:	**Summit Scientific**
Sample Name(s):	**INF-110921-1329**

Analytical Report

Job #:	21116702
Lab #:	DIG-026672
Client:	Summit Scientific
Sample Name:	INF-110921-1329
Date Sampled:	11/09/21
Time Sampled:	13:29
Sample Description:	Isoflask
Sampling Notes:	
Date Received:	11/10/21
Date Analyzed:	Gas Composition: 11/10/21 δ13C: 11/10/21 δD: 11/11/21
Date Reported:	11/12/21
Comments:	

Measured Values:	**Measured ppm**	**Analyte mol %[a]**	**HC mol %**	**$\delta^{13}C$ ‰ VPDB**	**δD ‰ VSMOW**	**Comments**
Nitrogen (N_2)	244654	24.47	-	-	-	
Oxygen + Argon (O_2+Ar)	8309	0.83	-	-	-	
Carbon Dioxide (CO_2)	1107	0.11	-	-	-	
Helium (He)[b]	1046	0.10	-	-	-	
Hydrogen (H_2)	nd	nd	-	-	-	
Methane (CH_4)	654125	65.41	87.82	-58.0	-269	
Ethane (C_2H_6)	57239	5.72	7.68		-	
Ethene (C_2H_4)	nd	nd	nd		-	
Propane (C_3H_8)	24796	2.48	3.33		-	
iso-Butane (C_4H_{10})	2917	0.29	0.39		-	
n-Butane (C_4H_{10})	4391	0.44	0.59		-	
iso-Pentane (C_5H_{12})	712	0.07	0.10		-	
n-Pentane (C_5H_{12})	515	0.05	0.07		-	
Hexanes + (C_6H_{14})	177	0.02	0.02		-	

Calculated Values:	
Total HCs (ppm)	744872
Gas Wetness (mol % C_2+/C_1+)	12.18
$C_1/(C_2+C_3)$ (mol/mol)	8

[a] Analyte concentrations normalized to 100% (Mol. % is approximately equal to Vol. %)

[b] Addition of helium negates the ability to detect native helium and may negate the ability to detect hydrogen.

HC= Hydrocarbons

nd = not detected

na = not analyzed

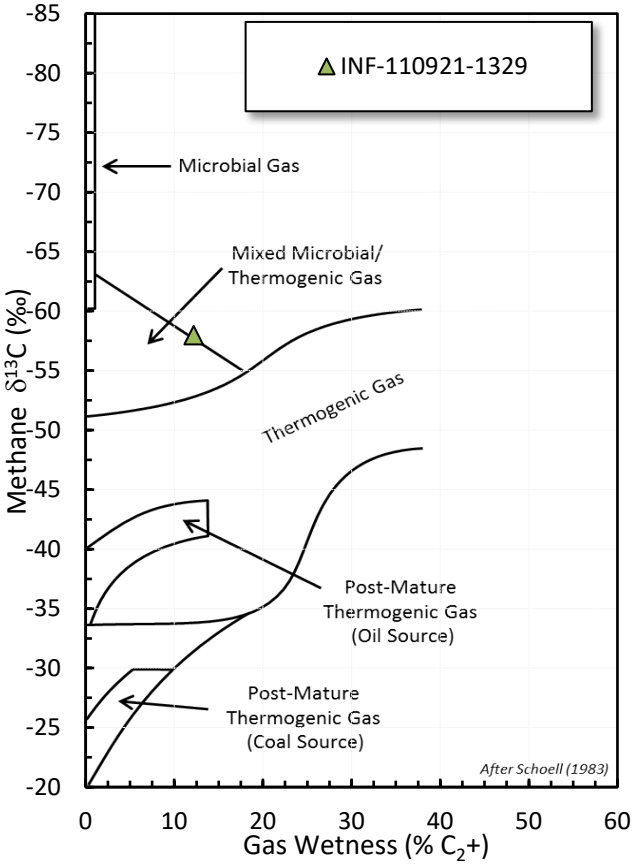
Stable isotope results based on multi-point laboratory calibration

Error $\delta^{13}C$ < 0.5 ‰

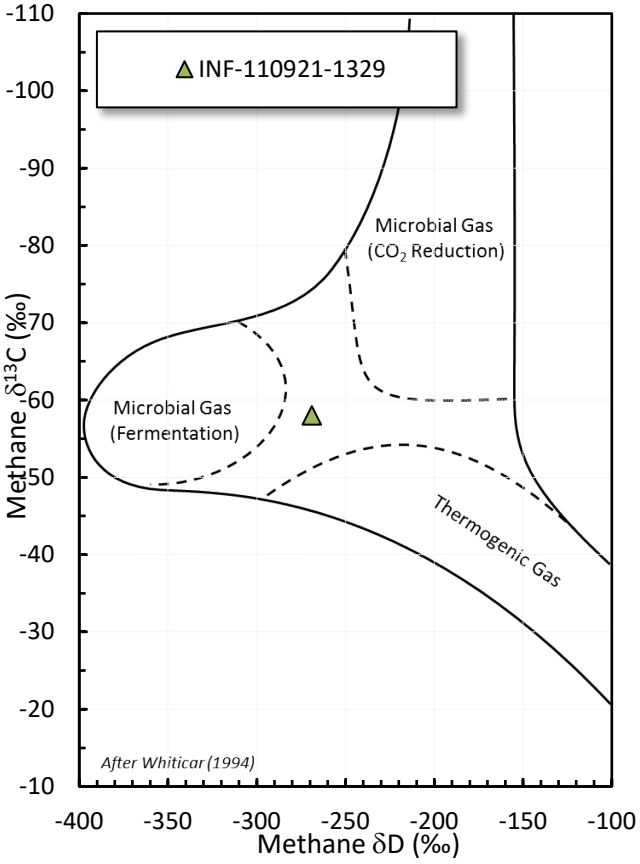
Error δD < 5.0 ‰

Stable Isotope Interpretive Plots

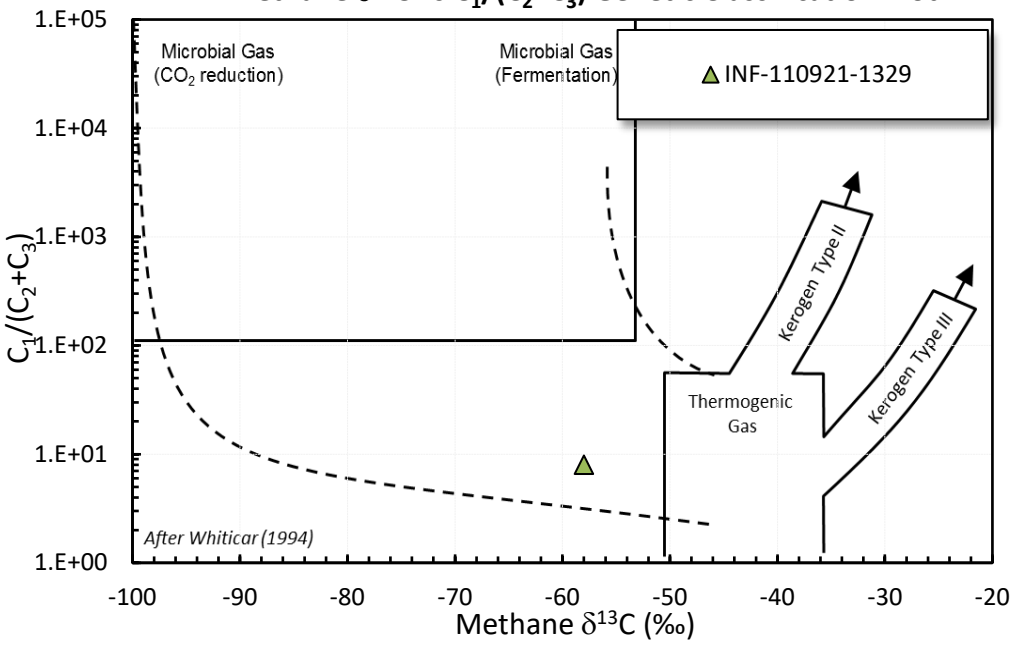
Methane vs Gas Wetness Genetic



Methane $\delta^{13}C$ vs δD Genetic Classification Plot



Methane $\delta^{13}C$ vs $C_1/(C_2+C_3)$ Genetic Classification Plot



JOB 2111670? DIG-026672

dig Geochemistry for Energy
Dolan Integration Group

main 303.531.2030 • info@digforenergy.com • digforenergy.com
Office and Lab 11025 Dover St • Ste 800 • Westminster, CO 80021

Send Data to:	Send Invoice to (if different):	Additional Information:
Name: Muri Premer / Paul Shrewsbury	Name: Ben Shrewsbury	AFE #:
Company: Summit Scientific	Company: Summit Scientific	Project: 2111170
Address: 4653 Table Mountain Drive	Address: 4653 Table Mountain Drive	PO #:
City, State: Golden, CO 80403	City, State: Golden, CO 80403	Location:
Phone: 303-277-9310	Phone: 303-277-9310	Sampled By:
Email: mpremer@s2scientific.com / pshrewsbury@s2scientific.com	Email: bshrewsbury@s2scientific.com	API #:

Turnaround Time**: ○ Standard (≤ 10 Business days) ○ Rush (≤ 5 Business days) ● Expedited Rush (≤ 3 Business days)

Container Number	Sample Identification	Date Sampled	Time	Sample Type*	Gas Composition	d13C of Methane (C1)	d13C of Ethane (C2)	d13C of Propane+ (C3+)	d13C of Carbon Dioxide (CO2)	dD of Methane (C1)	Whole Oil Gas Chromatography	d18O and dD Isotopes of Water	RSK 175 Dissolved Gas Quantification
	INF-110921-1329	11/9/21	13:29	Other	●	●	☐	☐	☐	●	☐	☐	☐
				Other	☐	☐	☐	☐	☐	☐	☐	☐	☐
				Other	☐	☐	☐	☐	☐	☐	☐	☐	☐
				Other	☐	☐	☐	☐	☐	☐	☐	☐	☐
				Other	☐	☐	☐	☐	☐	☐	☐	☐	☐
				Other	☐	☐	☐	☐	☐	☐	☐	☐	☐
				Other	☐	☐	☐	☐	☐	☐	☐	☐	☐
				Other	☐	☐	☐	☐	☐	☐	☐	☐	☐
				Other	☐	☐	☐	☐	☐	☐	☐	☐	☐
				Other	☐	☐	☐	☐	☐	☐	☐	☐	☐

Chain of Custody Record

Comments:

Relinquished by Signature	Company	Date	Time	Received by Signature	Company	Date	Time
[signature]	SummitScientific	11-10-21	12:41	[signature]	DIG	11-10-21	1241

*Gas composition vs RSK-175 - Gas composition is a basic analysis of the concentration (ppm) of gases within the headspace of the sample (headspace is created at the lab). RSK-175 is a specific analysis technique combined with calculations to give the total dissolved gas of each species in the water sample (mg/L). Why one or the other? Gas composition gives us a quick, general look at relative concentrations and ratios (e.g., gas wetness). RSK-175 gives us an exact total of gas present in the sample (headspace and dissolved in the water). Questions? Give us a call at 303-531-2030.

** Rush and Expedited Rush turnaround time analysis will incur additional costs at 2x and 3x the standard turnaround time pricing.

Organization	Reporting Organization	Reporting Organization Name	Order Number	Entity Requesting Analysis	Purpose	Project																
	10206	Dolan Integration Group		Summit Scientific																		
Sample	COGCC Facility No.	Sample Date and Time	API #	LAB Sample ID	Sample Type	Matrix	Comments	Project Number	Chain of Custody ID	Date Received by Lab												
		11/9/21 1:29 PM		DIG-026672		GAS			INF-110921-1329	11/10/2021												
Batch	LabID	Lab Batch Identifier	Leach Date	Extract Date and Time	Extract Method	Start Date and Time	Conc Method	Init Vol	Final Vol	Init Vol Units	Final Vol Units	Analysis Date and Time	Report Basis	Comments	File Name	Column #						
	10206																					
Result	CAS Number	Analysis Name	Analysis Method	Analytical Method Modifier	Unit	Result Value	Qualifier	Test Type	Result Text	Data Flag	Dilution	Fraction Type	MDC	Requested MDC	Detection Limit	Instrument Detection Limit	Method Detection Limit	Comments	AnalyticalBatchID			
	O2+AR	OXYGEN + ARGON	SOP		MOL %	0.830									0.005	0.005	0.005		21116702			
	124-38-9	CARBON DIOXIDE	SOP		MOL %	0.110									0.005	0.005	0.005		21116702			
	7727-37-9	NITROGEN (N2)	SOP		MOL %	24.470									0.005	0.005	0.005		21116702			
	7440-59-7	Helium	SOP		MOL %	0.100									0.005	0.005	0.005		21116702			
	1333-74-0	HYDROGEN	SOP		MOL %	0.005	ND								0.005	0.005	0.005		21116702			
	74-82-8	METHANE	SOP		MOL %	65.410									0.005	0.005	0.005		21116702			
	74-84-0	ETHANE	SOP		MOL %	5.720									0.005	0.005	0.005		21116702			
	74-85-1	ETHENE	SOP		MOL %	0.005	ND								0.005	0.005	0.005		21116702			
	74-98-6	PROPANE	SOP		MOL %	2.480									0.005	0.005	0.005		21116702			
	75-28-5	ISOBUTANE	SOP		MOL %	0.290									0.005	0.005	0.005		21116702			
	106-97-8	N-BUTANE	SOP		MOL %	0.440									0.005	0.005	0.005		21116702			
	iC5	ISOPENTANE	SOP		MOL %	0.070									0.005	0.005	0.005		21116702			
	109-66-0	N-PENTANE	SOP		MOL %	0.050									0.005	0.005	0.005		21116702			
	92112-69-1+	C6+ (hexanes +)	SOP		MOL %	0.020									0.005	0.005	0.005		21116702			
	delta13C_C1	DELTA 13C C1	SOP		per mil	-58.0													21116702			
	deltaD_C1	DELTA D C1	SOP		per mil	-269													21116702			

PDC Energy 1775 Sherman St. STE. 3000 Denver CO, 80203	Project: DWR Permit #137465 Project Number: AFE #EX-000335 Project Manager: Karen Olson	**Reported:** 11/15/21 15:19

Notes and Definitions

S-04	A sample matrix effect prevented complete surrogate recovery.
R-01	The Reporting Limit for this analyte has been raised to account for matrix interference.
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.
QM-02	The RPD and/or percent recovery for this QC 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

ATTACHMENT B

DWR WATER WELL PERMIT # 137465
Methane Mitigation System
Photographic Overview

Well Ventilation

Water Treatment System