

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:



6855 WEST 119TH AVENUE
BROOMFIELD, COLORADO 80020

April 11, 2022

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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.

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 February 23, 2022. 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.

Second quarter 2022 System sampling and maintenance will be conducted in May 2022.

TABLE

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

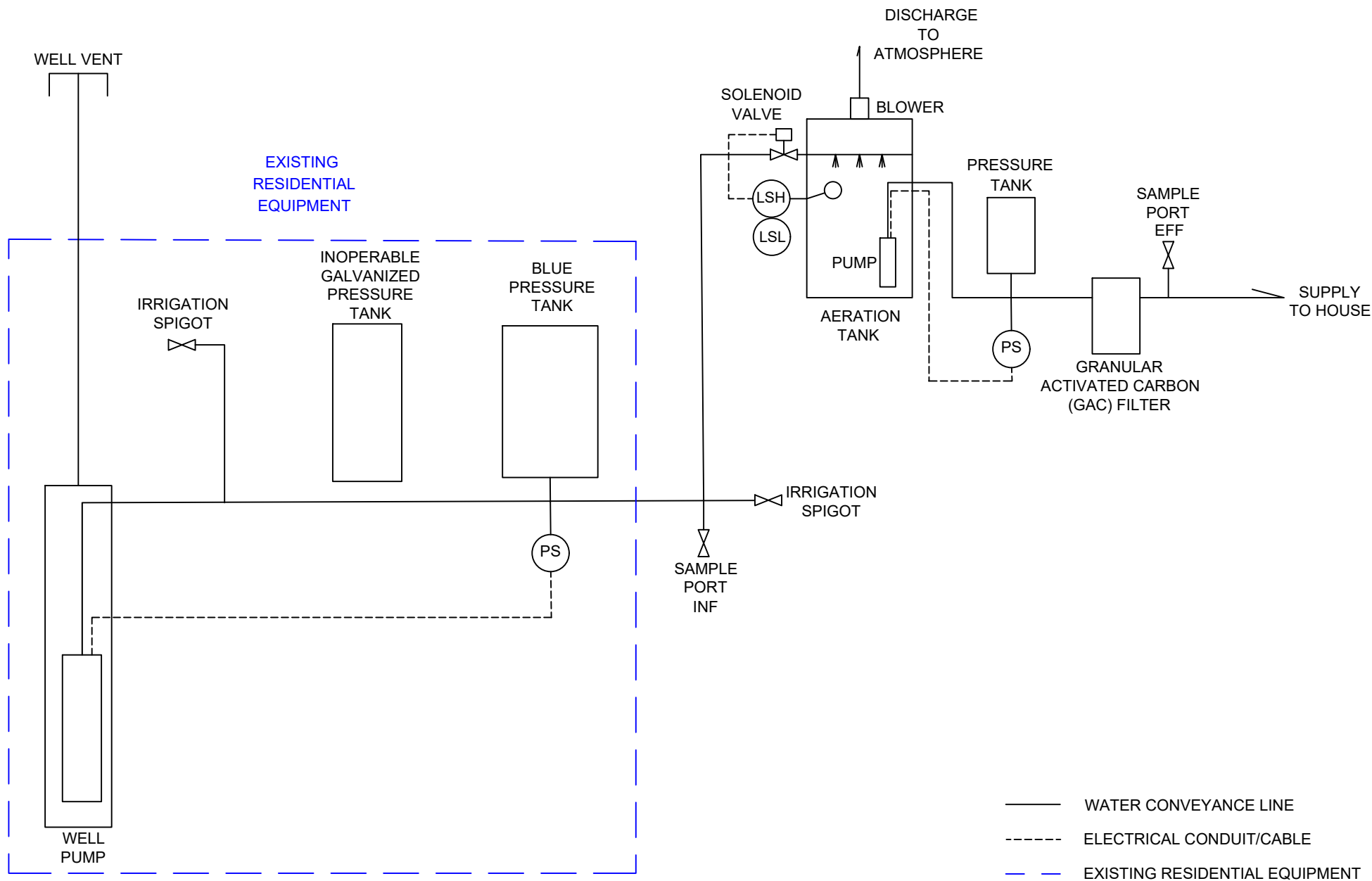


Sample ID	Date Sampled	Methane (mg/L)	Ethane (mg/L)	Propane (mg/L)
Target Level (mg/L)		10	-	-
EFF-080720-1100	8/7/2020	7.8	1.18	0.488
EFF-081220-0832	8/12/2020	3.3	0.95	0.46
EFF-081920-0855	8/19/2020	2.2	1.2	0.75
EFF-082620-0921	8/26/2020	2.9	0.99	0.65
EFF-110520-1026	11/5/2020	4.4	2.7	1.9
EFF-020921-1102	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
EFF-022322-1052	2/23/2022	4.6	1.8	1.7
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
INF-022322-1153	2/23/2022	10	2.5	2.9

Notes:

mg/L= Milligrams per liter

FIGURES



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

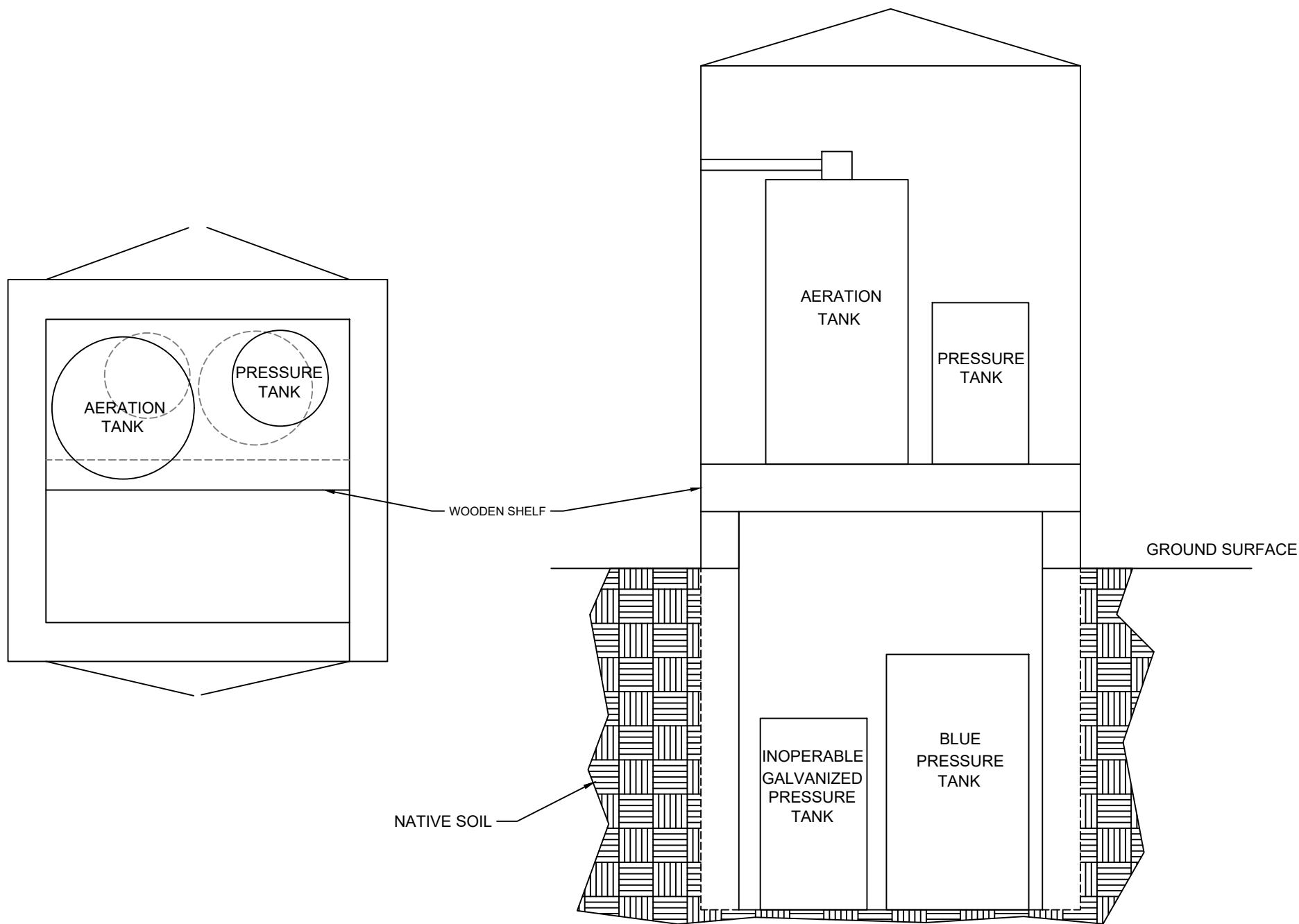


Methane Mitigation System Process and Instrumentation Diagram

DWR Permit Number 137465

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

Figure
1



Project Manager's name		TRAVIS JOHANSEN	
Professional Engineer's No.			
Date	Date Signed	Project Mgr.	
		TJ	
Designed by		Checked by	
DAG		TJ	
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 TASMAN GEOSCIENCES			



Methane Mitigation System System Enclosure Layout

DWR Permit Number 137465

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

Figure
2

ATTACHMENT A



dig
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 #: 22027167
Lab #: DIG-027381
Client: Summit Scientific
Sample Name(s): INF-022322-1153

The analytical results, opinions, or interpretations contained in this report are based upon information and material supplied by the client for whose exclusive and confidential use this report has been made. The analytical results, opinions, or interpretations expressed represent the best judgment of Dolan Integration Group based on its experience, but any interpretation of test or other data, and any recommendation(s) based upon such interpretations, are opinions based upon inferences from measurements and empirical relationships and assumptions which are not infallible, and with respect to which professional engineers and analysts may differ. Accordingly, Dolan Integration Group makes no warranty or representation, expressed or implied, of any type, and expressly disclaims same as to the productivity, proper operations, or profitability of any oil, gas, coal, or other mineral, property, well, or sand in connection with which such report is used or relied upon for any reason whatsoever. This report shall not be reproduced, in whole or in part, without the written approval of Dolan Integration Group.

Dolan Integration Group shall use commercially reasonable efforts to maintain the Samples it receives from Customer in the condition in which same were initially received, and shall store, free of charge, any portion(s) of the Sample(s) not consumed or altered in the course of testing and analysis for a period of 60 days after their initial receipt, after which time the Samples will be destroyed. At Customer's written request and expense, Dolan Integration Group shall return unused Samples to Customer. At Customer's written request, Dolan Integration Group will also store and maintain Customer's Samples beyond the Free Storage Period for a monthly fee in accordance with Dolan Integration Group's the current storage rates. If Customer fails to timely pay any applicable storage charges, Dolan Integration Group shall

Analytical Report



Job #: 22027167
 Lab #: DIG-027381
 Client: Summit Scientific
 Sample Name: INF-022322-1153
 Date Sampled: 02/23/22
 Time Sampled: 11:53
 Sample Description: Isoflask
 Sampling Notes:
 Date Received: 02/24/22
 Date Analyzed: Gas Composition: 02/24/22 $\delta^{13}\text{C}$: 02/26/22 δD : 02/24/22
 Date Reported: 02/28/22
 Comments:

Measured Values:	Measured ppm	Analyte mol % ^a	HC mol %	$\delta^{13}\text{C}$ ‰ VPDB	δD ‰ VSMOW	Comments
Nitrogen (N_2)	403301	41.13	-	-	-	
Oxygen + Argon (O_2+Ar)	54283	5.54	-	-	-	
Carbon Dioxide (CO_2)	841	0.09	-	-	-	
Helium (He) ^b	na	na	-	-	-	Helium added to create headspace.
Hydrogen (H_2)	na	na	-	-	-	
Methane (CH_4)	464662	47.38	88.98	-61.8	-267	
Ethane (C_2H_6)	36404	3.71	6.97		-	
Ethene (C_2H_4)	nd	nd	nd		-	
Propane (C_3H_8)	15681	1.60	3.00		-	
iso-Butane (C_4H_{10})	1886	0.19	0.36		-	
n-Butane (C_4H_{10})	2710	0.28	0.52		-	
iso-Pentane (C_5H_{12})	434	0.04	0.08		-	
n-Pentane (C_5H_{12})	305	0.03	0.06		-	
Hexanes + (C_6H_{14})	115	0.01	0.02		-	

Calculated Values:	
Total HCs (ppm)	522197
Gas Wetness (mol % C_2+C_1+)	11.02
$\text{C}_1/(\text{C}_2+\text{C}_3)$ (mol/mol)	9

^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

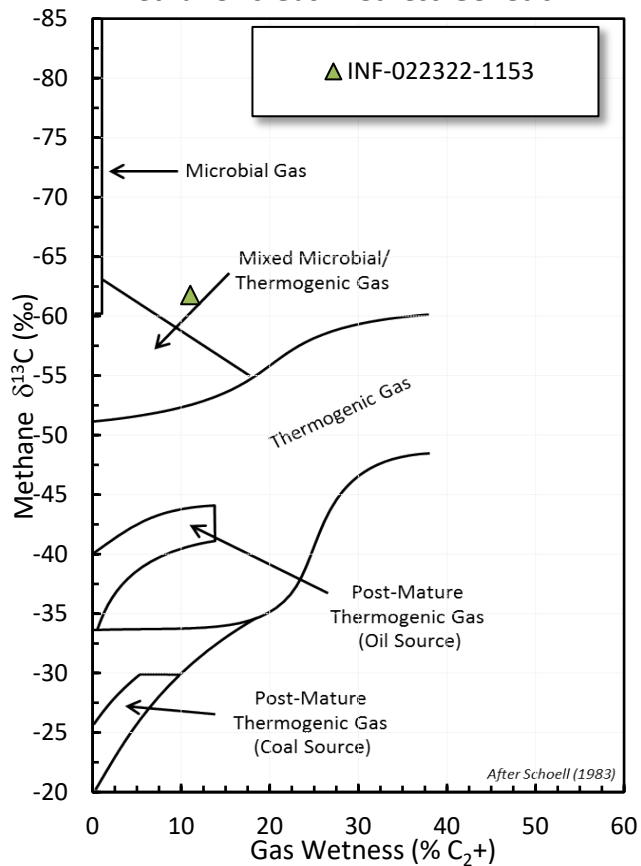
Stable isotope results based on multi-point laboratory calibration

Error $\delta^{13}\text{C}$ < 0.5 ‰

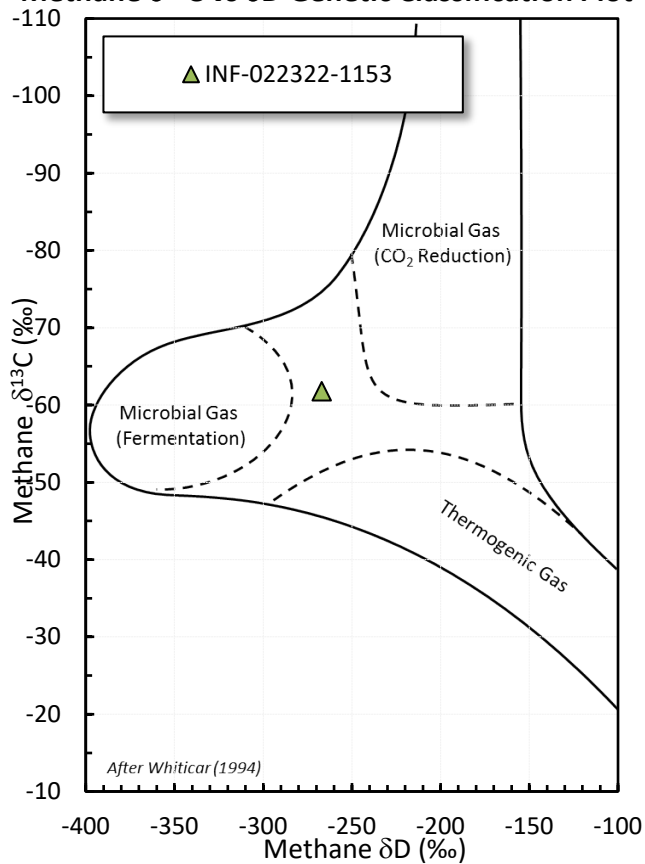
Error δD < 5.0 ‰

Stable Isotope Interpretive Plots

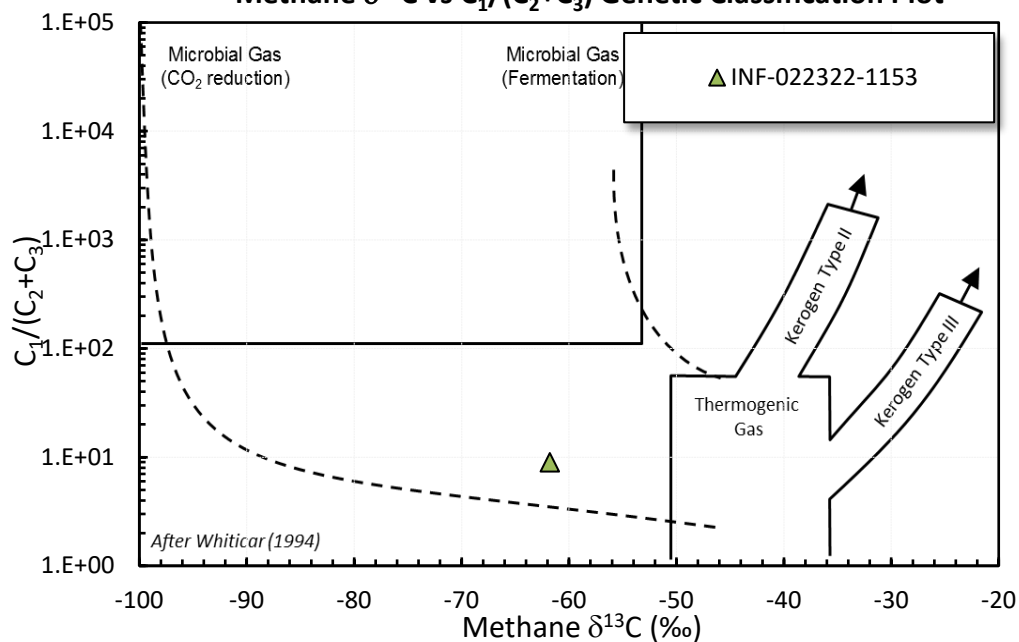
Methane vs Gas Wetness Genetic



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



Methane $\delta^{13}\text{C}$ vs $\text{C}_1/(\text{C}_2+\text{C}_3)$ Genetic Classification Plot



Chain of Custody Form



JOB 22027167

DIG - 027



dig
Dolan Integration Group

Geochemistry
for Energy

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):	
Name: Muri Premer / Paul Shrewsbury		Name: Ben Shrewsbury	AFE
Company: Summit Scientific		Company: Summit Scientific	Pro
Address: 4653 Table Mountain Drive		Address: 4653 Table Mountain Drive	PO
City, State: Golden, CO 80403		City, State: Golden, CO 80403	Loc
Phone: 303-277-9310		Phone: 303-277-9310	San
Email: mpremer@s2scientific.com / pshrewsbury@s2scientific.com		Email: bshrewsbury@s2scientific.com	API

Turnaround Time**:	<input type="radio"/> Standard (≤ 10 Business days)	<input type="radio"/> Rush (≤ 5 Business days)	<input checked="" type="radio"/>
--------------------	---	--	----------------------------------

Container Number	Sample Identification	Date Sampled	Time	Sample Type*	Gas Composition	d13C of Methane (C1)	d13C of Ethane (C2)	
	INF-022322-1153	2/23/22	11:53	Other	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
				Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
				Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
				Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
				Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
				Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
				Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
				Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
				Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
				Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
				Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Chain of Custody Record				Comments:	
Relinquished by Signature	Company	Date	Time	Received by Signature	
	Summit Scientific	2/24/22	12:19		

*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 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 composition of 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.

Summit Scientific

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

March 01, 2022

Karen Olson

PDC Energy

1775 Sherman St. STE. 3000

Denver, CO 80203

RE: DWR Permit #137465

Work Order #2202304

Enclosed are the results of analyses for samples received by Summit Scientific on 02/23/22 14:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

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

Muri Premier For Paul Shrewsbury
President



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

Project: DWR Permit #137465
Project Number: AFE #EX-000335
Project Manager: Karen Olson

Reported:
03/01/22 10:34

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
EFF-022322-1052	2202304-01	Water	02/23/22 10:52	02/23/22 14:00
INF-022322-1153	2202304-02	Water	02/23/22 11:53	02/23/22 14:00

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

S₂

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

2202309

Page 1 of 1

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: *Boyce Goldade*

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)	D1G	D1G Gas Composition	D1G methane (carbon)	D1G methane (Hydrogen)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														

Relinquished by: <i>Boyce J Goldade</i>	Date/Time: 2/23/22 @ 1400	Received by: <i>[Signature]</i>	Date/Time: 22322 1400	Turn Around Time (Check) Same Day _____ 72 hours _____ 24 hours <u>X</u> Standard _____ 48 hours _____	Notes: Please provide data in PDF and COGCC EDD formats. COGCC Facility No.: 765500
Relinquished by:	Date/Time:	Received by:	Date/Time:	Sample Integrity: Temperature Upon Receipt: <u>1.6</u> Samples Intact: <u>Yes</u> No	
Relinquished by:	Date/Time:	Received by:	Date/Time:		

S₂


Sample Receipt Checklist

S2 Work Order# 2202304Client: ADCenergy/Tasman Client Project ID: DWR Permit # 137465Shipped Via: ☐ H.D./P.U./FedEx/UPS/USPS/Other ☐ Airbill #: _____Matrix (check all that apply): ☐ Air ☐ Soil/Solid ☒ Water ☐ Other: _____
(Describe)Temp (°C) 16

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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>on ILS</u>
Were all samples received intact ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was adequate sample volume provided ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If custody seals are present, are they intact ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are samples with holding times due within 48 hours sample due within 48 hours present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>24 hrs</u>
Is a chain-of-custody (COC) form present and filled out completely ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is the COC properly relinquished by the client w/ date and time recorded ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Are samples preserved that require preservation (excluding cooling) ⁽¹⁾ ? Note the type of preservative in the Comments column – HCl, H ₂ SO ₄ , NaOH, HNO ₃ , etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If samples are acid preserved for metals, is the pH ≤ 2 ⁽¹⁾ ? Record the pH in Comments.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If dissolved metals are requested, were samples field filtered?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Additional Comments (if any):

⁽¹⁾ If NO, then contact the client before proceeding with analysis and note in case narrative.
Custodian Printed Name or Initials2.23.22
Date/Time



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

Project: DWR Permit #137465
Project Number: AFE #EX-000335
Project Manager: Karen Olson

Reported:
03/01/22 10:34

EFF-022322-1052
2202304-01 (Water)

Summit Scientific

Dissolved Gases by RSK-175

Date Sampled: **02/23/22 10:52**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Methane	4.6	1.0	mg/L	100	BFB0287	02/24/22	02/24/22	RSK-175 mod	
Ethane	1.8	1.0	"	"	"	"	"	"	
Propane	1.7	1.0	"	"	"	"	"	"	

Date Sampled: **02/23/22 10:52**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						

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.



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

Project: DWR Permit #137465
Project Number: AFE #EX-000335
Project Manager: Karen Olson

Reported:
03/01/22 10:34

INF-022322-1153
2202304-02 (Water)

Summit Scientific

Dissolved Gases by RSK-175

Date Sampled: **02/23/22 11:53**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Methane	9.6	1.0		mg/L	100	BFB0287	02/24/22	02/24/22	RSK-175 mod	
Ethane	2.5	1.0		"	"	"	"	"	"	
Propane	2.9	0.10		"	10	"	"	"	"	

Date Sampled: **02/23/22 11:53**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
<i>Surrogate: Ethene</i>		170 %		70-130		"	"	"	"	S-04

Summit Scientific

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

Project: DWR Permit #137465
Project Number: AFE #EX-000335
Project Manager: Karen Olson

Reported:
03/01/22 10:34

Dissolved Gases by RSK-175 - Quality Control
Summit Scientific

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

Batch BFB0287 - GC

Blank (BFB0287-BLK1)

Prepared & Analyzed: 02/24/22

Methane	ND	0.010	mg/L							
Ethane	ND	0.010	"							
Propane	ND	0.010	"							
Surrogate: Ethene	0.0450		"	0.0364	124	70-130				

LCS (BFB0287-BS1)

Prepared & Analyzed: 02/24/22

Methane	0.039	0.010	mg/L	0.0428	90.3	70-130				
Ethane	0.090	0.010	"	0.0798	113	70-130				
Propane	0.16	0.010	"	0.139	114	70-130				
Surrogate: Ethene	0.0942		"	0.0728	129	70-130				

Duplicate (BFB0287-DUP1)

Source: 2202304-01

Prepared & Analyzed: 02/24/22

Methane	2.7	1.0	mg/L	4.6			50.5	30	QR-03
Ethane	0.84	1.0	"	1.8			71.8	30	QR-03
Propane	0.59	1.0	"	1.7			95.6	30	QR-03
Surrogate: Ethene	0.0451		"	0.0364	124	70-130			

Matrix Spike (BFB0287-MS1)

Source: 2202304-01

Prepared & Analyzed: 02/24/22

Methane	4.5	1.0	mg/L	0.0428	4.6	NR	70-130		QM-05
Ethane	2.5	1.0	"	0.0798	1.8	852	70-130		QM-05
Propane	2.6	1.0	"	0.139	1.7	670	70-130		QM-05
Surrogate: Ethene	0.150		"	0.0728	206	70-130			QM-05

Summit Scientific

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03/01/22 10:34

Notes and Definitions

S-04	A sample matrix effect prevented complete surrogate recovery.
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-05	The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The associated LCS and/or LCSD were within acceptance limits, therefore the data are considered valid.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

ATTACHMENT B

DWR WATER WELL PERMIT # 137465
Methane Mitigation System
Photographic Overview

Well Ventilation



Water Treatment System

