



Nicholson GeoSolutions, LLC

3433 East Lake Drive
Centennial, CO 80121

January 25, 2021

Mr. Don Wilbourn
Berry Petroleum Company
235 Callahan Avenue
Parachute, Colorado 81635

Subject: P-32 Water Facility Additional Methane Isotope Analyses

Dear Don:

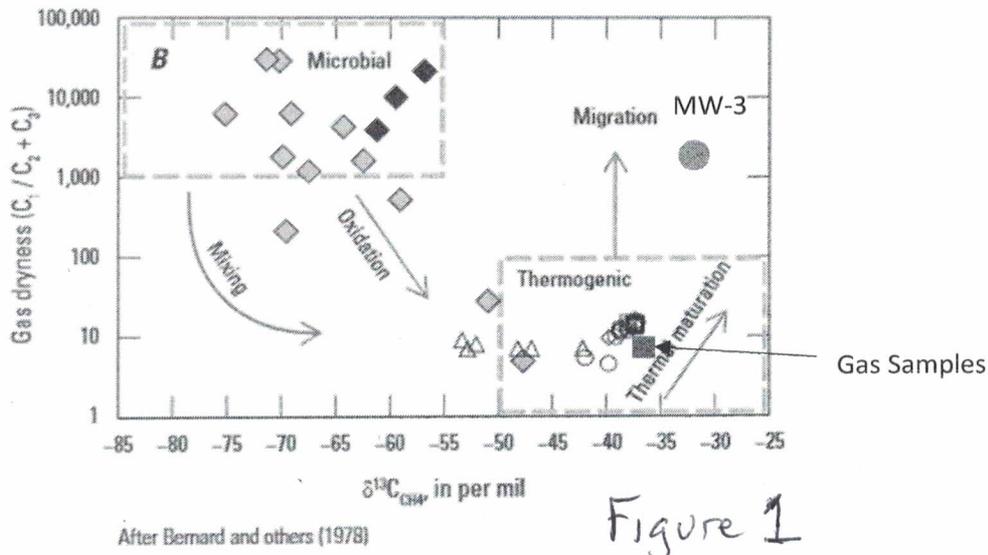
This report provides the methane isotope results for the two air samples that were collected from the pipeline near the P-32 monitoring well MW-3 and an existing well on the I-02 well pad. These samples were hand-delivered to SGS North America Laboratory in Wheat Ridge, Colorado and then forwarded to Dolan Integration Group in Westminster, Colorado for stable isotope analysis. Stable isotope interpretive plots were provided with the stable isotope report and are included with the DIG lab report in Appendix A. In addition, two interpretive diagrams are attached as Figures 1 and 2.

The results for the air samples from this sampling event indicate post-mature, thermogenic gas. Both samples plot in the thermogenic field on both diagrams and very close to each other. Previous methane results from the groundwater in well MW-3 plot within the kerogen type II thermogenic field. As shown on the Figures 1 and 2, the previous result from well MW-3 lies along the migration and mixing/migration lines, shown best on Figure 1. The methane in well MW-3 is interpreted as gas with a thermogenic origin that is mixed with and/or has been affected by microbial organisms (methanogens). It is notable that the groundwater methane is dryer than the produced gas in the air samples. This may have been caused by geochemical reactions with the Green River Formation solids through which the methane migrated.

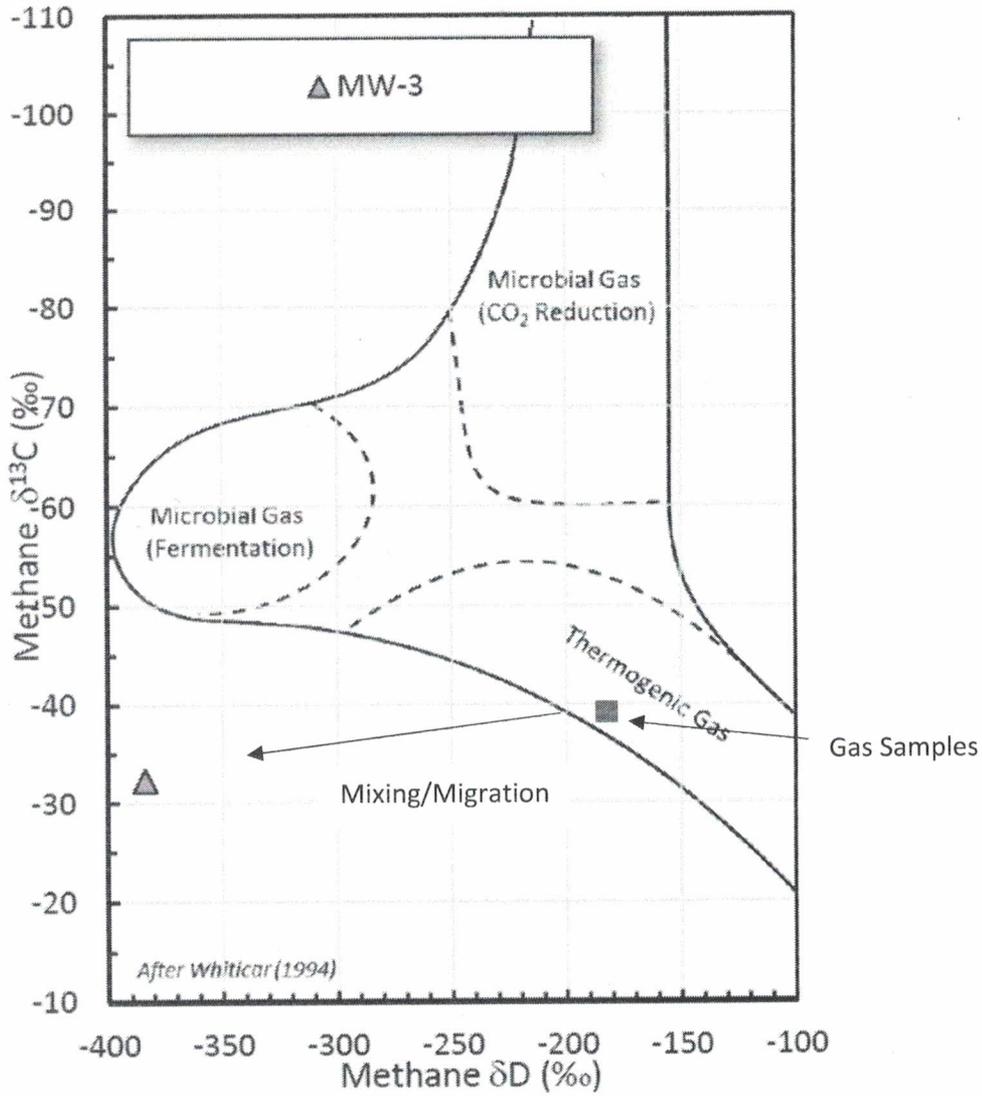
Nicholson GeoSolutions LLC

A handwritten signature in blue ink that reads "DK Nicholson".

David K. Nicholson, P.G.
Principal Geologist



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



APPENDIX A
Methane Stable Isotope Report

The results set forth herein are provided by SGS North America Inc.

e-Hardcopy 2.0
Automated Report

Technical Report for

Nicholson GeoSolutions

Nicholson GeoSolutions

SGS Job Number: DA31540X

Sampling Date: 12/28/20

Report to:

**Nicholson GeoSolutions
3433 East Lake Drive
Centennial, CO 80121
dknicholson@q.com**

ATTN: Dave Nicholson

Total number of pages in report: 16



Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

A handwritten signature in black ink, appearing to read "Jason Savoie".

Jason Savoie
General Manager

Client Service contact: Elizabeth Sutcliffe 303-425-6021

Certifications: CO (CO00049), NE (NE-OS-06-04), ND (R-027), UT (NELAP CO00049)
LA (LA150028), TX (T104704511), WY (8TMS-L)

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Test results relate only to samples analyzed.

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Sample Summary

Nicholson GeoSolutions

Job No: DA31540X

Nicholson GeoSolutions

Sample Number	Collected Date	Time By	Received	Matrix Code	Type	Client Sample ID
DA31540-1X	12/28/20	09:25 DN	12/31/20	AIR	Air	OLD MTN. IO2 OM 16A
DA31540-2X	12/28/20	09:50 DN	12/31/20	AIR	Air	OLD MTN. CDP PIPE LINE

Subcontract Lab Data

Report of Analysis



dig
Dolan Integration Group

Geochemistry for Energy

11025 Dover Street Unit 800
Westminster, CO 80021
p: 303.531.2030

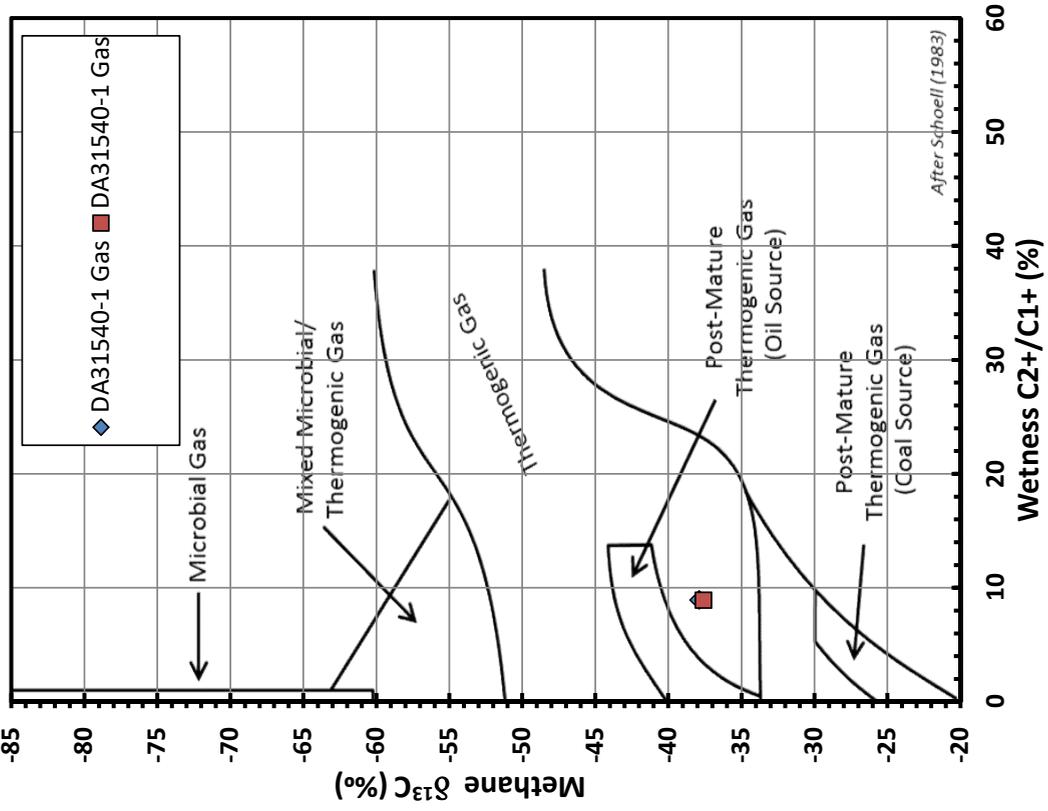
**Hydrocarbon Gas Composition and Stable Isotopes
Data and Interpretation**

Job #: 21015061
Lab #: DIG-024424 - DIG-024425
Client: SGS Accutest
Well Name: DA31540-1

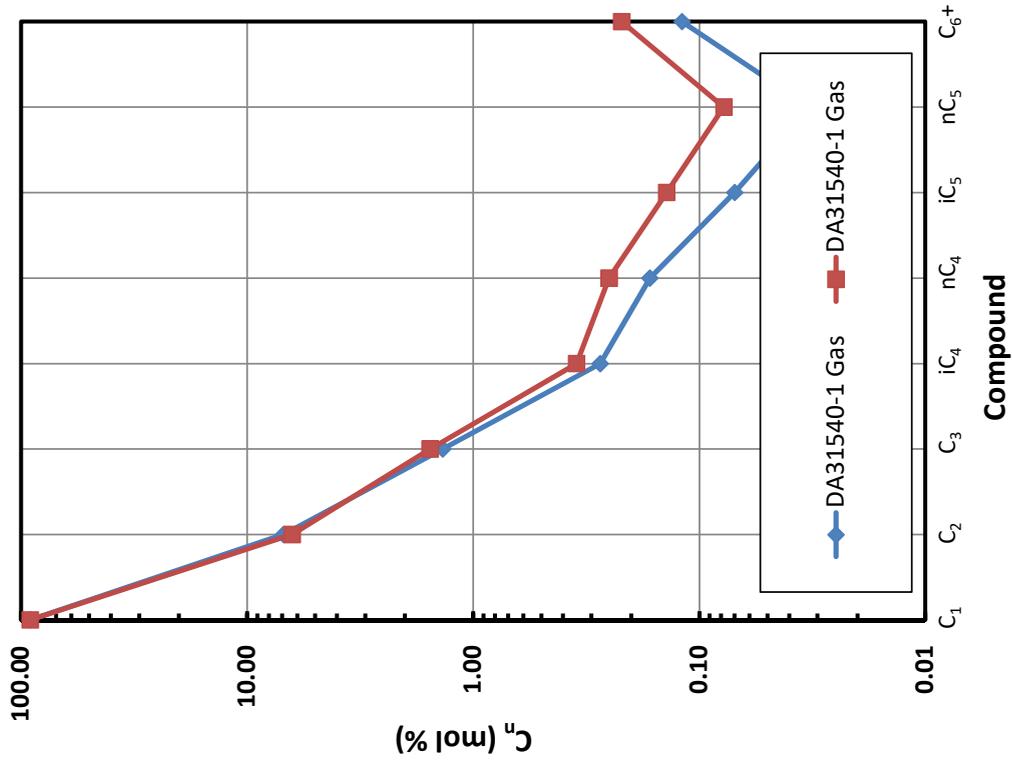
The analytical results, opinions, or interpretations contained in this report are based upon information and material supplied by the client for whose exclusive and confidential use this report has been made. The analytical results, opinions, or interpretations expressed represent the best judgment of 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.

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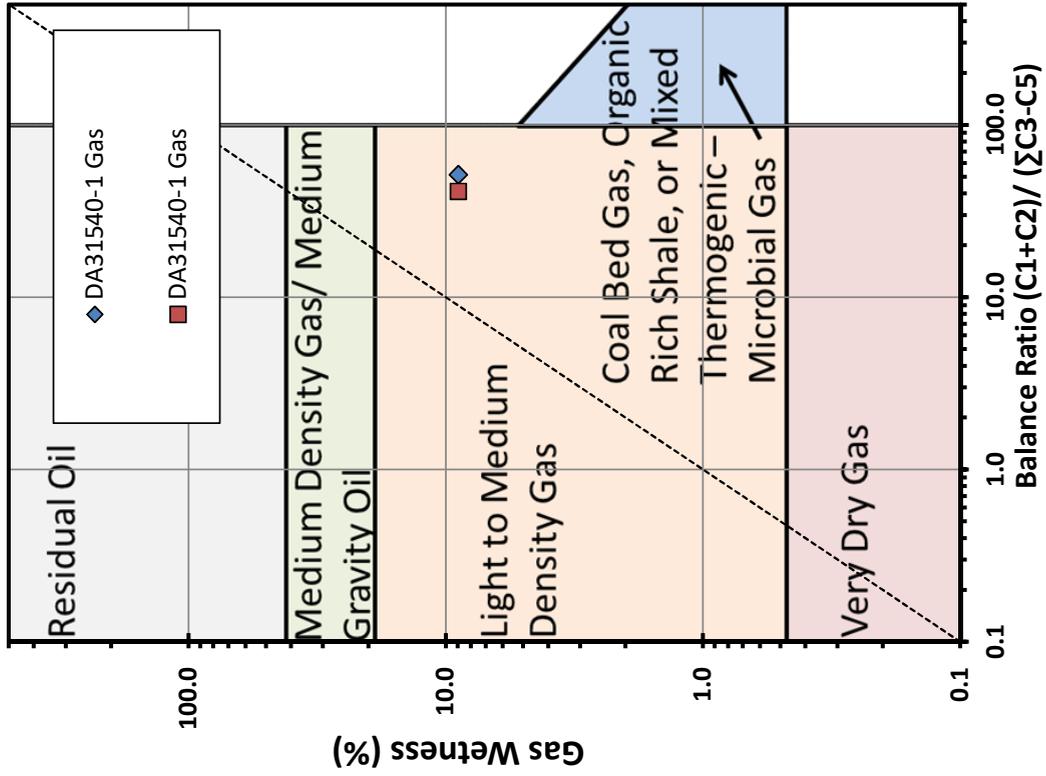
Methane $\delta^{13}\text{C}$ vs Wetness Genetic Classification Plot



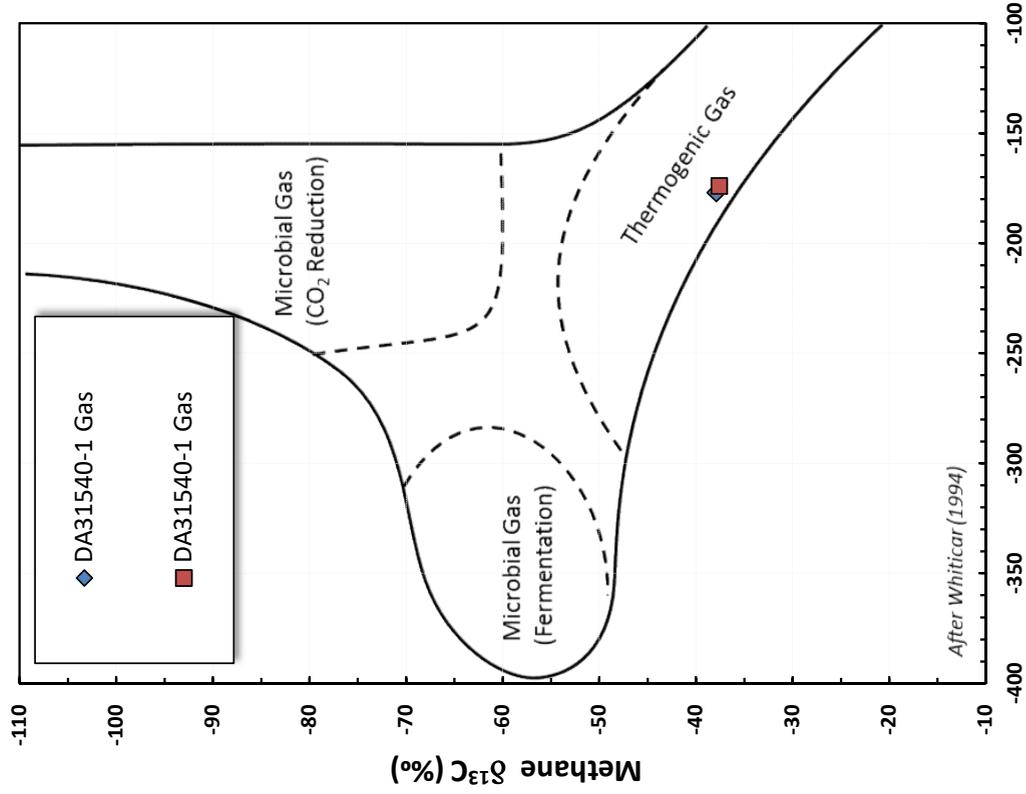
Hydrocarbon Composition Plot



Haworth Ratio Plot - Characterization of Hydrocarbon Type

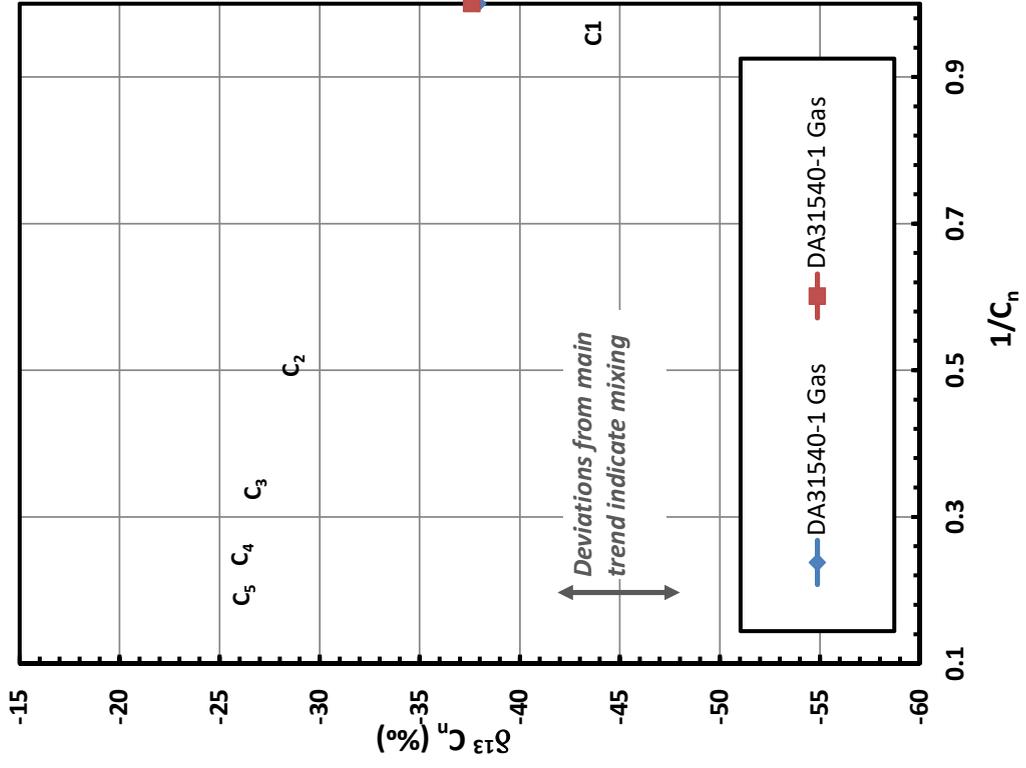


Methane δ¹³C vs δD Genetic Classification Plot

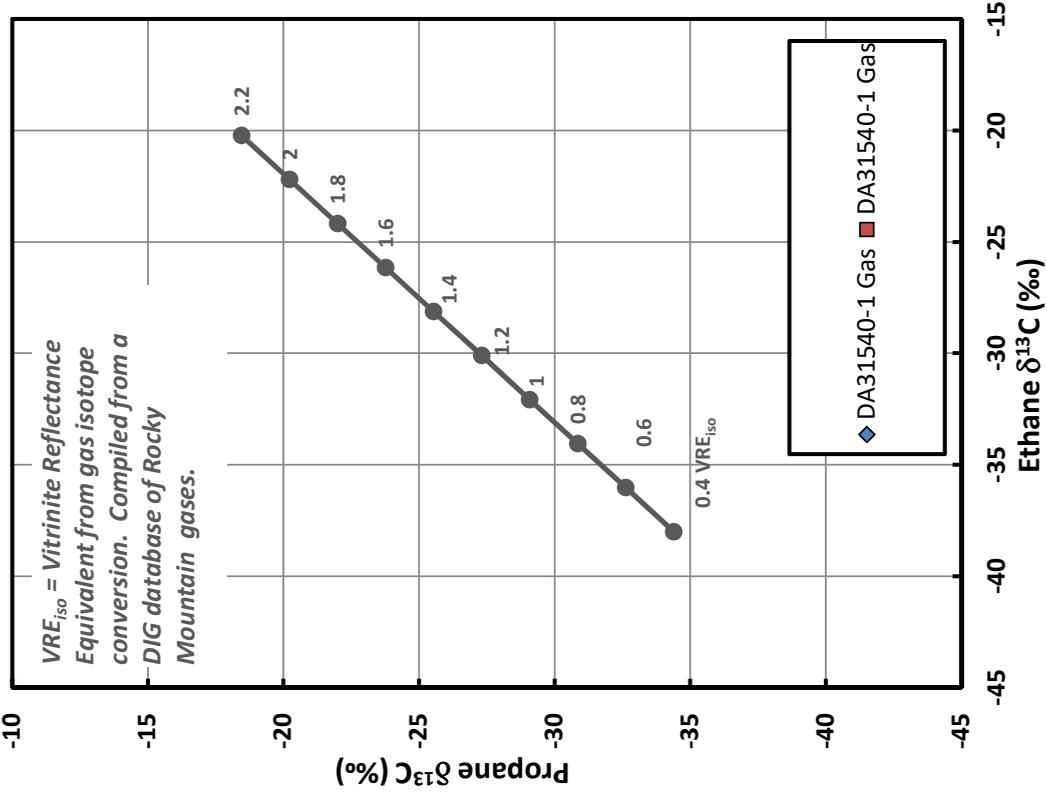


Methane δD (‰)

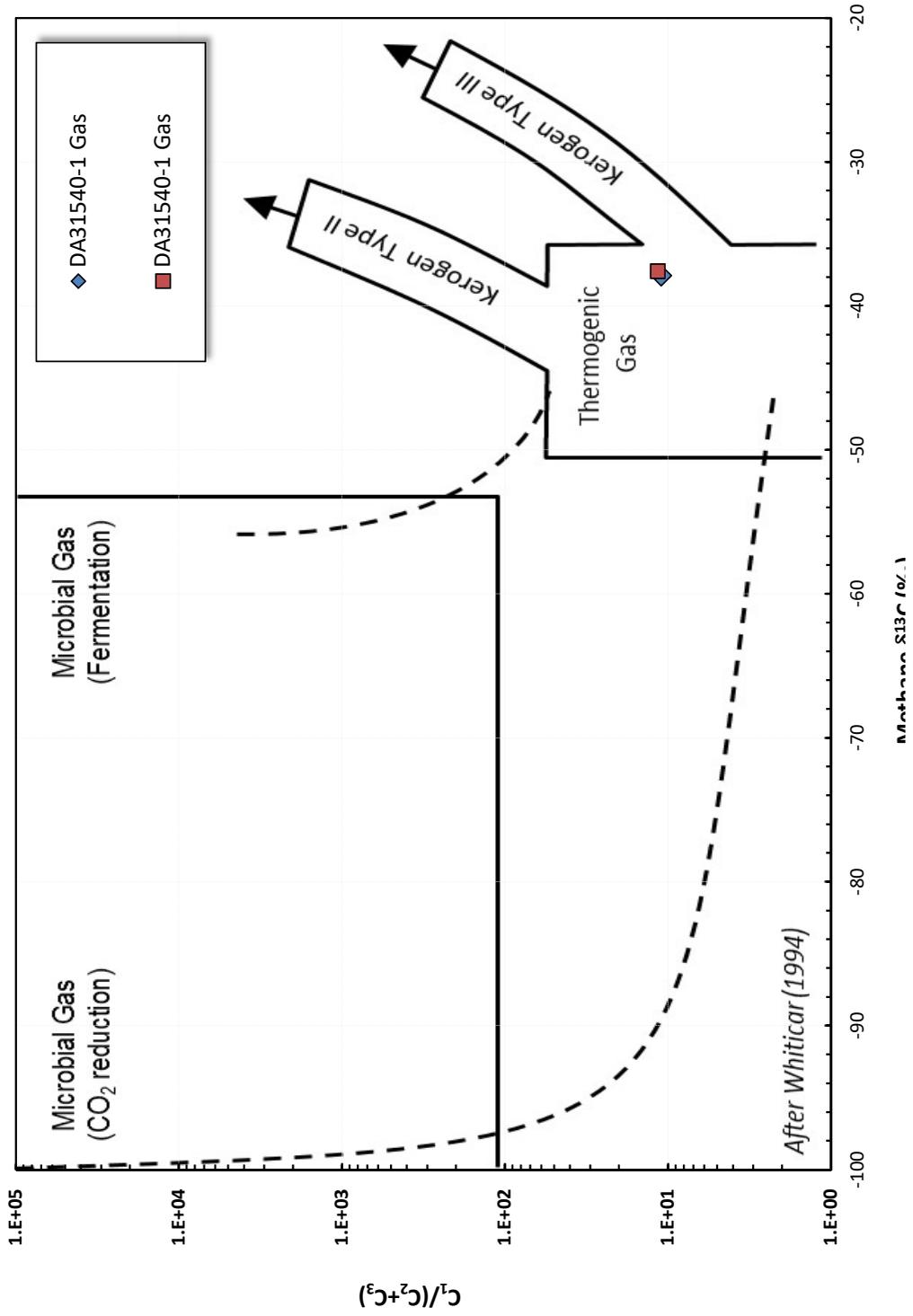
Mixing Plot



Ethane - Propane Maturity Plot



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



VIETNAME OIL (%)

JOB 21015061

DIG-024424-0



CHAIN OF CUSTODY

SGS North America Inc. - Wheat Ridge
4036 Youngfield Street, Wheat Ridge, CO 80033
TEL: 303-425-6021 FAX: 303-425-6854
www.sgs.com/ehsusa

Page 1 of 4

Send Report and Invoice to:

Elizabeth.Sutcliffe@sgs.com; Carissa.Cumine@sgs.com;
Janel.Mulholland@sgs.com; Angela.Wu2@sgs.com;
Jason.Savoie@sgs.com; Larisa.Dimarco@sgs.com

Project Information, Billing Information, Client Purchase Order #, City, State, Zip, Sampler(s) Name(s), Project Manager, Attention, Table with columns: Sample #, Field ID / Point of Collection, MECHDV Val #, Date, Time, Sampled by, Matrix, # of bottles, and various chemical analysis options (Pb, Ni, Mn, etc.).

Turnaround Time (Business days), Data Deliverable Information, Standard 10 Day (business), 8 Business Days RUSH, 7 Business Days RUSH, 2 Business Days RUSH, 1 Business Day EMERGENCY, other STD TAT, Commercial "A" (Level 1), Commercial "B" (Level 2), REDT1 (Level 3), FULT1 (Level 4), Commercial "C", State Forms, EDD Format, Other.

Table with 4 columns: Relinquished By, Date/Time, Received By, Date/Time. Rows 1-5 showing custody transfer points.



024425

Bottle Order Control #	
SGS Job #	DA31540X
d Analysis (see TEST CODE sheet)	
Matrix Codes	
DW - Drinking Water GW - Ground Water WW - Wastewater SW - Surface Water SO - Soil SL - Sludge SED - Sediment LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank	
LAB USE ONLY	
Comments / Special Instructions	
Please Call Cariss as client write Cannistos back For instruction http://www.sgs.com/en/terms-and-conditions	
Every	
Date Time: 10:00 15/2020	Received By: Linka Annaberg 22/01/2020
Date Time: 4	Received By:
<input type="checkbox"/> Wet <input type="checkbox"/> Therm. St.	<input type="checkbox"/> On Ice <input type="checkbox"/> Cooler Temp.

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody

