



**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 #:** 240511799  
**Lab #:** DIG-035723  
**Client:** Olsson  
**Well Name:** SCMW053024  
**API #:**

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SAMPLE INFORMATION						COMPLETE GAS ANALYSIS														HYDROCARBON GAS ANALYSIS (normalized to total HC content)										BTU CONTENT*
Job Number	Lab Number	Well Name	Sample Type	Sample Date	Sample Time	GC Date	N <sub>2</sub> ppm	O <sub>2</sub> + Ar ppm	CO <sub>2</sub> ppm	C <sub>1</sub> ppm	C <sub>2</sub> ppm	C <sub>3</sub> ppm	iC <sub>4</sub> ppm	nC <sub>4</sub> ppm	iC <sub>5</sub> ppm	nC <sub>5</sub> ppm	C <sub>6</sub> + ppm	C <sub>2</sub> H <sub>4</sub> ppm	He ppm	H <sub>2</sub> ppm	C <sub>1</sub> mol%	C <sub>2</sub> mol%	C <sub>3</sub> mol%	iC <sub>4</sub> mol%	nC <sub>4</sub> mol%	iC <sub>5</sub> mol%	nC <sub>5</sub> mol%	C <sub>6</sub> + mol%	Total Gas BTU/ft <sup>3</sup>	
240511799	DIG-035723	SCMW053024 Gas	Gas	05/30/24	9:45	6/3/2024	550524	155964	1597	215803	35500	15407	2086	3919	843	625	79				78.7	12.94	5.62	0.76	1.43	0.31	0.23	0.03	352	

SAMPLE INFORMATION						HYDROCARBON RATIOS				STABLE ISOTOPE ANALYSIS										Comments
Job Number	Lab Number	Well Name	Sample Type	Sample Date	Sample Time	Total HC ppm	Wetness % C <sub>2</sub> to C <sub>6</sub>	C <sub>2</sub> /C <sub>1</sub> +C <sub>3</sub> mol/mol	Balance Ratio C <sub>1</sub> +C <sub>2</sub> /C <sub>1</sub> -C <sub>2</sub>	Mass Spec Date	δ <sup>13</sup> C <sub>1</sub> ‰ VPDB	δ <sup>13</sup> C <sub>2</sub> ‰ VPDB	δ <sup>13</sup> C <sub>3</sub> ‰ VPDB	δ <sup>13</sup> iC <sub>4</sub> ‰ VPDB	δ <sup>13</sup> nC <sub>4</sub> ‰ VPDB	δ <sup>13</sup> iC <sub>5</sub> ‰ VPDB	δ <sup>13</sup> nC <sub>5</sub> ‰ VPDB	δ <sup>13</sup> CO <sub>2</sub> ‰ VPDB	δD ‰ VSMOW	
240511799	DIG-035723	SCMW053024 Gas	Gas	05/30/24	9:45	274262	21.3	4.2	11.0	6/6/2024	-44.4	-31.3	-28.3	-28.2						-252

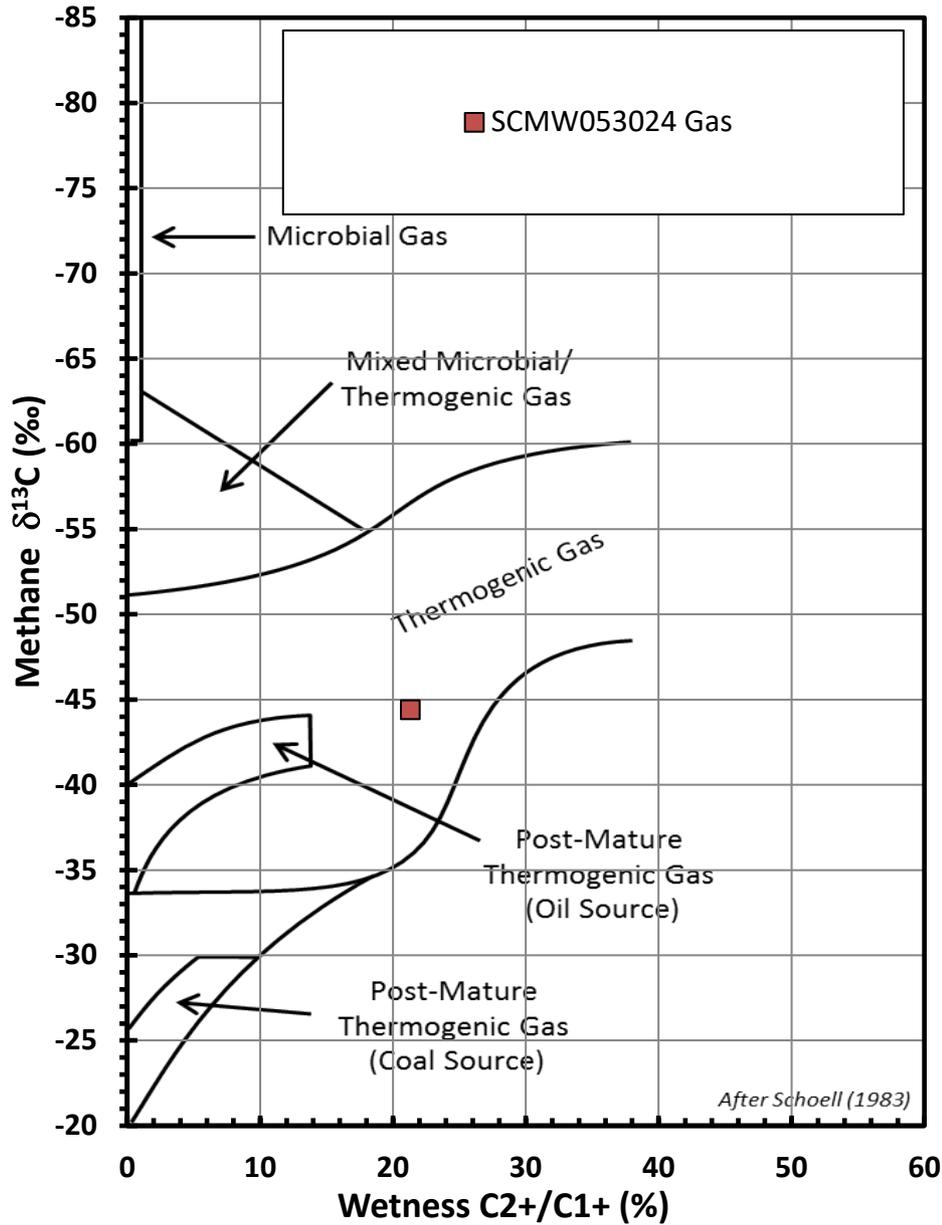
Stable isotope results based on multi-point laboratory calibration  
 Values in red represent low signal; interpret with caution  
 Precision δ13C < 0.5 ‰  
 Precision δD < 5 ‰

SPECIFIC GRAVITY*	
Total Gas Spec Grav	HCs only Spec Grav
0.919	0.714

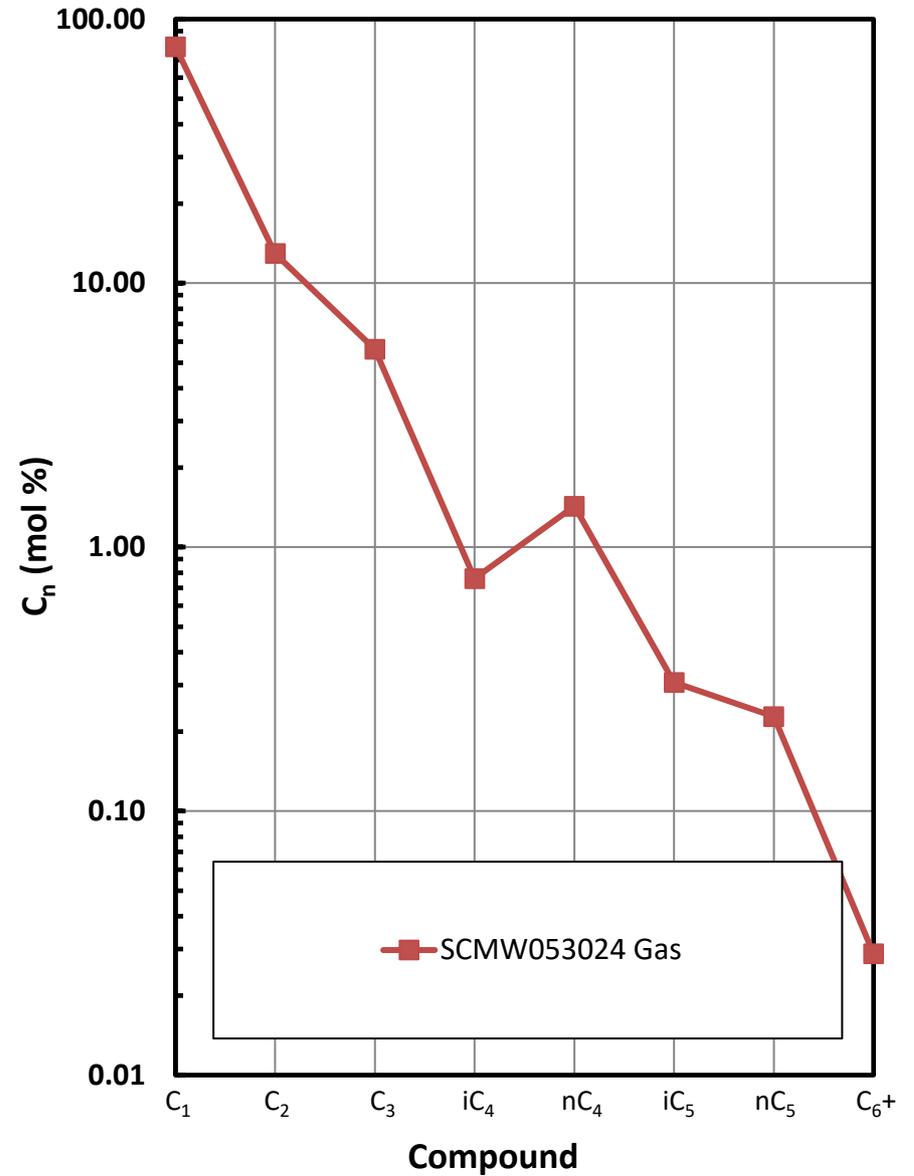
\* As ideal gas, with gas concentrations normalized to 100%; calculations based on GPA 2145-09 physical constants.

**INTERPRETIVE PLOTS**

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

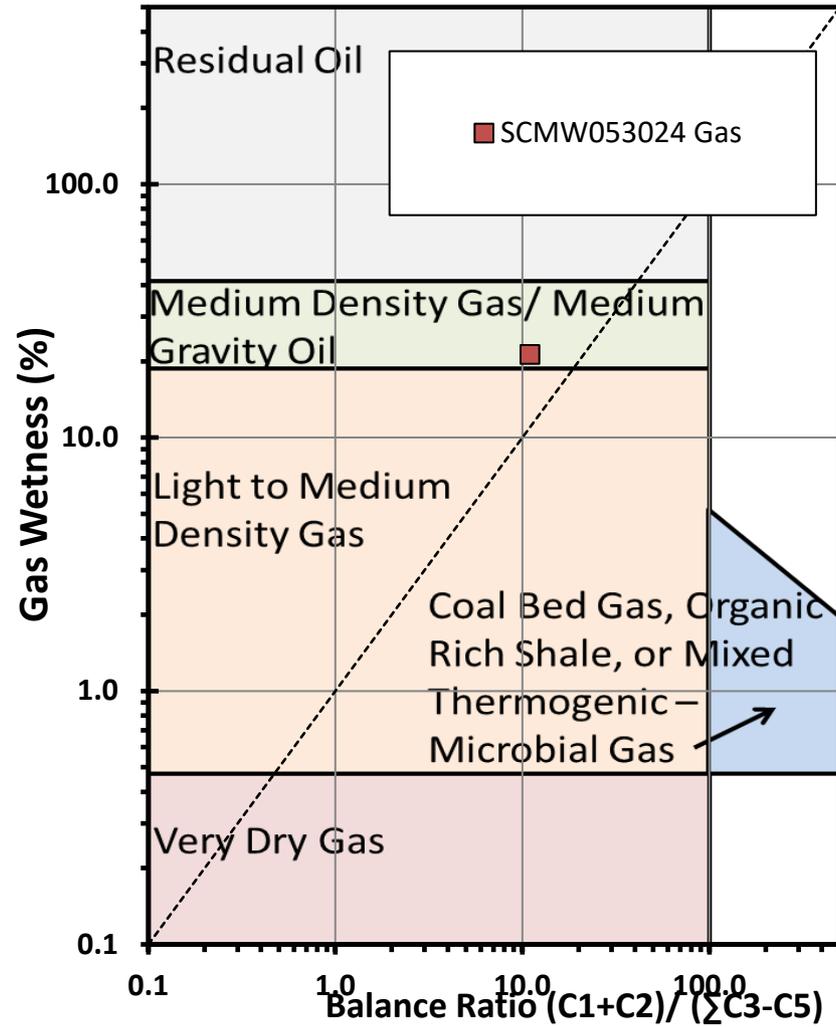


**Hydrocarbon Composition Plot**

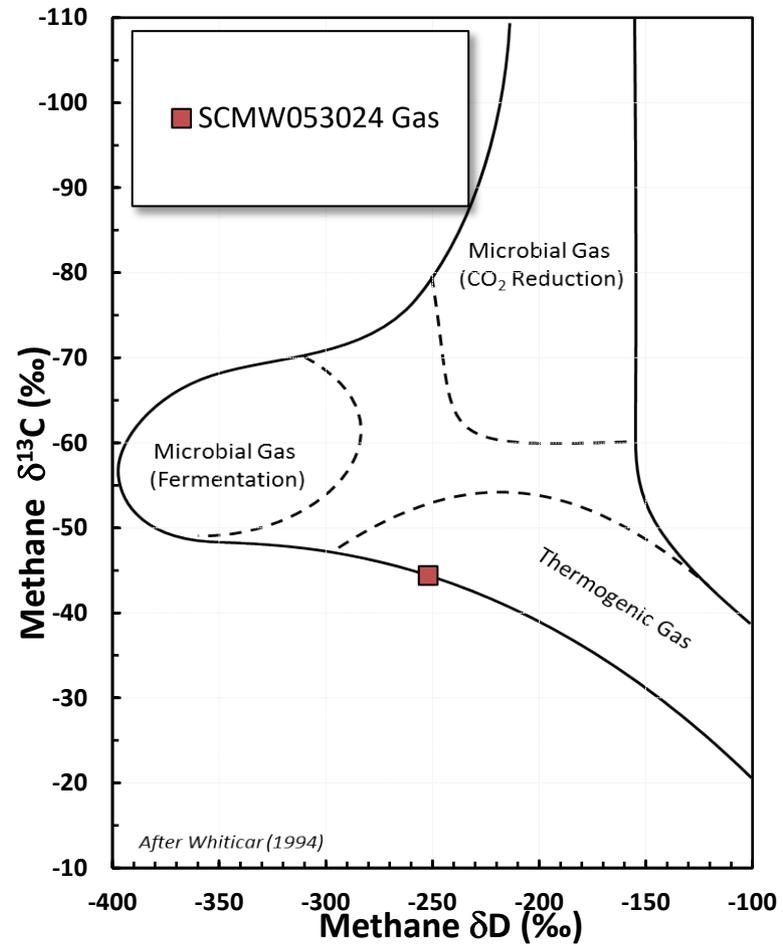


**INTERPRETIVE PLOTS**

**Haworth Ratio Plot - Characterization of Hydrocarbon Type**

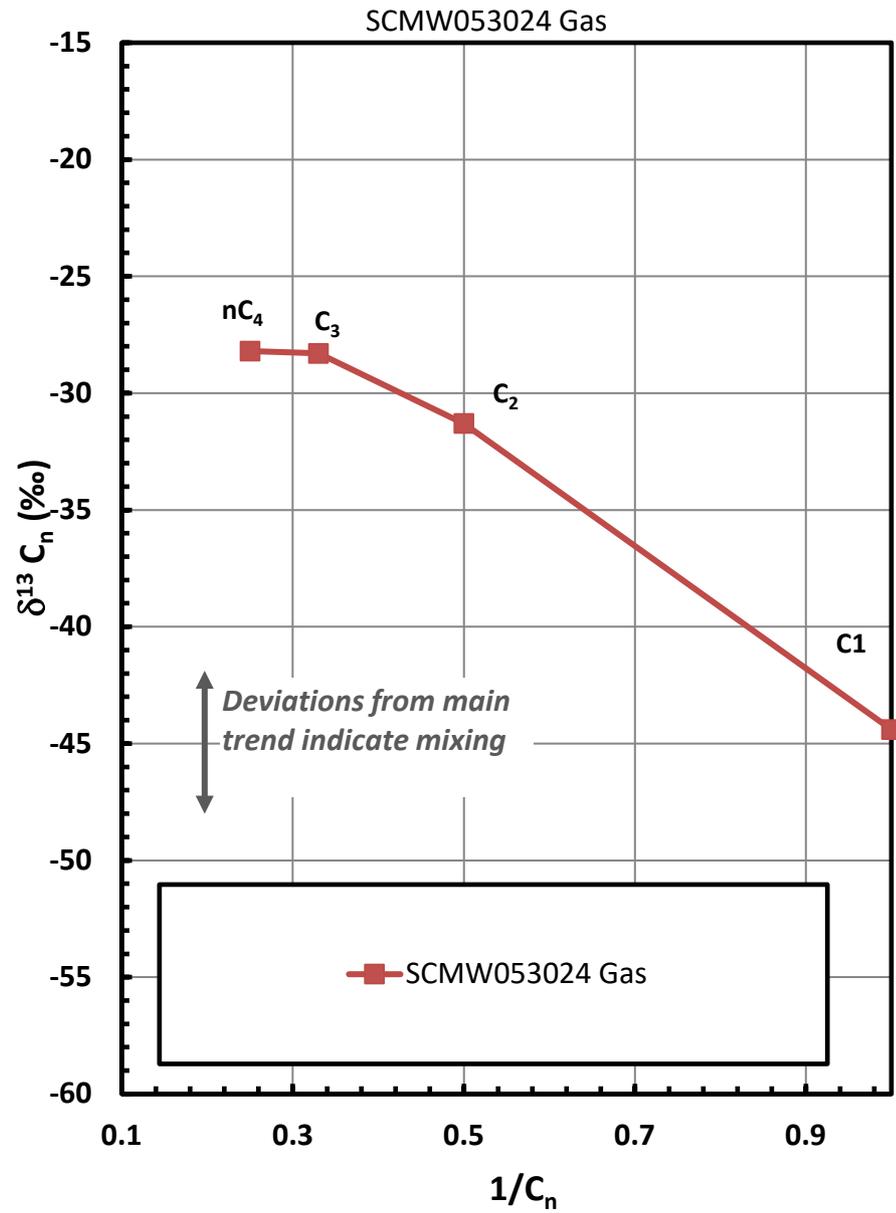


**Methane  $\delta^{13}C$  vs  $\delta D$  Genetic Classification Plot**

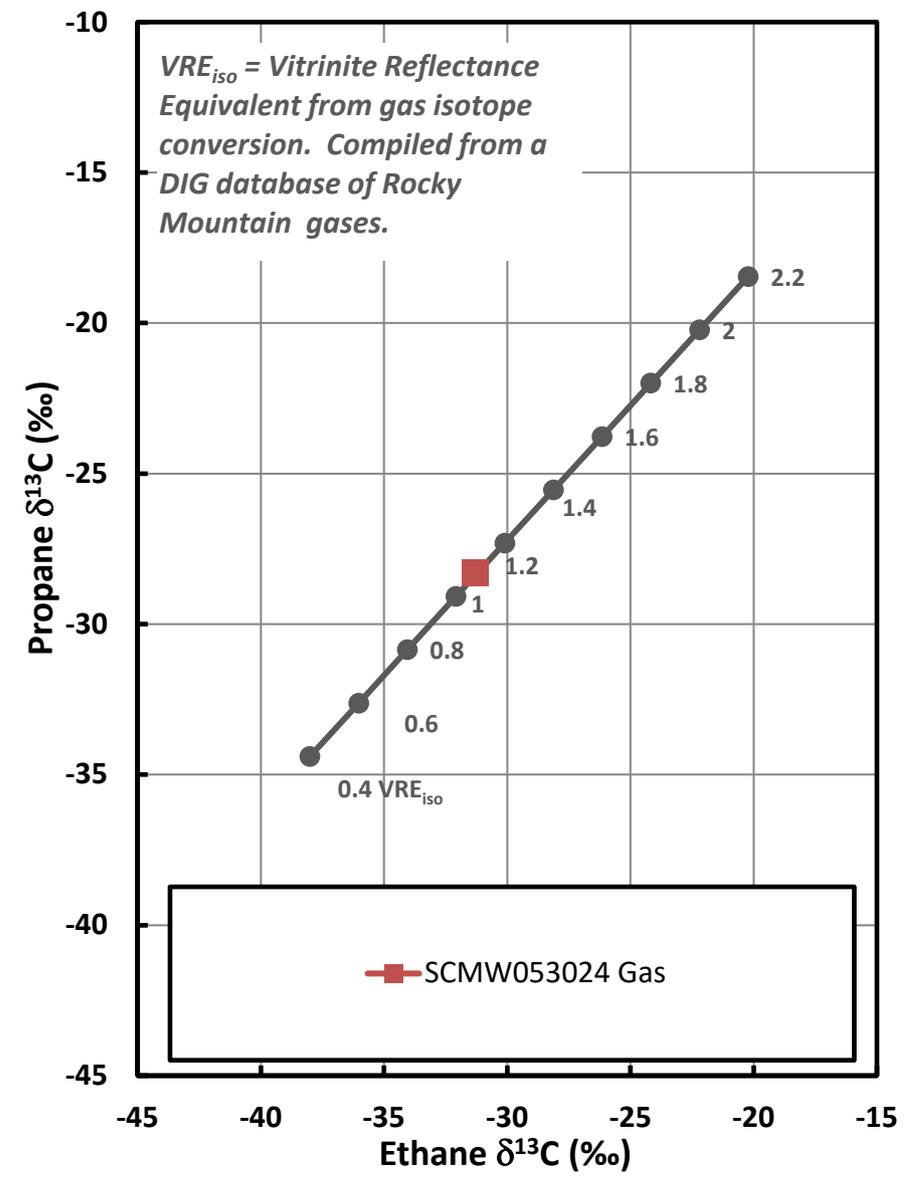


**INTERPRETIVE PLOTS**

**Mixing Plot**

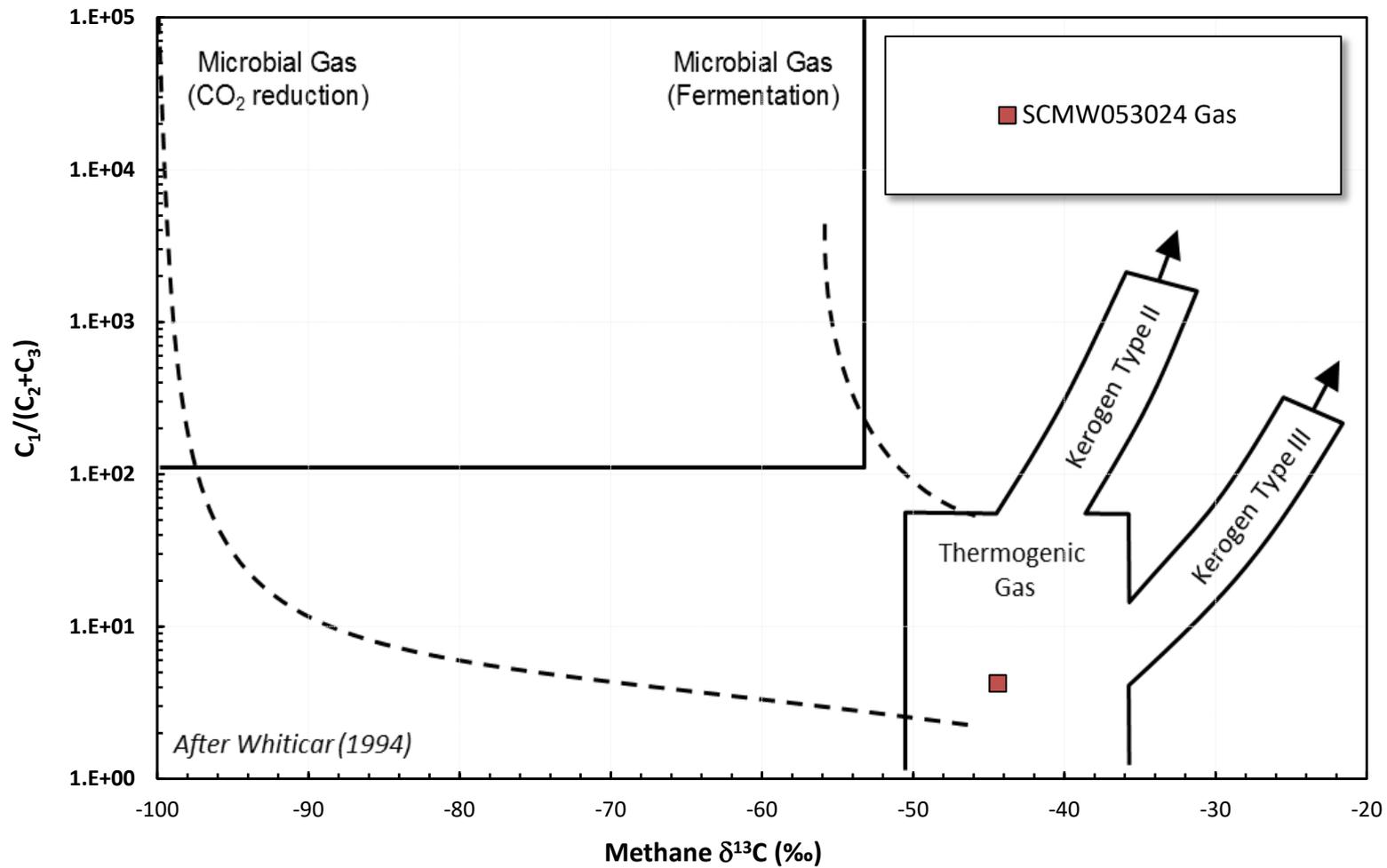


**Ethane - Propane Maturity Plot**



**INTERPRETIVE PLOTS**

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







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Send Data to:		Send Invoice to (if different):		Additional Information:	
Name: Trent Watne		Name:		AFE #: BCD521330	
Company: Olsson		Company:		Project: Sand Creek Monitoring Well	
Address: 1525 N Raleigh St.		Address:		PO #:	
City, State: Denver, CO		City, State:		Location: <del>Same</del> Greener, CO	
Phone: (303) 503-5110		Phone:		Sampled By: Brock Hunt	
Email: twatne@olsson.com		Email:		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)	δD of Methane (C1)	Whole Oil Gas Chromatography (With ASTM D1250)	ASTM D1250 (API Gravity)	ASTM D1250 (API Gravity)	Isotopes of Water	RSK 175 Dissolved Gas Quantification	d180 and dD	d13C of Dissolved Inorganic Carbon (DIC)	Other (specify):
	SCMW053024	5/30	9:45	Other	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
				Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
				Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
				Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
				Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
				Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
				Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
				Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
				Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
				Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							

Chain of Custody Record      Comments:

Relinquished by Signature	Company	Date	Time	Received by Signature	Company	Date	Time
<i>[Signature]</i>	Olsson	5/30	14:45	<i>[Signature]</i>	DIG	5/30/24	14:45

\*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.