



dig
Dolan Integration Group

Geochemistry for Energy

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

Job #: 19123187
Lab #: DIG-021231
Client: Southern Petroleum Labs, Inc.
Well Name: HORSETAIL 07F-0639

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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	O ₂	N ₂	O ₂ + Ar	CO ₂	C ₁	C ₂	C ₃	iC ₄	nC ₄	iC ₅	nC ₅	C ₆	C ₇	C ₈	C ₉	C ₁₀	H ₂	N ₂	C ₁	C ₂	C ₃	iC ₄	nC ₄	iC ₅	nC ₅	C ₆	C ₇	Total Gas	
						ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	mol%	mol%	mol%	mol%	mol%	mol%	mol%	mol%	mol%	mol%	BTU/SCF
19123187	DIG-021231	HORSETAIL 07F-0639	Bradenhead Gas	12/12/19		78723	14354		798174	75744	21351	1644	2461	486	481	472						279	65	88.6	8.40	2.37	0.18	0.33	0.05	0.05		1001		

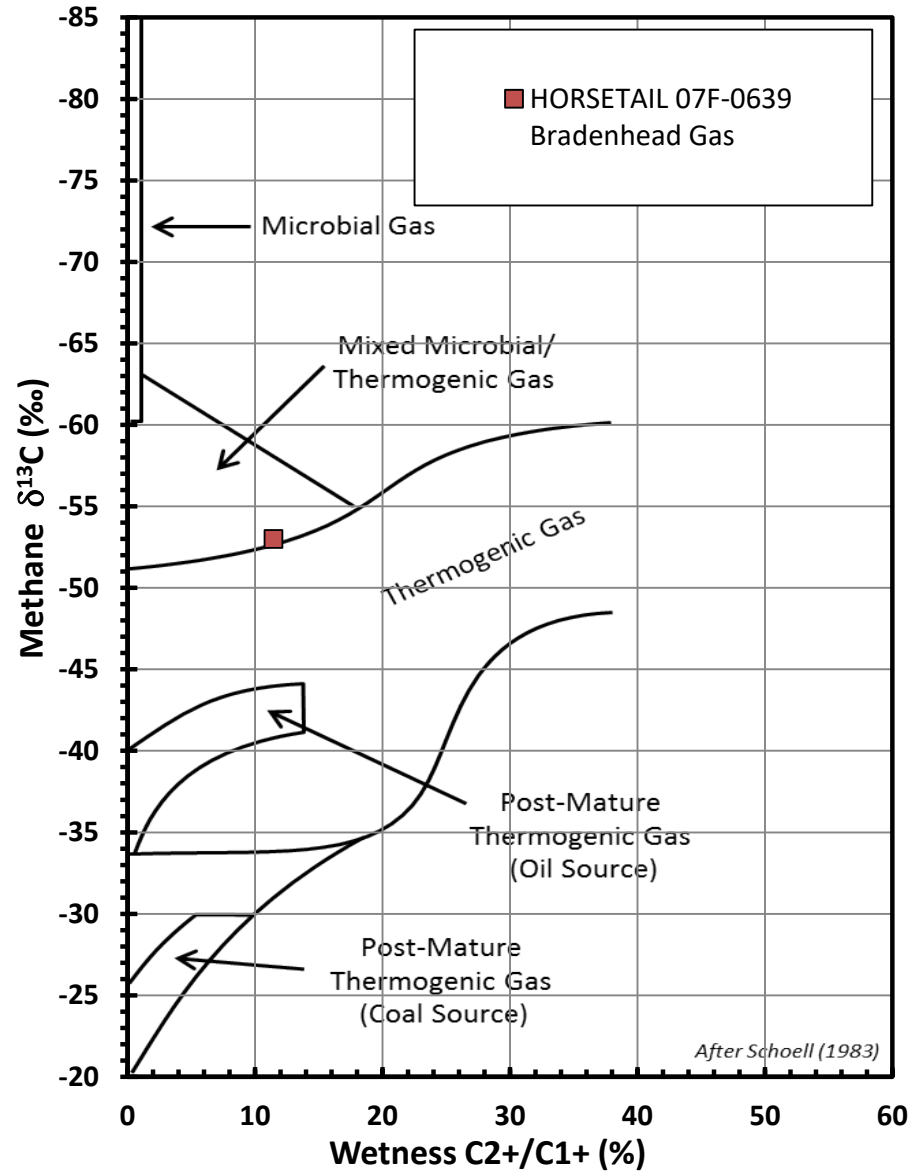
SAMPLE INFORMATION				HYDROCARBON RATIOS				STABLE ISOTOPE ANALYSIS										Comments	
Job Number	Lab Number	Well Name	Sample Type	Sample Date	Sample Time	Total HC	Wetness	C ₂ /C ₁ +C ₂	Balance Ratio	Mass Spec	δ ¹³ C ₁	δ ¹³ C ₂	δ ¹³ C ₃	δ ¹³ C _{iC4}	δ ¹³ C _{nC4}	δ ¹³ C _{iC5}	δ ¹³ C _{nC5}	δ ¹³ CO ₂	δ ¹⁸ O
						ppm	% C ₂ to C ₁	mol/mol	C ₁ +C ₂ /C ₁ +C ₃	Date	‰ VPDB	‰ VPDB	‰ VPDB	‰ VPDB	‰ VPDB	‰ VPDB	‰ VPDB	‰ VPDB	‰ VSMOW
19123187	DIG-021231	HORSETAIL 07F-0639	Bradenhead Gas	12/12/19		90290	11.4	8.9	12.5	12/23/2019	-83.0	-37.1	-32.0						-377

Stable isotope results based on multi-point laboratory calibration
 Values in red represent low signal; interpret with caution
 Precision δ¹³C < 0.5 ‰
 Precision δ¹⁸O < 5 ‰
 * As ideal gas, with gas concentrations normalized to 100%;
 calculations based on GPA 2145-09 physical constants.

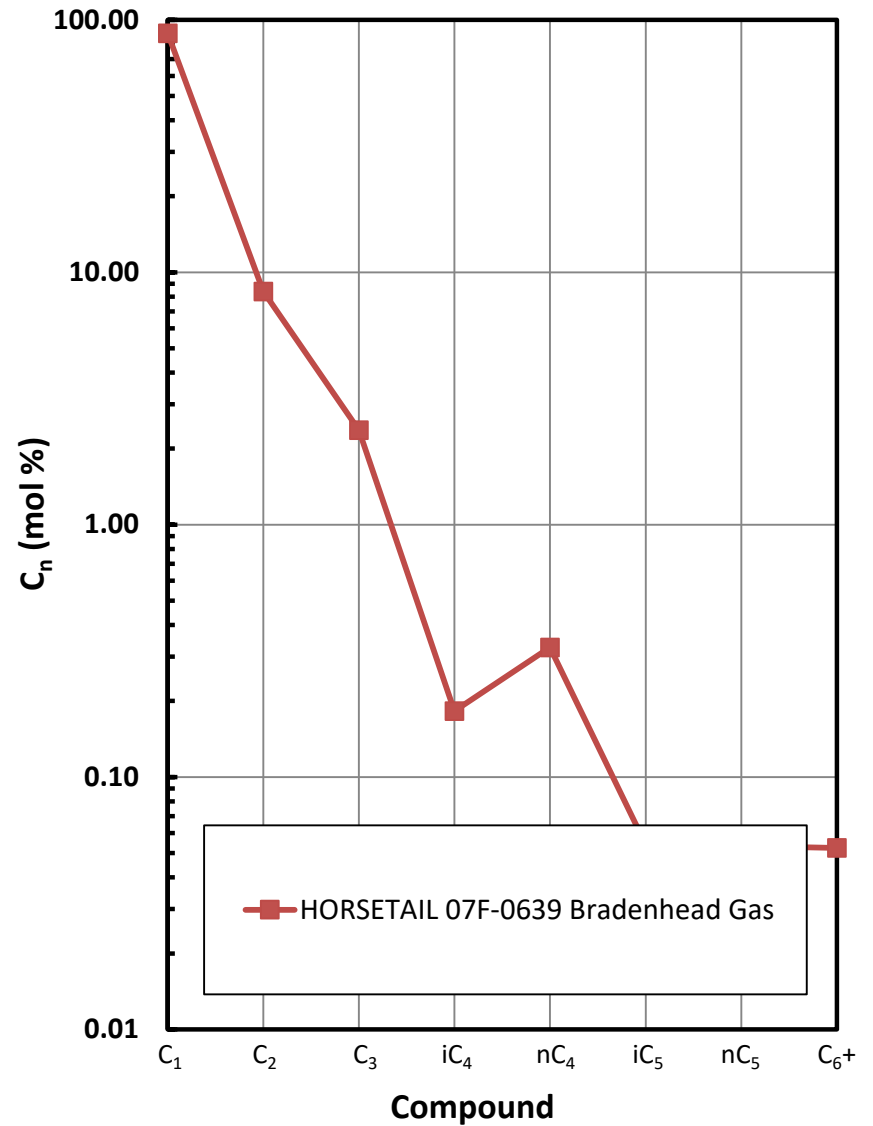
SPECIFIC GRAVITY*	
Total Gas	HCs only
0.662	0.628

INTERPRETIVE PLOTS

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

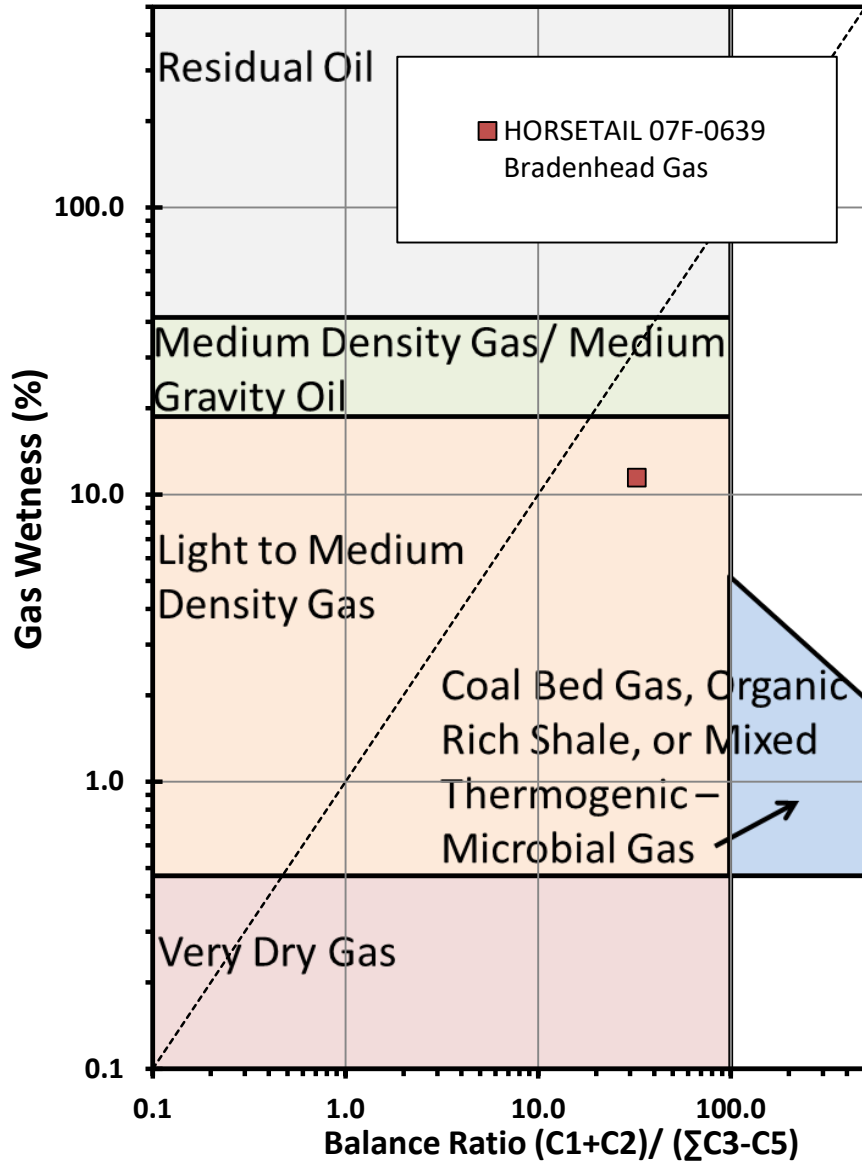


Hydrocarbon Composition Plot

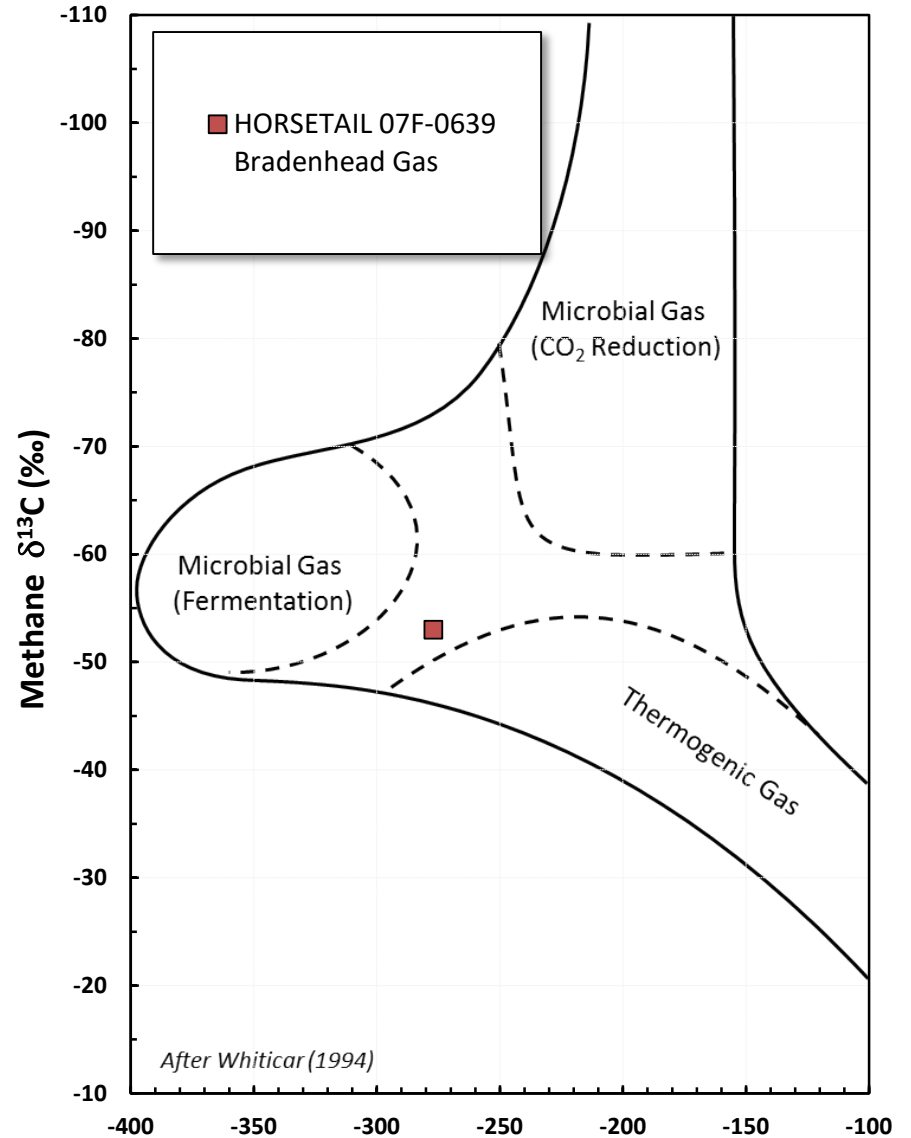


INTERPRETIVE PLOTS

Haworth Ratio Plot - Characterization of Hydrocarbon Type



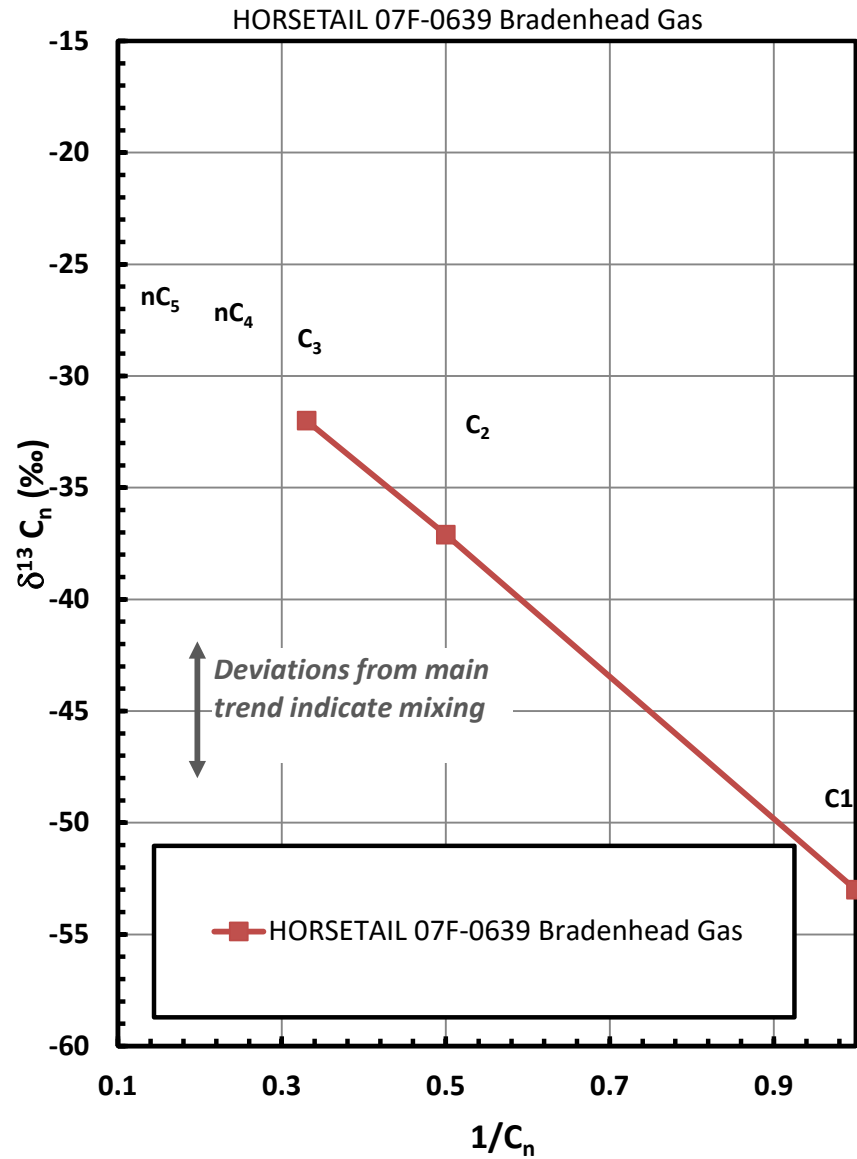
Methane $\delta^{13}\text{C}$ vs δD Genetic Classification Plot



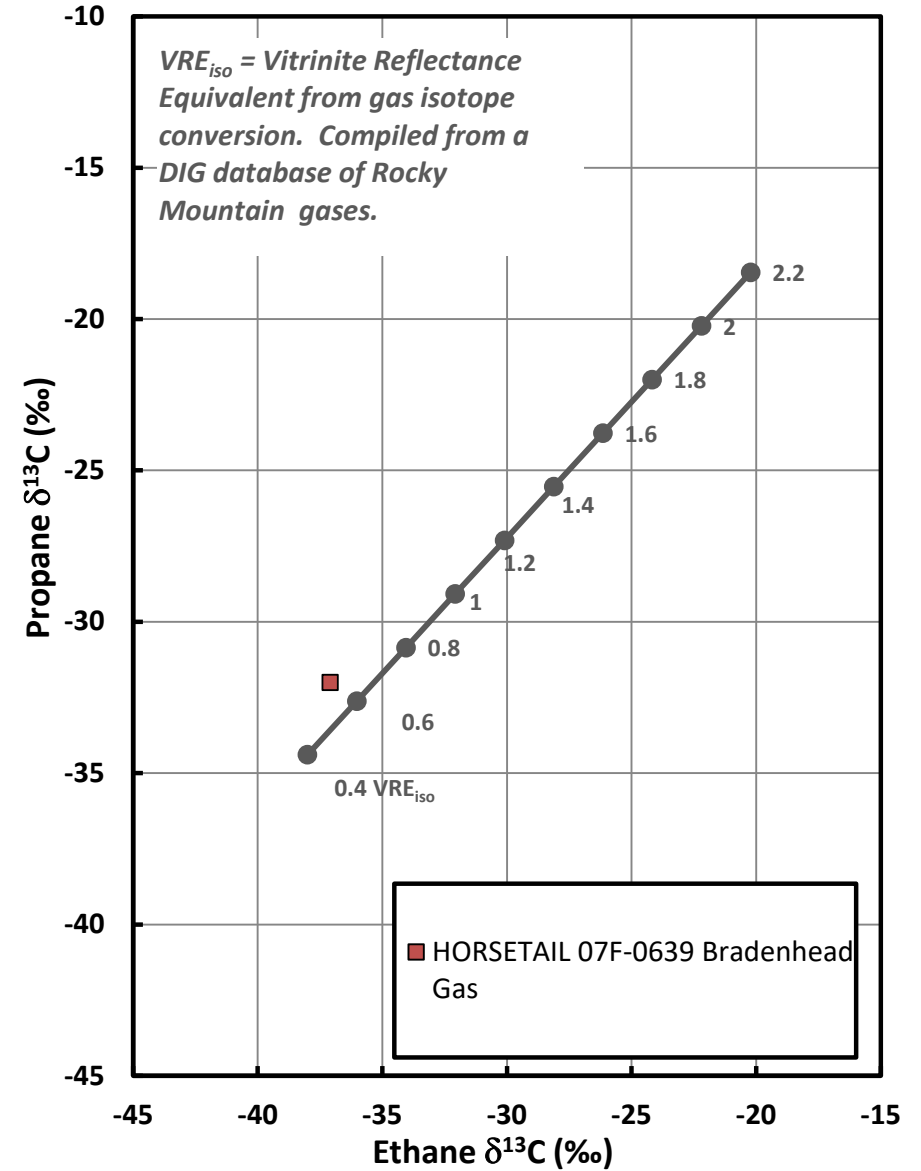
Methane δD (‰)

INTERPRETIVE PLOTS

Mixing Plot

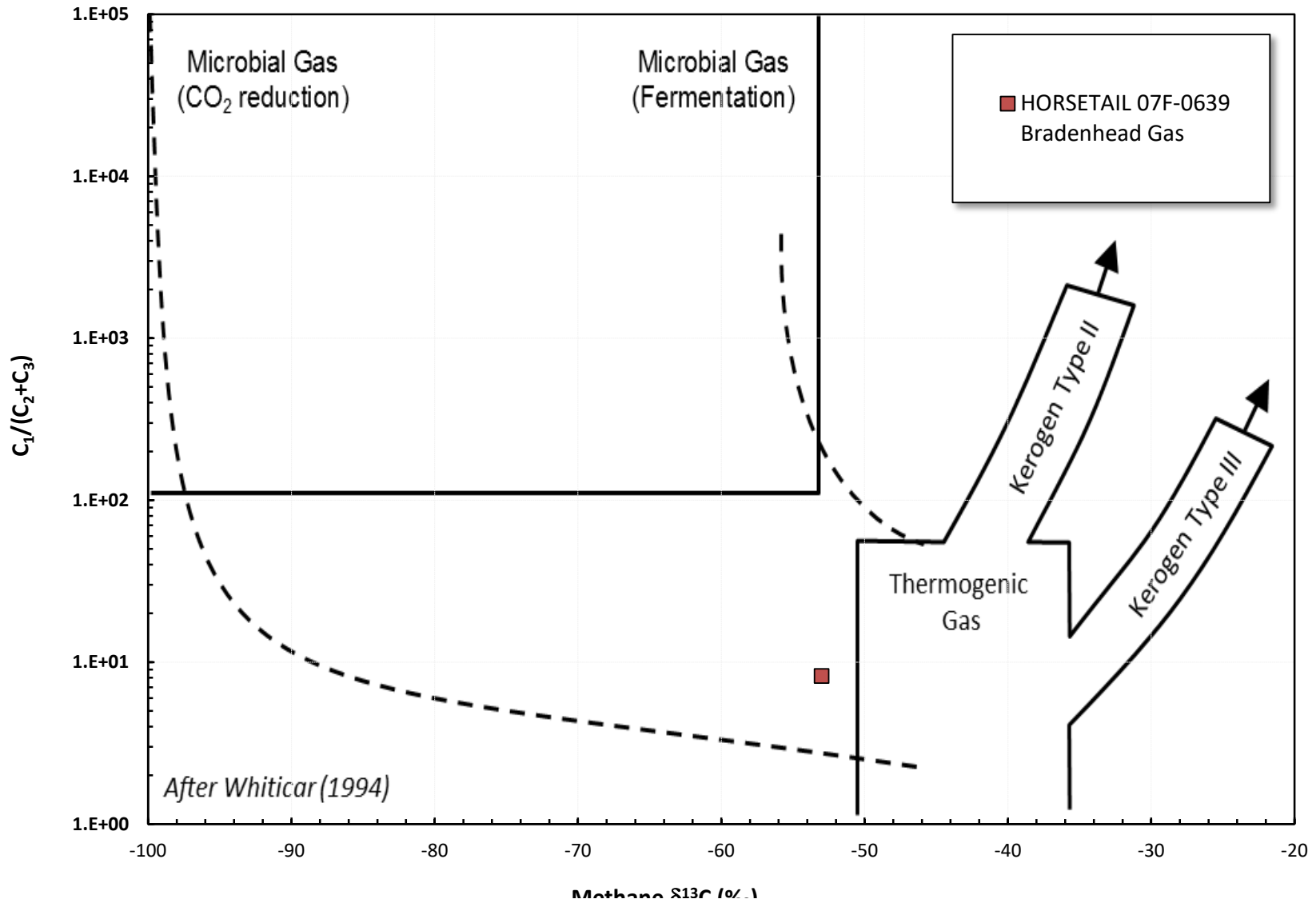


Ethane - Propane Maturity Plot



INTERPRETIVE PLOTS

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



vietname o~c (%)

