



dig
Dolan Integration Group

Geochemistry for Energy

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

Job #: 20125048
Lab #: DIG-024401 - DIG-024402
Client: Southern Petroleum Labs, Inc.
Well Name: HORSETAIL FED 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	OC Date	H ₂ ppm	O ₂ % Ar ppm	CO ₂ ppm	C ₁ ppm	C ₂ ppm	C ₃ ppm	iC ₄ ppm	nC ₄ ppm	iC ₅ ppm	nC ₅ ppm	C ₆₊ ppm	H ₂ ppm	N ₂ ppm	C ₁ mol%	C ₂ mol%	C ₃ mol%	iC ₄ mol%	nC ₄ mol%	iC ₅ mol%	nC ₅ mol%	C ₆₊ mol%	Total Gas BTU/ft ³	
20125048	DIG-024401	HORSETAIL FED 07F-0639 Bradenhead gas	Bradenhead gas	12/02/20	8:00	12/31/2020	289410	76984	128	579390	71758	18848	1247	2312	312	278	217												759
20125048	DIG-024402	HORSETAIL FED 07F-0639 Production gas	Production gas	12/02/20	9:00	12/31/2020	124987	31258	31266	631918	103924	89974	5460	15448	1700	1815	1118												1064

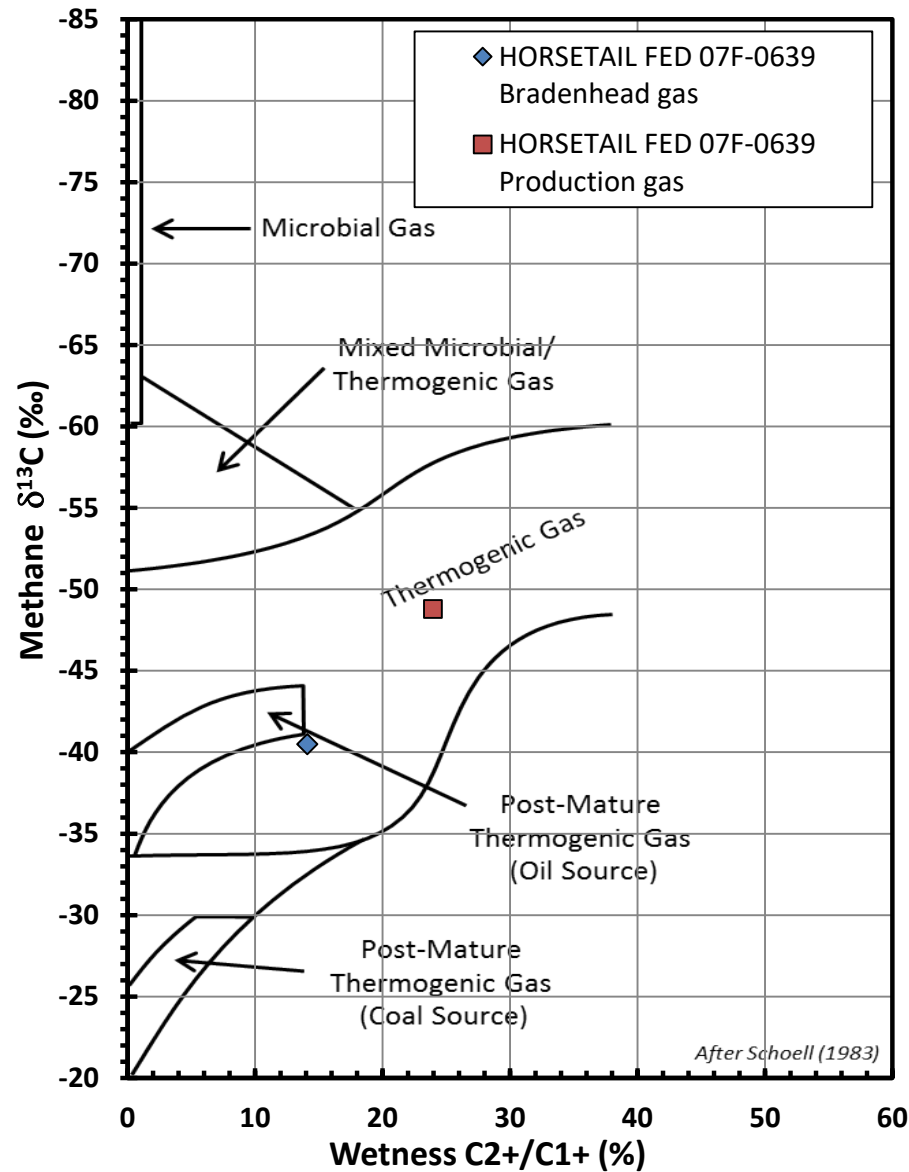
SAMPLE INFORMATION			HYDROCARBON RATIOS				STABLE ISOTOPE ANALYSIS										Comments					
Job Number	Lab Number	Well Name	Sample Type	Sample Date	Sample Time	Total HC ppm	Wetness % C ₁ to C ₂	C ₂ /C ₁ +C ₂ modified	Balance Ratio C ₂ C ₃ /C ₁ C ₂	Mass Spec Date	δ ¹³ C ₁ ‰ VPDB	δ ¹³ C ₂ ‰ VPDB	δ ¹³ C ₃ ‰ VPDB	δ ¹³ C _{iC4} ‰ VPDB	δ ¹³ C _{nC4} ‰ VPDB	δ ¹³ C _{iC5} ‰ VPDB		δ ¹³ C _{nC5} ‰ VPDB	δ ¹³ C _{C6+} ‰ VPDB	δ ¹³ C _{DOC} ‰ VPDB	δ ¹³ C _{SOM/OM}	
20125048	DIG-024401	HORSETAIL FED 07F-0639 Bradenhead gas	Bradenhead gas	12/02/20	8:00	674072	14.1	6.4	28.3	1/23/2021	-40.5	-32.7	-30.1								-248	
20125048	DIG-024402	HORSETAIL FED 07F-0639 Production gas	Production gas	12/02/20	9:00	830957	24.0	3.6	7.8	1/21/2021	-48.8	-36.2	-31.3							0.6	-260	

Stable isotope results based on multi-point laboratory calibration
 low signal, interpret with caution
 Precision δ¹³C < 0.5 ‰
 Precision δD < 5 ‰
 * All listed gas, with gas concentrations normalized to 100%
 calculations based on GPA 2145-09 physical constants.

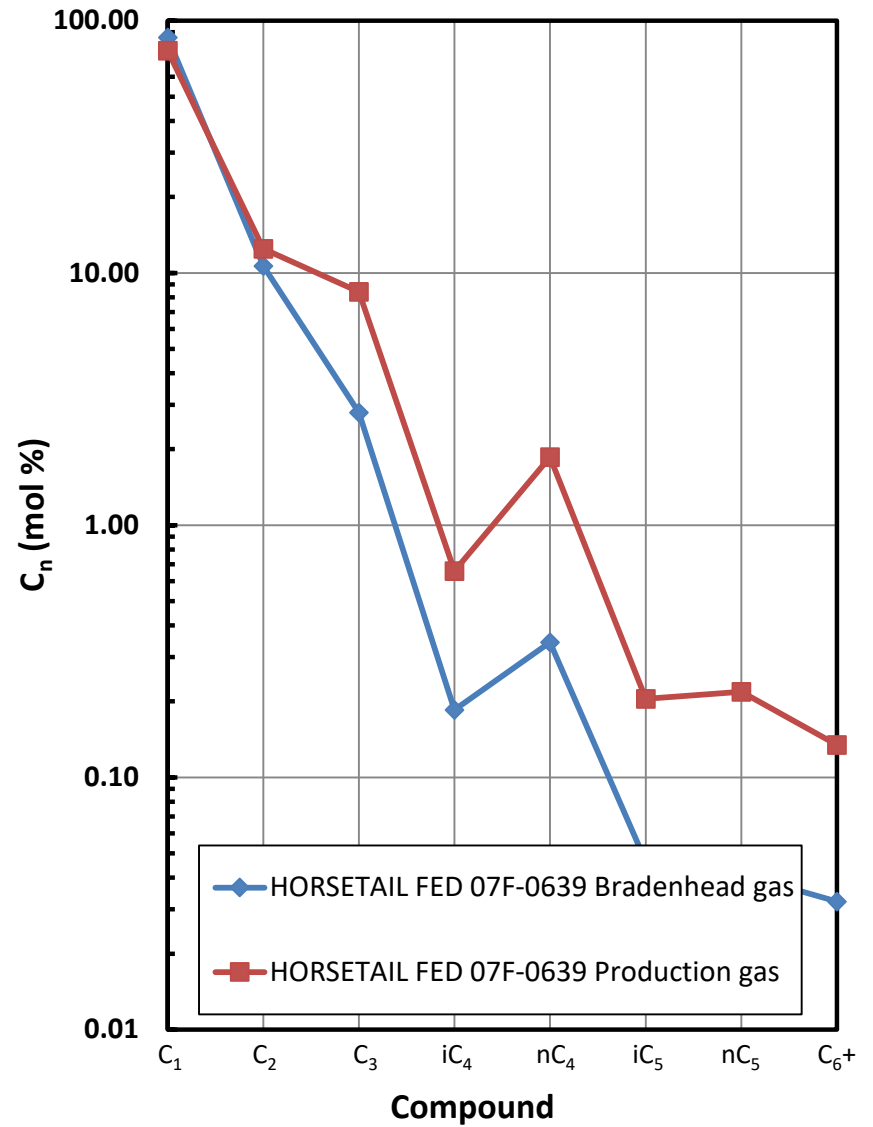
SPECIFIC GRAVITY*	
Total Gas Spec Grav	HCs only Spec Grav
0.763	0.643
0.806	0.744

INTERPRETIVE PLOTS

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

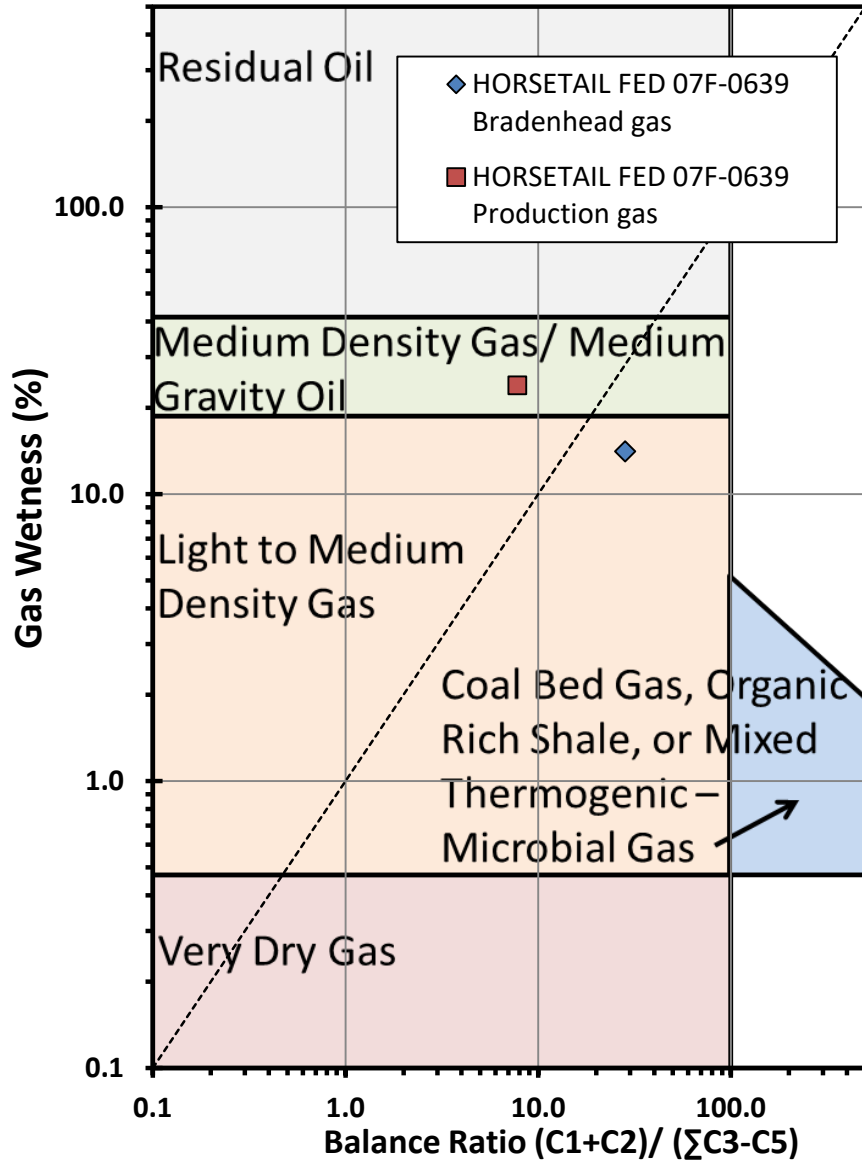


Hydrocarbon Composition Plot

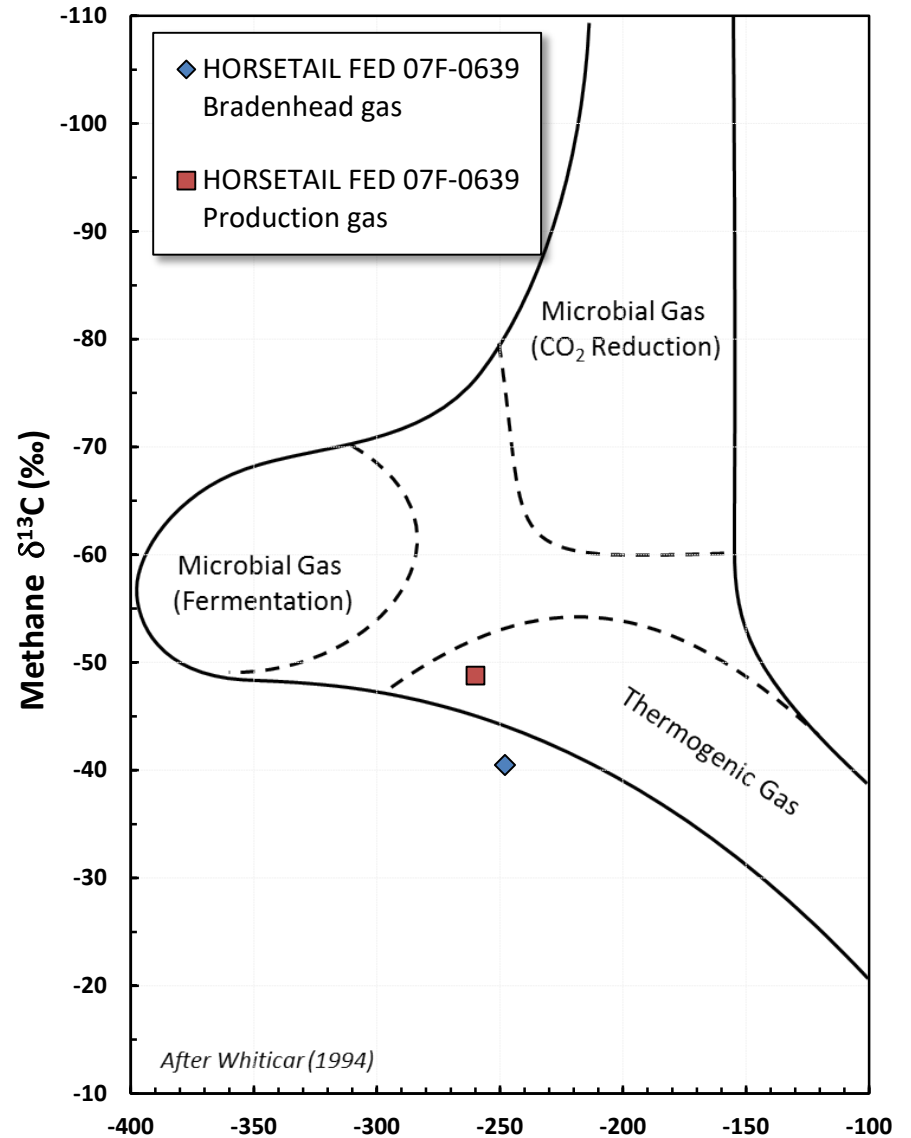


INTERPRETIVE PLOTS

Haworth Ratio Plot - Characterization of Hydrocarbon Type



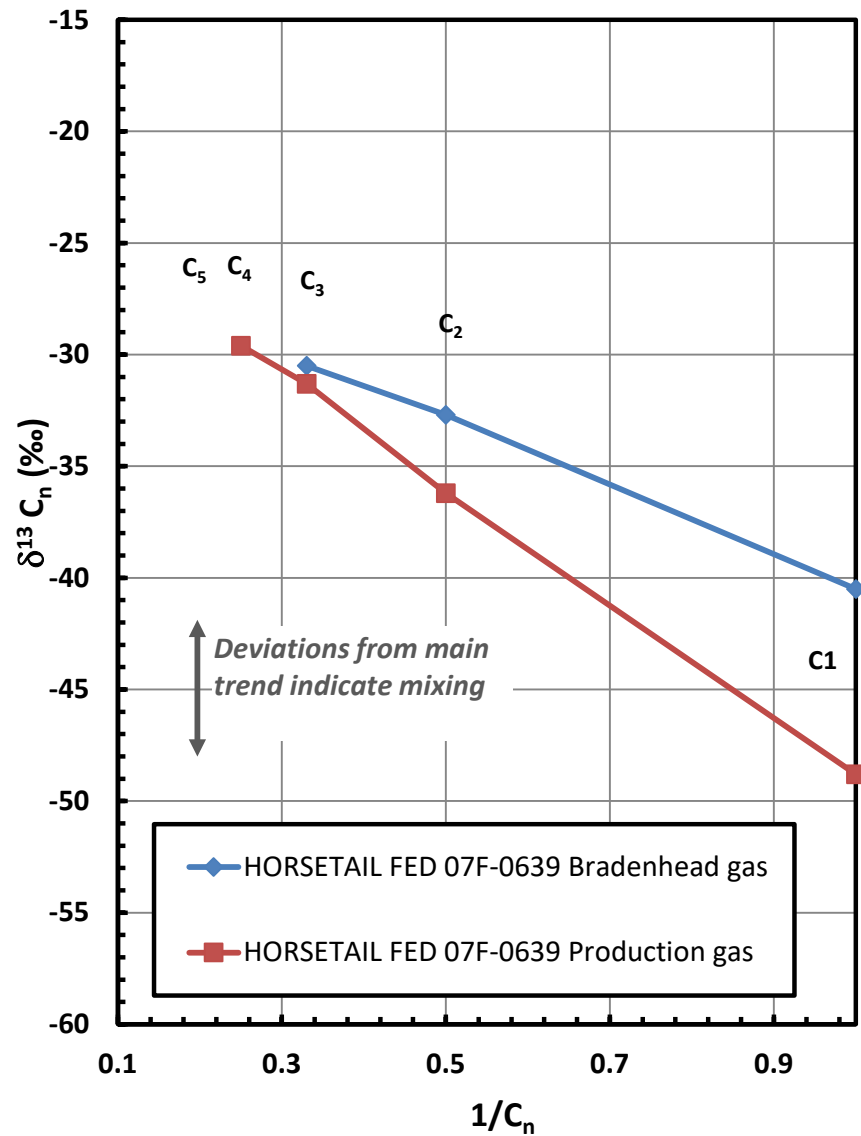
Methane δ¹³C vs δD Genetic Classification Plot



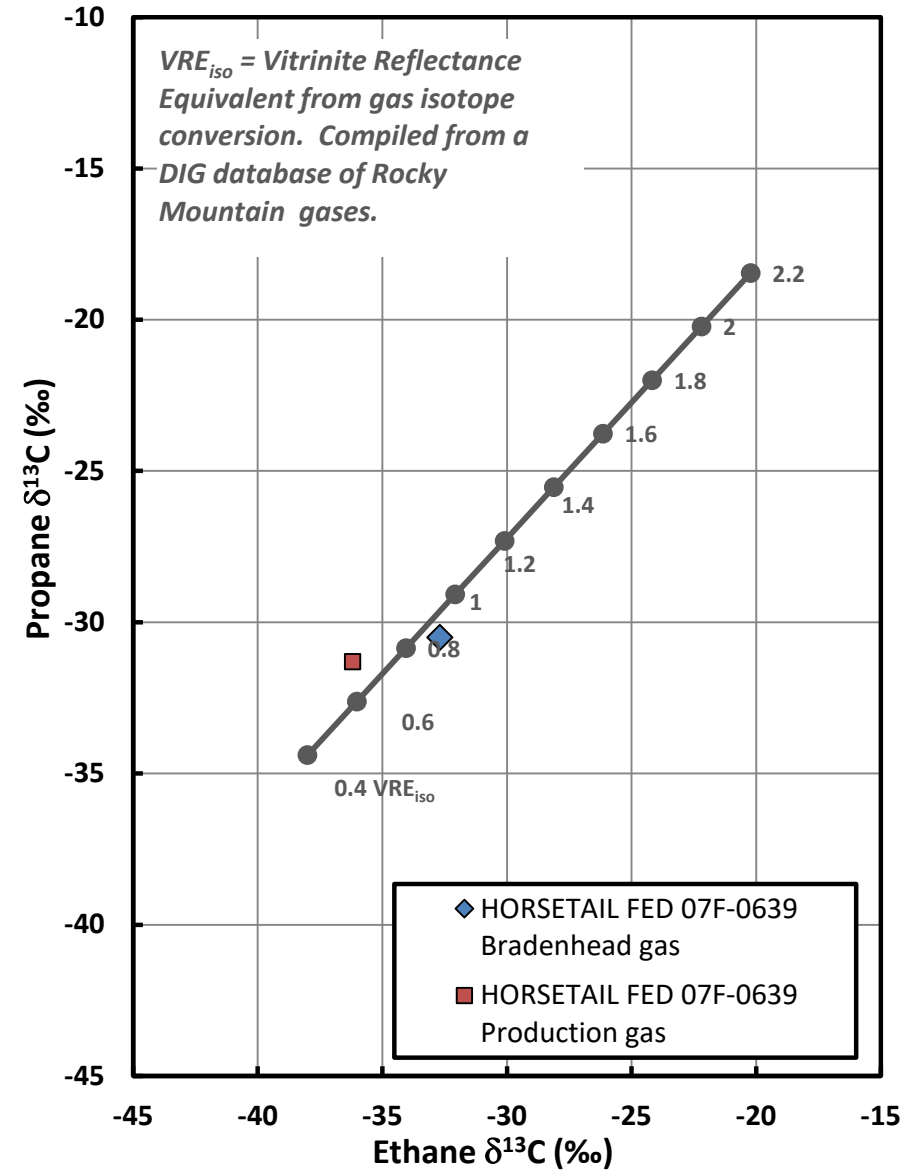
Methane δD (‰)

INTERPRETIVE PLOTS

Mixing Plot

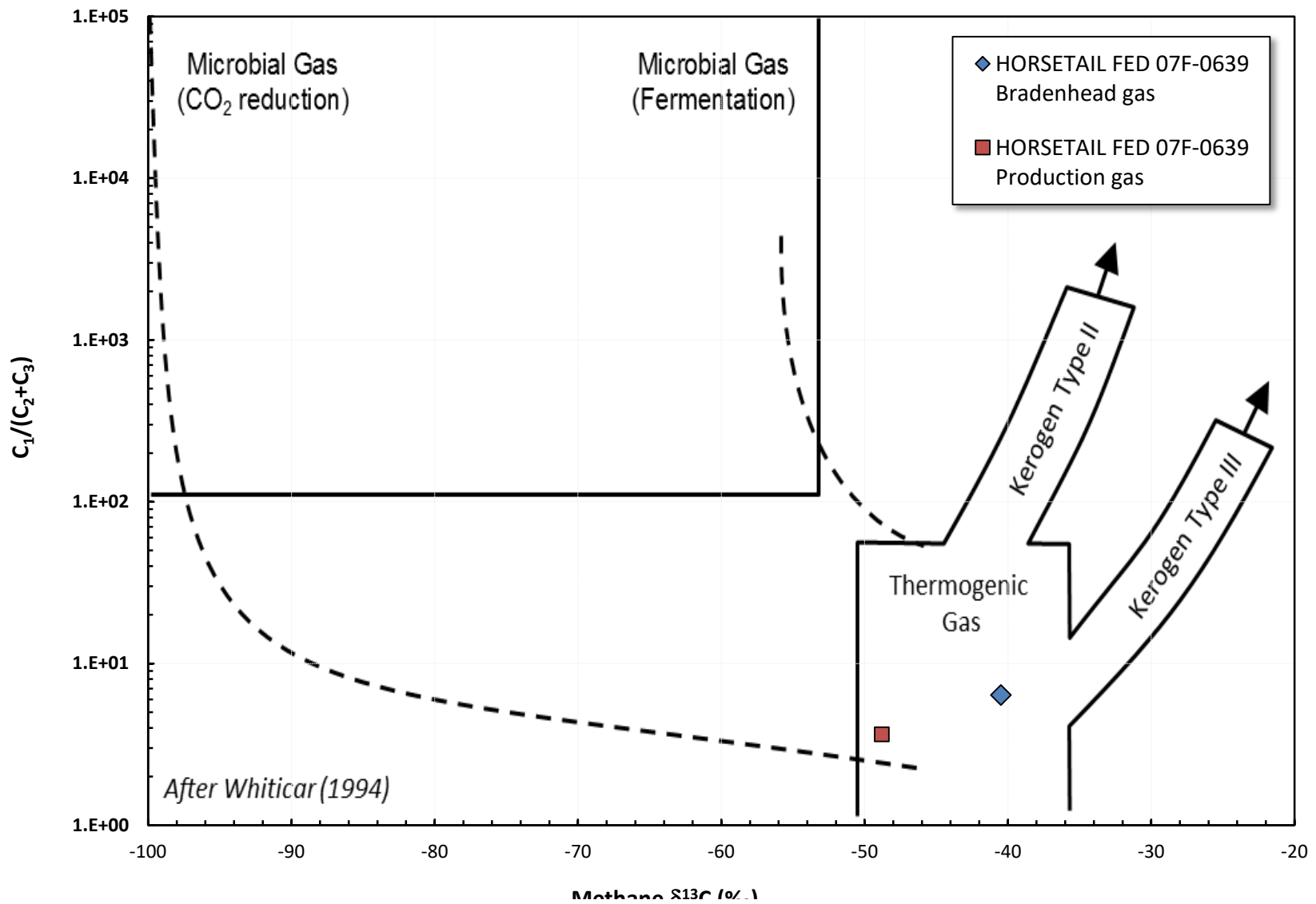


Ethane - Propane Maturity Plot



INTERPRETIVE PLOTS

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



vietname o~c (%)



Report To:
(Company Name):
Address:

City/State/Zip:

SPL COLORADO

Dee.Bernoski@spl-inc.com
mlovelley@spl-inc.com

**SPL, Inc.
Analysis Request Chain of Custody Record**

SPL Work Order No.:

Acct. Mate Code:

Dept. Code

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Requested 1

Project/Station Number: N/A

Project/Station Location: N/A

Sampling

6-10 Rincinos

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