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 #:	**21116736**
Lab #:	**DIG-026727**
Client:	**Southern Petroleum Labs, Inc.**
Well Name:	**RMV 29-27**

Client/Well Name: Southern Petroleum Labs, Inc. / RMV 29-27
Job #: 21116736
Lab #: DIG-026727

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_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	C_2H_4 ppm	He ppm	H_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/ft³
21116736	DIG-026727	RMV 29-27 Gas	Gas	11/12/21	10:00	11/29/2021	24733	5230		913366	30833	6885	1669	1435	648	442	1333				95.5	3.22	0.72	0.17	0.15	0.07	0.05	0.14	1029

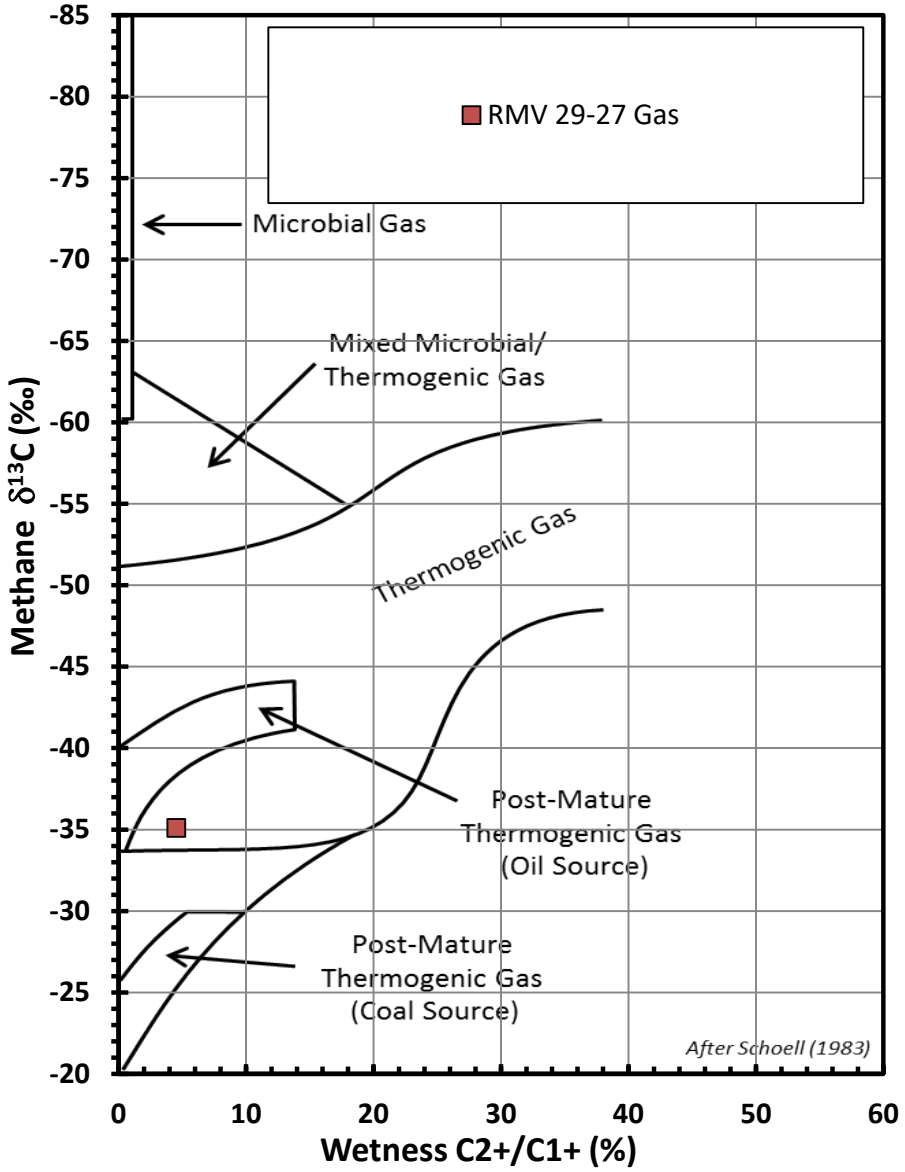
SAMPLE INFORMATION						HYDROCARBON RATIOS				STABLE ISOTOPE ANALYSIS										
Job Number	Lab Number	Well Name	Sample Type	Sample Date	Sample Time	Total HC ppm	Wetness % C_2 to C_6	C_1/C_2+C_3 mol/mol	Balance Ratio C_1+C_2/C_3-C_5	Mass Spec Date	$\delta^{13}C_1$ ‰ VPDB	$\delta^{13}C_2$ ‰ VPDB	$\delta^{13}C_3$ ‰ VPDB	$\delta^{13}iC_4$ ‰ VPDB	$\delta^{13}nC_4$ ‰ VPDB	$\delta^{13}iC_5$ ‰ VPDB	$\delta^{13}nC_5$ ‰ VPDB	$\delta^{13}CO_2$ ‰ VPDB	δD ‰ VSMOW	Comments
21116736	DIG-026727	RMV 29-27 Gas	Gas	11/12/21	10:00	956611	4.5	24.2	85.2	12/1/2021	-35.1	-24.6	-23.9						-159	

Stable isotope results based on multi-point laboratory calibration
Values in red represent low signal; interpret with caution
Precision $\delta 13C < 0.5$ ‰
Precision $\delta D < 5$ ‰
* As ideal gas, with gas concentrations normalized to 100%; caculations based on GPA 2145-09 physical constants.

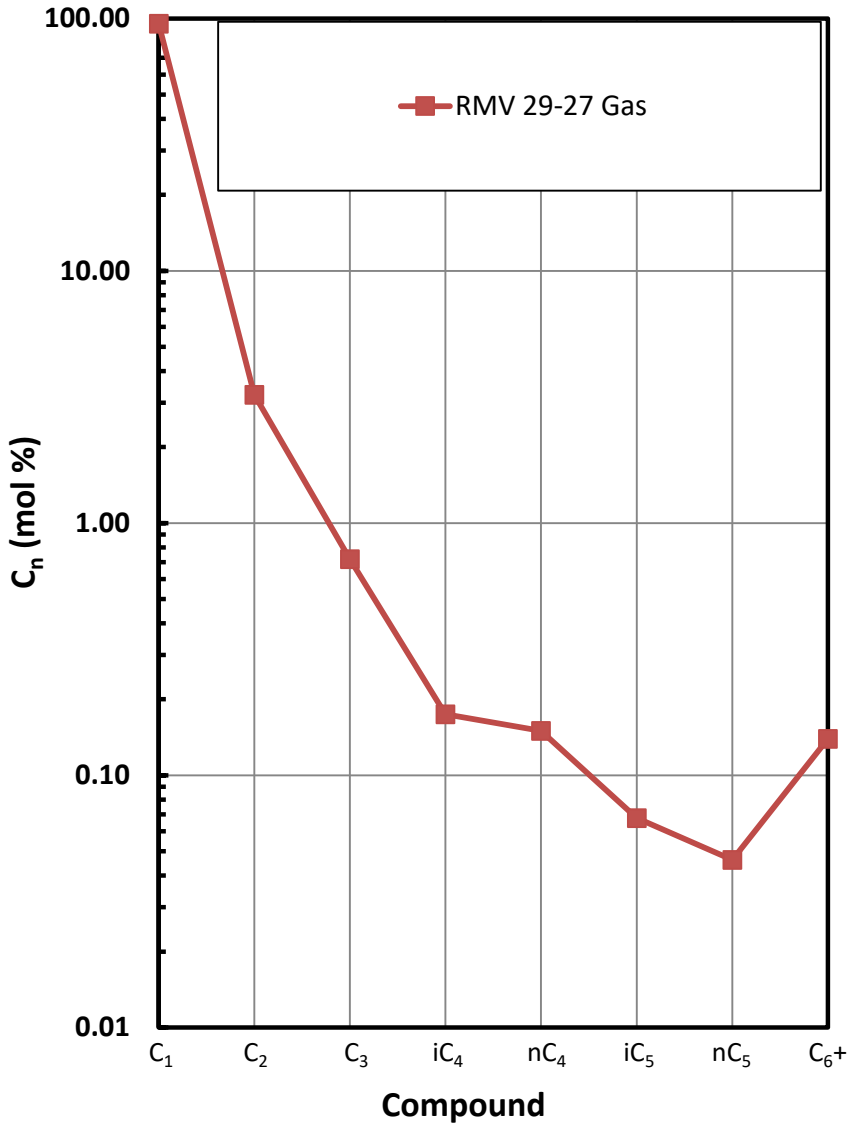
SPECIFIC GRAVITY*	
Total Gas Spec Grav	HCs only Spec Grav
0.599	0.587

INTERPRETIVE PLOTS

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

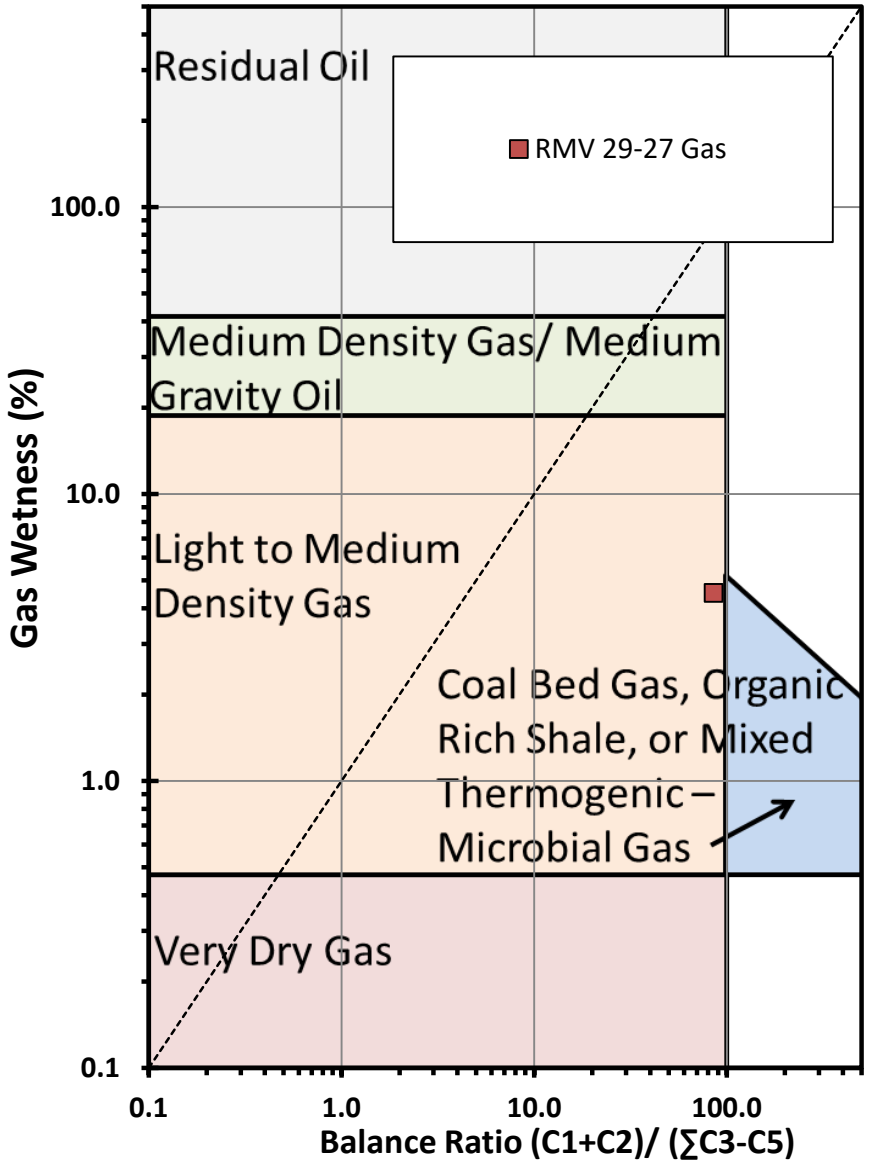


Hydrocarbon Composition Plot

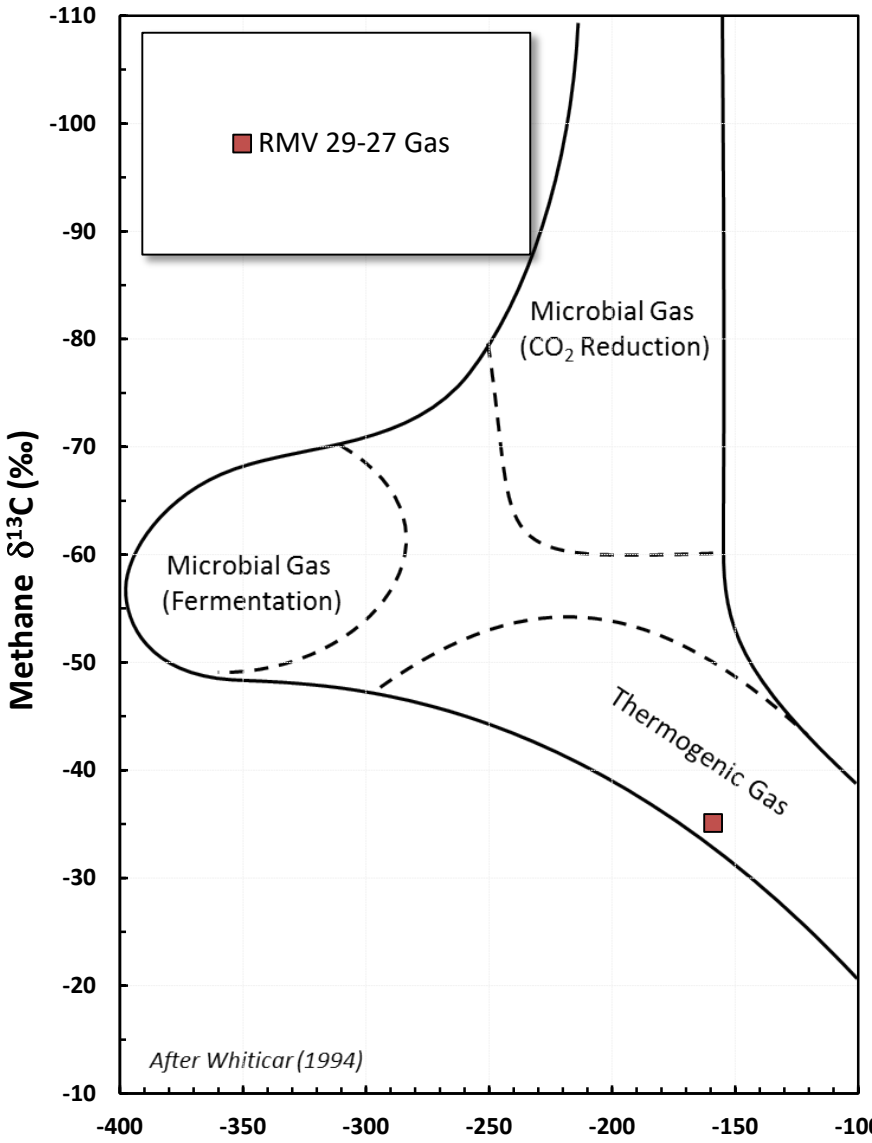


INTERPRETIVE PLOTS

Haworth Ratio Plot - Characterization of Hydrocarbon Type

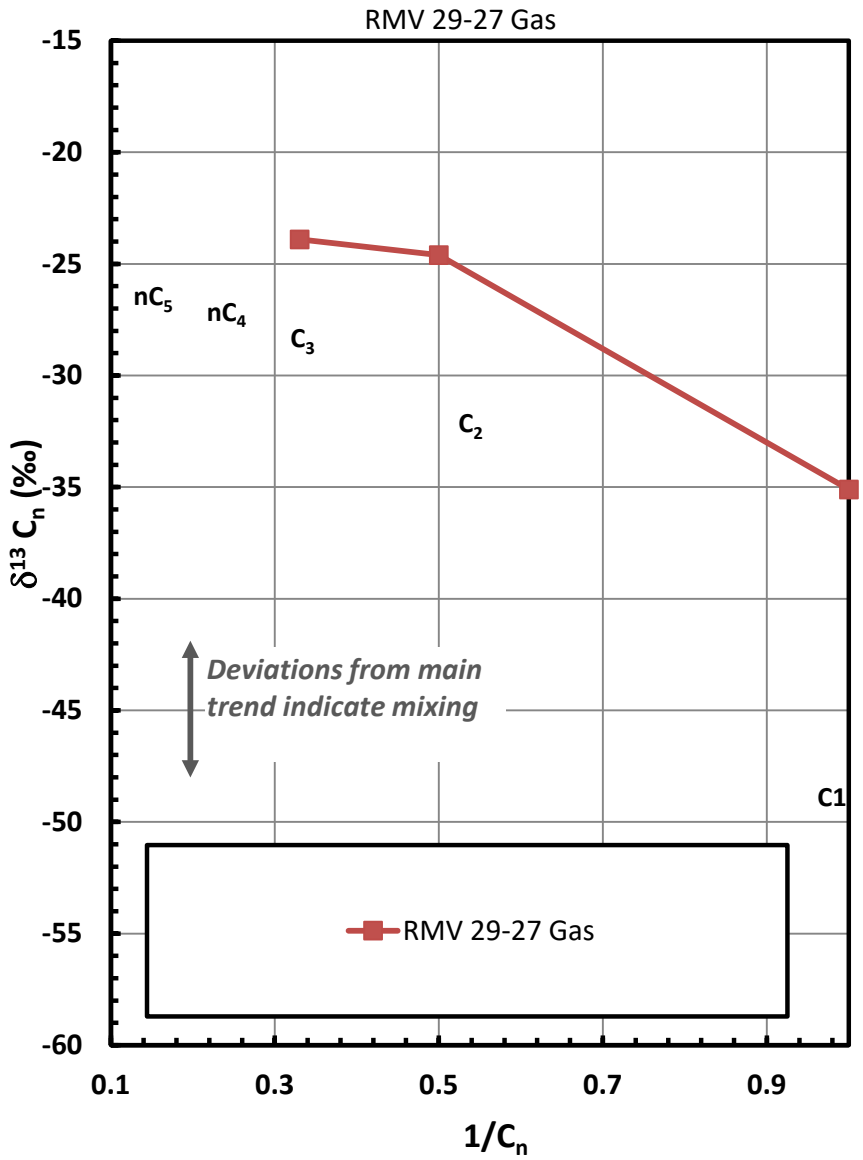


Methane $\delta^{13}C$ vs δD Genetic Classification Plot

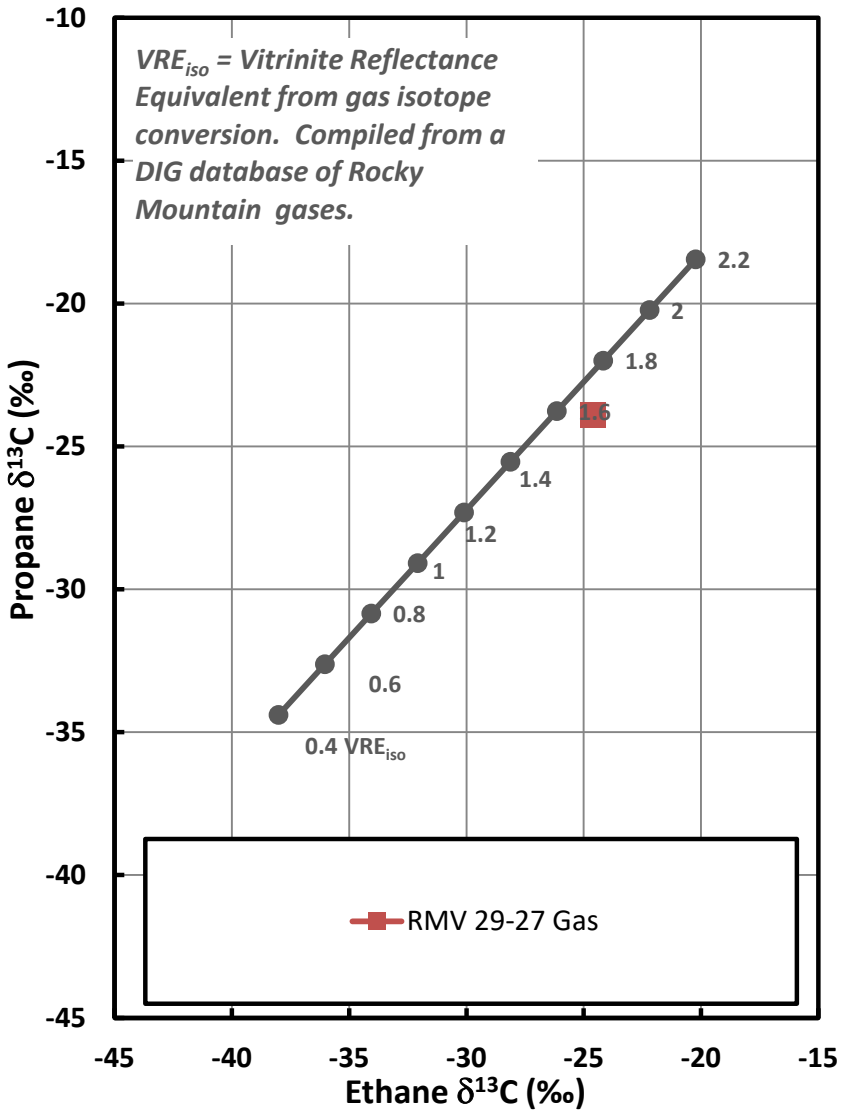


INTERPRETIVE PLOTS

Mixing Plot

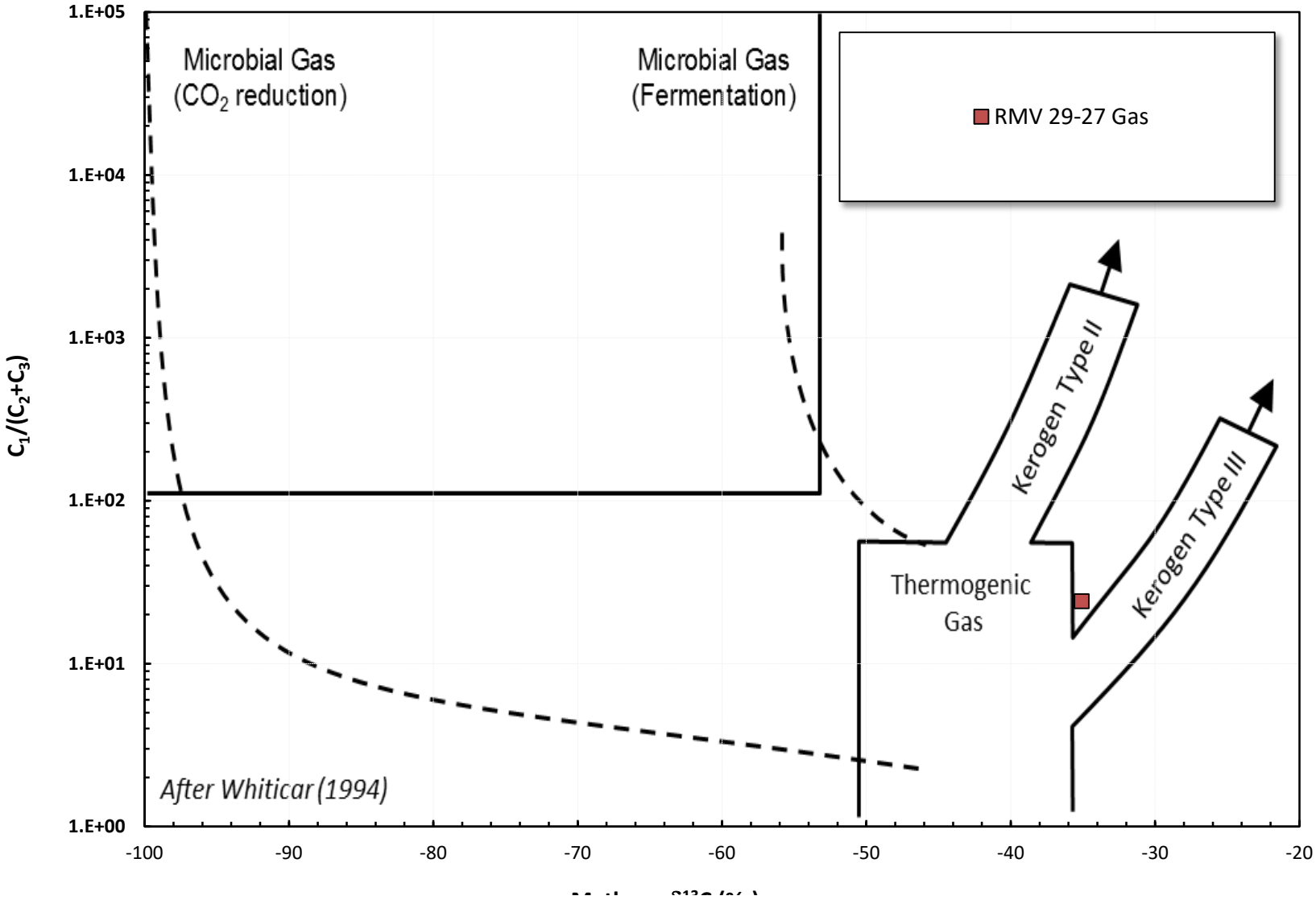


Ethane - Propane Maturity Plot



INTERPRETIVE PLOTS

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



Organization	Reporting Organization	Reporting Organization Name	Order Number	Entity Requesting Analysis	Purpose	Project														
	10206	Dolan Integration Group		Southern Petroleum Labs, Inc.																
Sample	COGCC Facility No.	Sample Date and Time	API #	LAB Sample ID	Sample Type	Matrix	Comments	Project Number	Chain of Custody ID	Date Received by Lab										
		11/12/21 10:00		DIG-026727		GAS			RMV 29-27	11/19/2021										
Batch	LabID	Lab Batch Identifier	Leach Date	Extract Date and Time	Extract Method	Start Date and Time	Conc Method	Init Vol	Final Vol	Init Vol Units	Final Vol Units	Analysis Date and Time	Report Basis	Comments	File Name	Column #				
	10206	21116736																		
Result	CAS Number	Analysis Name	Analysis Method	Analytical Method Modifier	Unit	Result Value	Qualifier	Test Type	Result Text	Data Flag	Dilution	Fraction Type	MDC	Requested MDC	Detection Limit	Instrument Detection Limit	Method Detection Limit	Comments	AnalyticalBatchID	
	O2+AR	OXYGEN + ARGON	SOP		MOL %	0.530									0.005	0.005	0.005		21116736	
	124-38-9	CARBON DIOXIDE	SOP		MOL %	0.005	ND								0.005	0.005	0.005		21116736	
	7727-37-9	NITROGEN (N2)	SOP		MOL %	2.507									0.005	0.005	0.005		21116736	
	7440-59-7	Helium	SOP		MOL %	0.005	ND								0.005	0.005	0.005		21116736	
	1333-74-0	HYDROGEN	SOP		MOL %	0.005	ND								0.005	0.005	0.005		21116736	
	74-82-8	METHANE	SOP		MOL %	92.580									0.005	0.005	0.005		21116736	
	74-84-0	ETHANE	SOP		MOL %	3.125									0.005	0.005	0.005		21116736	
	74-85-1	ETHENE	SOP		MOL %	0.005	ND								0.005	0.005	0.005		21116736	
	74-98-6	PROPANE	SOP		MOL %	0.698									0.005	0.005	0.005		21116736	
	75-28-5	ISOBUTANE	SOP		MOL %	0.169									0.005	0.005	0.005		21116736	
	106-97-8	N-BUTANE	SOP		MOL %	0.145									0.005	0.005	0.005		21116736	
	iC5	ISOPENTANE	SOP		MOL %	0.066									0.005	0.005	0.005		21116736	
	109-66-0	N-PENTANE	SOP		MOL %	0.045									0.005	0.005	0.005		21116736	
	92112-69-1+	C6+ (hexanes +)	SOP		MOL %	0.135									0.005	0.005	0.005		21116736	
	delta13C_C1	DELTA 13C C1	SOP		per mil	-35.1													21116736	
	deltaD_C1	DELTA D C1	SOP		per mil	-159													21116736	
	delta13C_C2	DELTA 13C C2	SOP		per mil	-24.6													21116736	
	delta13C_C3	DELTA 13C C3	SOP		per mil	-23.9				Low Signal									21116736	
	BTU	BRITISH THERMAL UNITS	SOP		BTU/cuft	1029													21116736	
	SpGrav	SPECIFIC GRAVITY	SOP		No Unit	0.599													21116736	

JOB 2111736-6738 DEG-06727-729

SPL, Inc.
Analysis Request Chain of Custody Record

SPL

SPL Work Order No.:	Acct. Mate Code:	Dept. Code	Page	Pages
			1	1

Report To: (Company Name):	SPL Inc. Greeley, CO	Project/Station Name:	Project/Station Number:	Project/Station Location:	Special Instructions:	Requested TAT*
Address:						6-10 Business days
City/State/Zip:						
Contact:						
Phone:						

Net 30 day Acct. ☐ Check # ☐
Credit Card ☐ <<<Contact SPL, Inc for CC payment arrangements.

* Surcharges May Apply (See quote for details)

Invoice To: (Company Name):	SPL Inc. Greeley, CO
Address:	
City/State/Zip:	
Contact:	
Phone:	
Client PO# or Ref. No.:	
Contract/Proposal #: (i.e. SPLQ####)	

† Terms: Cylinders will be rented for $10/cyl. All cylinders checked out are to be returned within 21 days, whether they contain sample or not. Cylinders not returned after 30 days will be considered lost and will be billed at current replacement cost.

Sample ID used to log/track sample)	Sample Date	Sample Time	Sample Type (Gas/Liq. /Solid)	Duplicate	Composite	Spot	Cylinder Tracking Info† Cylinder #	Date Out	Date In	Requested Analysis (Place an "X" next to Sample ID below): Gas Compositional	Stable Isotope Analysis								Temperature	PSI	Comments
RMV 29-27	11/12/2021	10:00 a.m.	Gas				-00887			X	X										
RMV 29-27	11/12/2021	10:00 a.m.	Gas				-01823			X	X										DUPLICATE
GV 22-29	11/12/2021	11:00 a.m.	Gas				-00808			X	X										
GV 22-29	11/12/2021	11:15 a.m.	Gas				-01848			X	X										DUPLICATE
GM 230-34	11/12/2021	11:30 a.m.	Gas				-01047			X	X										
GM 230-34	11/12/2021	11:45 a.m	Gas				-00479			X	X										DUPLICATE

Sampled By-Print Name:	Brandon Sagrillo			Received By-Company:	SPL INC	
Signature:						
Relinquished By-Print Name:	Brandon Sagrillo	11/12/2021	12:30 a.m.	Received By-Print Name:	RALEIGH JACOBS	Date: 11/15/21 Time: 10:00
Signature:				Signature:		
Relinquished By-Print Name:		Date:	Time:	Received By-Print Name:		Date: 11-18-21 Time: 1300
Signature:				Signature:		
Relinquished By-Print Name:		Date:	Time:	Received By-Print Name:		Date: Time:
Signature:				Signature:		

Note - As a convenience to our clients, this form is available in an electronic format. Please contact one of our offices above for the form to be e-mailed to you.