



**dig**  
Dolan Integration Group

Geochemistry for Energy

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

**Job #:** 16070657  
**Lab #:** DIG-009448  
**Client:** NGL Solutions  
**Sample Name:** NGL C6A

# Analytical Report



Job #: 16070657  
Lab #: DIG-009448  
Client: NGL Solutions  
Sample Name: NGL C6A  
Date Sampled: 07/18/16  
Time Sampled:  
Sample Description: Cylinder  
Sampling Notes: Bradenhead  
Date Received: 07/18/16  
Date Analyzed: Gas Composition: 7/20/16,  $\delta^{13}\text{C}$ : 7/19/16,  $\delta\text{D}$ : 7/27/16  
Date Reported: 07/28/16  
Comments:

Measured Values:	Measured ppm	Analyte mol % <sup>a</sup>	HC mol %	$\delta^{13}\text{C}$ ‰ VPDB	$\delta\text{D}$ ‰ VSMOW	Comments
Nitrogen (N <sub>2</sub> )	19472	1.88	-	-	-	
Oxygen + Argon (O <sub>2</sub> +Ar)	32001	3.09	-	-	-	
Carbon Dioxide (CO <sub>2</sub> )	235	0.0	-	-	-	
Helium (He) <sup>b</sup>	210	0.02	-	-	-	
Hydrogen (H <sub>2</sub> )	213	0.02	-	-	-	
Methane (CH <sub>4</sub> )	839370	81.02	85.30	-45.9	-214	
Ethane (C <sub>2</sub> H <sub>6</sub> )	79958	7.72	8.13	-27.4	-	
Propane (C <sub>3</sub> H <sub>8</sub> )	35618	3.44	3.62	-26.0	-	
iso-Butane (C <sub>4</sub> H <sub>10</sub> )	8260	0.8	0.84	-27.4	-	
n-Butane (C <sub>4</sub> H <sub>10</sub> )	11798	1.14	1.20	-26.7	-	
iso-Pentane (C <sub>5</sub> H <sub>12</sub> )	3855	0.37	0.39	-28.3	-	
n-Pentane (C <sub>5</sub> H <sub>12</sub> )	2953	0.29	0.30	-27.4	-	
Hexanes + (C <sub>6</sub> H <sub>14</sub> )	2252	0.22	0.23	na	-	

Calculated Values:	
Total HCs (ppm)	984064
Gas Wetness (mol % C <sub>2</sub> +C <sub>1</sub> +) )	14.70
C <sub>1</sub> /(C <sub>2</sub> +C <sub>3</sub> ) (mol/mol)	7

<sup>a</sup> Analyte concentrations normalized to 100% (Mol. % is approximately equal to Vol. % )

HC= Hydrocarbons

nd = not detected

na = not analyzed

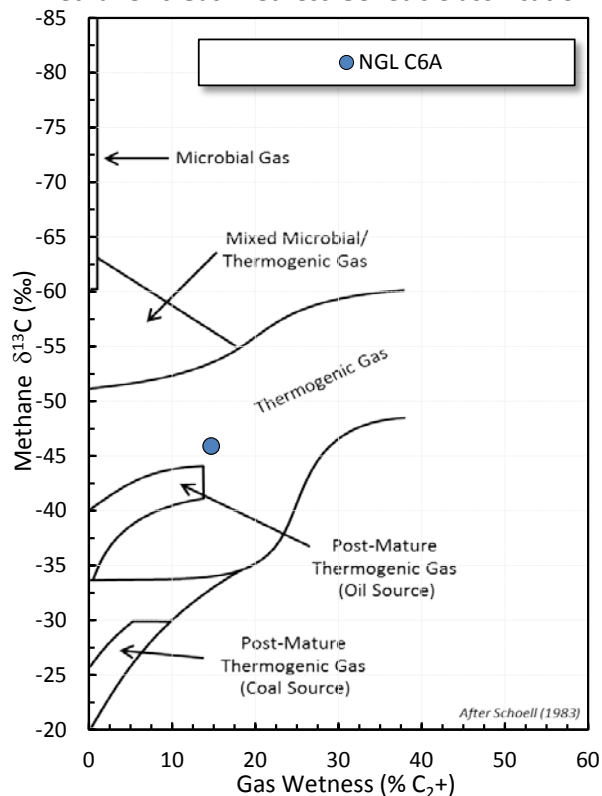
Stable isotope results based on multi-point laboratory calibration

Error  $\delta^{13}\text{C}$  < 0.5 ‰

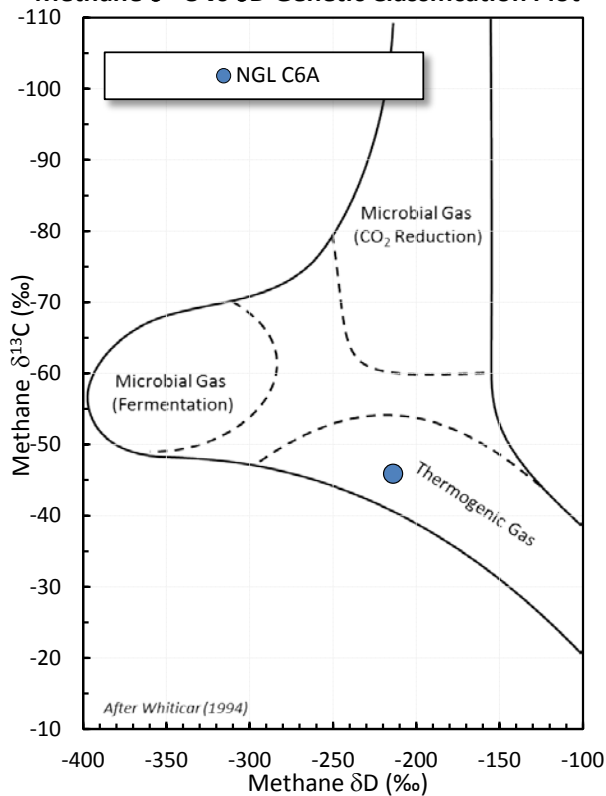
Error  $\delta\text{D}$  < 5.0 ‰

Values in red represent low peak heights. Interpret with caution.

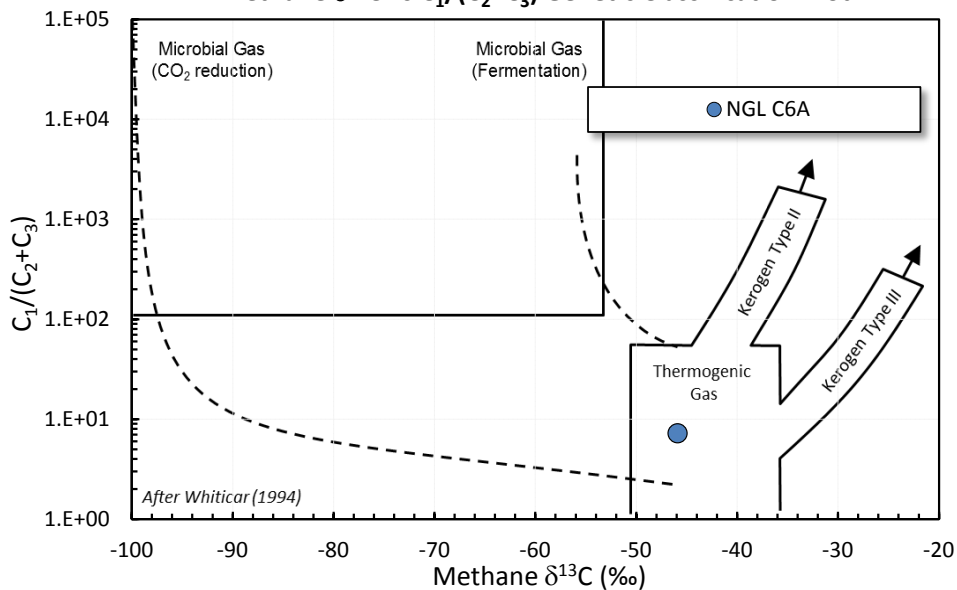
**Methane vs Gas Wetness Genetic Classification**



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



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



Organization	Reporting Organization	Reporting Organization Name	Order Number	Entity Requesting Analysis	Purpose	Project													
Sample	COGCC Facility No.	Dolan Integration Group	API #	NGL Solutions	Sample Type	Matrix	Comments	Project Number	Chain of Custody ID	Date Received by Lab									
		7/18/16 0:00		LAB Sample ID		GAS				7/18/2016									
Batch	LabID	Lab Batch Identifier	Leach Date	DIG-009448	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 #		
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
	02+AR	OXYGEN + ARGON	SOP		MOL %	3.09									0.005	0.005	0.005		16070657
	124-38-9	CARBON DIOXIDE	SOP		MOL %	0.02									0.005	0.005	0.005		16070657
	7727-37-9	NITROGEN (N2)	SOP		MOL %	1.88									0.005	0.005	0.005		16070657
	7440-59-7	Helium	SOP		MOL %	0.02									0.005	0.005	0.005		16070657
	1333-74-0	HYDROGEN	SOP		MOL %	0.02									0.005	0.005	0.005		16070657
	74-82-8	METHANE	SOP		MOL %	81.02									0.005	0.005	0.005		16070657
	74-84-0	ETHANE	SOP		MOL %	7.72									0.005	0.005	0.005		16070657
	74-98-6	PROPANE	SOP		MOL %	3.44									0.005	0.005	0.005		16070657
	75-28-5	ISOBUTANE	SOP		MOL %	0.80									0.005	0.005	0.005		16070657
	106-97-8	N-BUTANE	SOP		MOL %	1.14									0.005	0.005	0.005		16070657
	iC5	ISOPENTANE	SOP		MOL %	0.37									0.005	0.005	0.005		16070657
	109-66-0	N-PENTANE	SOP		MOL %	0.29									0.005	0.005	0.005		16070657
	92112-69-1+	C6+ (hexanes +)	SOP		MOL %	0.22									0.005	0.005	0.005		16070657