



dig
Dolan Integration Group

Geochemistry for Energy

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Hydrocarbon Gas Composition and Stable Isotopes Data and Interpretation

Job #: 21116728
Lab #: DIG-026715
Client: Fremont Environmental Inc.
Well Name: NORDMAN 42-20X
API #: 05-039-06541

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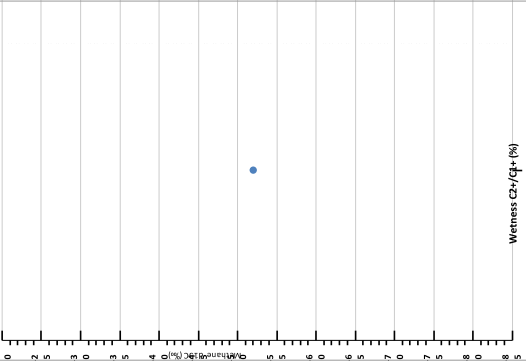
Client/Well Name: Fremont Environmental Inc. / NORDMAN 42-20X
Job #: 2116728
Lab #: DIG-026715

SAMPLE INFORMATION				COMPLETE GAS ANALYSIS										HYDROCARBON GAS ANALYSIS (normalised to total HC content)										BTU CONTENT**		
Job Number	Lab Number	Sample Date	Sample Type	Well Name	GC Date	N2	CO2	C1	C2	C3	iC4	nC4	iC5	nC5	C6+	CH4	H2	H2	C7	iC8	nC8	C9	C10	HC only BTU/B3	HC + N2 BTU/B3	
2116728	DIG-026715	11/16/21	Gas	NORMAN 42-20X Gas	11/19/2021	17352	34391	50562	17082	15330	15981	58962	6773	3446	3991	41302	285	285	1770	184	6.29	0.73	0.37	1545	1553	
SAMPLE INFORMATION				HYDROCARBON RATIOS										STABLE ISOTOPE ANALYSIS										SPECIFIC GRAVITY**		
Job Number	Lab Number	Sample Date	Sample Type	Well Name	Total HC	Witness	Balance Ratio	C2/C2+C3	C3/C2+C3	Mass Spec	d13C1	d13C2	d13C3	d13C4	d13C5	d13C6	d13C7	d13C8	d13C9	d13C10	d13C11	d13C12	d13C13	d13C14	HC only Specific Gravity	HC + N2 Specific Gravity
2116728	DIG-026715	11/16/21	Gas	NORMAN 42-20X Gas	493156	48.4	2.7	1.5	1.5	11/24/2021	-32.0	-36.8	-32.2	-34.5	-27.2	-28.2	-4.1	-279	-279	-27.2	-28.2	-4.1	-279	0.975	0.954	

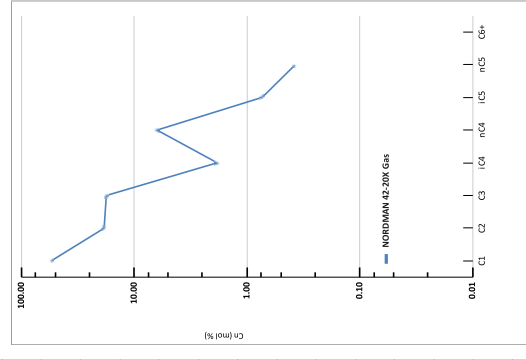
Stable isotope results based on multi-point laboratory calibration
Values in red highlight sample with carbon

* As ideal gas, with gas concentrations normalised to 100%,
calculation based on d13C 21.45 dp physical constants.

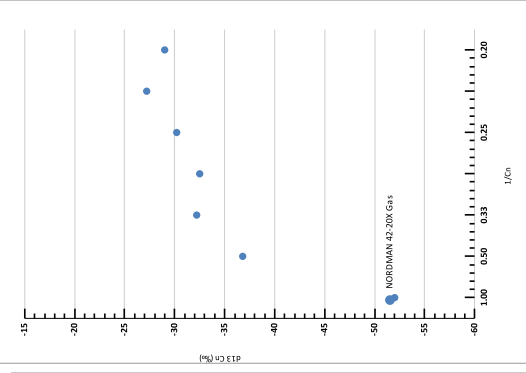
Methane d13C vs Wetness Genetic Classification Plot



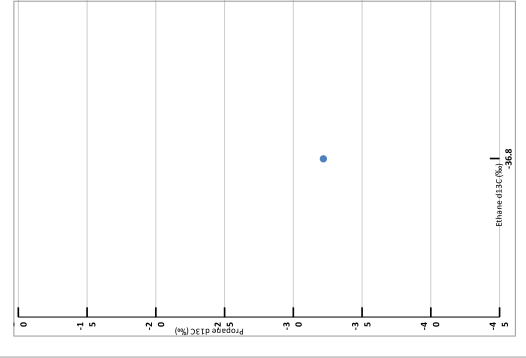
Hydrocarbon Composition Plot



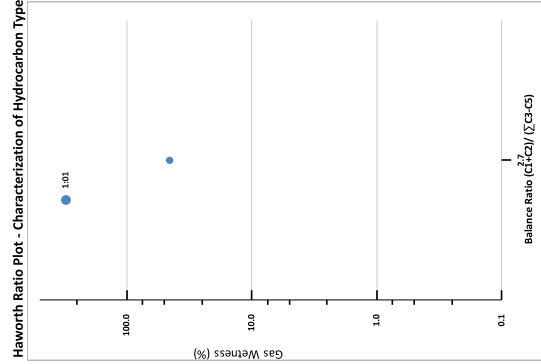
Mixing Plot



Ethane - Propane Maturity Plot



Haworth Ratio Plot - Characterization of Hydrocarbon Type



INTERPRETIVE PLOTS

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Organization	Reporting Organization				Entity Requesting Analysis				Project				Chain of Custody ID				Date Received by Lab			
	10206	COGCC Facility No.	Sample Date and Time	Order Number	Lab Sample ID	LAB Sample ID	Sample Type	Purpose	Matrix	Comments	Project Number	Final Vol	Final Vol	Final Vol	Final Vol	Final Vol	Final Vol	Final Vol	Final Vol	Final Vol
Sample	10206		11/16/21 10:00	039-06541	039-06541	039-06541	SAS													
Batch																				
Result																				
LSD Number	Analysis Name				Analytical Method				Unit				Result Value				Qualifier			
	Analysis Name				Analytical Method				Unit				Result Value				Qualifier			
	124-38-9	CHLORINE	SOP	SOP	124-38-9	CHLORINE	SOP	SOP	124-38-9	CHLORINE	SOP	SOP	124-38-9	CHLORINE	SOP	SOP	124-38-9	CHLORINE	SOP	SOP
	7727-37-9	NITROGEN (N2)	SOP	SOP	7727-37-9	NITROGEN (N2)	SOP	SOP	7727-37-9	NITROGEN (N2)	SOP	SOP	7727-37-9	NITROGEN (N2)	SOP	SOP	7727-37-9	NITROGEN (N2)	SOP	SOP
	7440-59-7	Helium	SOP	SOP	7440-59-7	Helium	SOP	SOP	7440-59-7	Helium	SOP	SOP	7440-59-7	Helium	SOP	SOP	7440-59-7	Helium	SOP	SOP
	1333-74-0	HYDROGEN	SOP	SOP	1333-74-0	HYDROGEN	SOP	SOP	1333-74-0	HYDROGEN	SOP	SOP	1333-74-0	HYDROGEN	SOP	SOP	1333-74-0	HYDROGEN	SOP	SOP
	74-82-8	METHANE	SOP	SOP	74-82-8	METHANE	SOP	SOP	74-82-8	METHANE	SOP	SOP	74-82-8	METHANE	SOP	SOP	74-82-8	METHANE	SOP	SOP
	74-84-0	ETHANE	SOP	SOP	74-84-0	ETHANE	SOP	SOP	74-84-0	ETHANE	SOP	SOP	74-84-0	ETHANE	SOP	SOP	74-84-0	ETHANE	SOP	SOP
	74-85-1	ETHENE	SOP	SOP	74-85-1	ETHENE	SOP	SOP	74-85-1	ETHENE	SOP	SOP	74-85-1	ETHENE	SOP	SOP	74-85-1	ETHENE	SOP	SOP
	74-98-6	PROPANE	SOP	SOP	74-98-6	PROPANE	SOP	SOP	74-98-6	PROPANE	SOP	SOP	74-98-6	PROPANE	SOP	SOP	74-98-6	PROPANE	SOP	SOP
	75-28-5	ISOBUTANE	SOP	SOP	75-28-5	ISOBUTANE	SOP	SOP	75-28-5	ISOBUTANE	SOP	SOP	75-28-5	ISOBUTANE	SOP	SOP	75-28-5	ISOBUTANE	SOP	SOP
	106-97-8	N-BUTANE	SOP	SOP	106-97-8	N-BUTANE	SOP	SOP	106-97-8	N-BUTANE	SOP	SOP	106-97-8	N-BUTANE	SOP	SOP	106-97-8	N-BUTANE	SOP	SOP
	ICS	N-PENTANE	SOP	SOP	ICS	N-PENTANE	SOP	SOP	ICS	N-PENTANE	SOP	SOP	ICS	N-PENTANE	SOP	SOP	ICS	N-PENTANE	SOP	SOP
	109-66-0	N-PENTANE	SOP	SOP	109-66-0	N-PENTANE	SOP	SOP	109-66-0	N-PENTANE	SOP	SOP	109-66-0	N-PENTANE	SOP	SOP	109-66-0	N-PENTANE	SOP	SOP
	92112-69-1+	CP- (Heptene+)	SOP	SOP	92112-69-1+	CP- (Heptene+)	SOP	SOP	92112-69-1+	CP- (Heptene+)	SOP	SOP	92112-69-1+	CP- (Heptene+)	SOP	SOP	92112-69-1+	CP- (Heptene+)	SOP	SOP
	delta13C_C1	delta13C_C1	SOP	SOP	delta13C_C1	delta13C_C1	SOP	SOP	delta13C_C1	delta13C_C1	SOP	SOP	delta13C_C1	delta13C_C1	SOP	SOP	delta13C_C1	delta13C_C1	SOP	SOP
	delta13C_C2	delta13C_C2	SOP	SOP	delta13C_C2	delta13C_C2	SOP	SOP	delta13C_C2	delta13C_C2	SOP	SOP	delta13C_C2	delta13C_C2	SOP	SOP	delta13C_C2	delta13C_C2	SOP	SOP
	delta13C_C3	delta13C_C3	SOP	SOP	delta13C_C3	delta13C_C3	SOP	SOP	delta13C_C3	delta13C_C3	SOP	SOP	delta13C_C3	delta13C_C3	SOP	SOP	delta13C_C3	delta13C_C3	SOP	SOP
	delta13C_C4	delta13C_C4	SOP	SOP	delta13C_C4	delta13C_C4	SOP	SOP	delta13C_C4	delta13C_C4	SOP	SOP	delta13C_C4	delta13C_C4	SOP	SOP	delta13C_C4	delta13C_C4	SOP	SOP
	delta13C_nC4	delta13C_nC4	SOP	SOP	delta13C_nC4	delta13C_nC4	SOP	SOP	delta13C_nC4	delta13C_nC4	SOP	SOP	delta13C_nC4	delta13C_nC4	SOP	SOP	delta13C_nC4	delta13C_nC4	SOP	SOP
	delta13C_nC5	delta13C_nC5	SOP	SOP	delta13C_nC5	delta13C_nC5	SOP	SOP	delta13C_nC5	delta13C_nC5	SOP	SOP	delta13C_nC5	delta13C_nC5	SOP	SOP	delta13C_nC5	delta13C_nC5	SOP	SOP
	delta13C_CO2	delta13C_CO2	SOP	SOP	delta13C_CO2	delta13C_CO2	SOP	SOP	delta13C_CO2	delta13C_CO2	SOP	SOP	delta13C_CO2	delta13C_CO2	SOP	SOP	delta13C_CO2	delta13C_CO2	SOP	SOP
	BTU	BRITISH THERMAL UNITS	SOP	SOP	BTU	BRITISH THERMAL UNITS	SOP	SOP	BTU	BRITISH THERMAL UNITS	SOP	SOP	BTU	BRITISH THERMAL UNITS	SOP	SOP	BTU	BRITISH THERMAL UNITS	SOP	SOP
	SGrav	SPECIFIC GRAVITY	SOP	SOP	SGrav	SPECIFIC GRAVITY	SOP	SOP	SGrav	SPECIFIC GRAVITY	SOP	SOP	SGrav	SPECIFIC GRAVITY	SOP	SOP	SGrav	SPECIFIC GRAVITY	SOP	SOP



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JOB 21116728
DIG-026715

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Phone: 303.7956.874	Phone:	Sampled by: PH
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Turnaround Time**:	<input checked="" type="radio"/> Standard (≤ 10 Business days)	<input type="radio"/> Rush (≤ 5 Business days)	<input type="radio"/> Expedited Rush (≤ 3 Business days)

[illegible]

Chain of Custody Record						Comments:		
	Relinquished by Signature	Company	Date	Time	Received by Signature	Company	Date	Time
	<i>[Signature]</i>	FIRE MGMT	11/16/21	1500	<i>[Signature]</i>	U.S.	11-16-21	1500

⁶ Gas composition was 15% CO_2 . Gas composition is a mix of the concentration (ppm) of gases with in the background of the sample. Background is measured at the 100. The 100 is a specific analysis technique used with a multi-analyte gas that the total dissolved gas for each species in the water sample (mg/L). Why not use the other? Gas composition given as a ratio, general, talk at relative concentrations and ratios (e.g., gas witness, 100:75 gives us an idea of the ratio of the two gases in the water). Quoted as (Gaseous gas at 100:75:25:25).

*** Rush and Expedite Run to around time and cost will incur additional costs at 2x and 3x the standard turnaround time price respectively. Rush price is for a single piece, as opposed to the volume quantities. Rush price is for a 200-300 piece order.