



EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY: **05-103-10405** NAME/DESCRIP : **YCF 34-44-1**
 LEASE #: **COC - 059394** **PRODUCTION CASING**
 FIELD/AREA:

PROJECT NO. : **202409057** ANALYSIS NO. : **01**
 COMPANY NAME : **QB ENERGY OPERATING, LLC** ANALYSIS DATE: **SEPTEMBER 20, 2024 10:04**
 OFFICE / BRANCH: **PARACHUTE, CO** SAMPLE DATE : **SEPTEMBER 9, 2024 12:00**
 CUSTOMER REF: TO:
 PRODUCER : **QB ENERGY OPERATING, LLC** EFFECTIVE DATE:

*****FIELD DATA*****

SAMPLE CYCLE: SAMPLE TYPE: SPOT
 SAMPLE PRES. : 1100 psig PROBE : NO
 FLOW PRES. : psig CYLINDER NO. : ECA-743
 LAB PRES: psig SAMPLED BY : JUSTIN STEELE
 SAMPLE TEMP. : 60 °f SAMPLING COMPANY: **QB ENERGY OPERATING, LLC**
 AMBIENT TEMP.: °f H2S BY STAIN TUBE: - ppm mol
 H2O BY STAIN TUBE: - #/mmcf CO2 BY STAIN TUBE: - Mol %
 FIELD COMMENTS:
 LAB COMMENTS:

COMPONENT	MOLE %	MASS %	GPM @	
			14.65	14.73
ALCOHOLS	0.1082	0.1880	0.0140	0.0141
HELIUM	0.01	0.00	---	---
HYDROGEN	0.67	0.07	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.45	0.68	---	---
CARBON DIOXIDE	0.30	0.71	---	---
METHANE	86.9431	75.1582	---	---
ETHANE	7.3372	11.8882	1.9562	1.9669
PROPANE	2.7609	6.5602	0.7587	0.7628
I-BUTANE	0.5496	1.7213	0.1789	0.1799
N-BUTANE	0.5475	1.7147	0.1719	0.1729
I-PENTANE	0.1619	0.6292	0.0600	0.0603
N-PENTANE	0.1025	0.3985	0.0370	0.0372
HEXANES PLUS	0.0591	0.2817	0.0220	0.0220
TOTALS	100.00000	100.00000	3.1987	3.2161

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0000	0.0000
TOLUENE	0.0001	0.0005
ETHYLBENZENE	0.0000	0.0000
XYLENES	0.0000	0.0000
TOTAL BTEX	0.0001	0.0005

	CALCULATED VALUES**	
	14.65	14.73
BTU @		
LHV NET DRY REAL :	1020.8 /scf	1026.4 /scf
NET WET REAL :	1003.0 /scf	1008.6 /scf
HHV GROSS DRY REAL :	1129.0 /scf	1135.2 /scf
GROSS WET REAL :	1109.3 /scf	1115.5 /scf
NET HEATING VALUE (60 °F ideal reaction):		20885.3 Btu/lbm
GROSS HEATING VALUE (60°F ideal reaction):		23100.6 Btu/lbm
RELATIVE DENSITY (AIR=1):		0.6407
DENSITY		0.04890 lbm/scf
COMPRESSIBILITY FACTOR :		0.9973
REGULAR WOBBE INDEX		1411.1

*(DETAILED HYDROCARBON ANALYSIS/NJ 1993)

Mod ASTM D6730, GPA 2261 & GPA 2286.

** (CALC: GPA 2172, GPA 2145 & TP-17 @14.696 & 60 F)

The data presented herein has been acquired by means of current analytical techniques and represents the judicious conclusion EMPACT Analytical Systems, Inc. Results of the analysis can be affected by the sampling conditions, therefore, are only warranted through proper lab protocol. EMPACT assumes no responsibility for interpretation or any consequences from application of the reported information and is the sole liability of the user. The reproduction in any media of this reported information may not be made, in portion or as a whole, without the written permission of EMPACT Analytical Systems, Inc.



**EXTENDED NATURAL GAS ANALYSIS (*DHA)
GLYCALC INFORMATION**

PROJECT NO. :	202409057	ANALYSIS NO. :	01
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	SEPTEMBER 20, 2024 10:04
ACCOUNT NO. :		SAMPLE DATE :	SEPTEMBER 9, 2024 12:00
PRODUCER :	QB ENERGY OPERATING, LLC	CYLINDER NO. :	ECA-743
LEASE NO. :	COC - 059394	SAMPLED BY :	JUSTIN STEELE
NAME/DESCRIP :	YCF 34-44-1		
	PRODUCTION CASING		

FIELD DATA		SAMPLE TEMP. :	60
SAMPLE PRES. :	1100	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	—		
COMMENTS :	<i>SPOT</i>		<i>NO PROBE</i>

<u>Componet</u>	<u>Mole %</u>	<u>Wt %</u>
Helium	0.01	0.00
Hydrogen	0.67	0.07
Carbon Dioxide	0.30	0.71
Nitrogen	0.45	0.68
Methane	86.9431	75.1582
Ethane	7.3372	11.8882
Propane	2.7609	6.5602
Isobutane	0.5496	1.7213
n-Butane	0.5475	1.7147
Isopentane	0.1602	0.6228
n-Pentane	0.1025	0.3985
Cyclopentane	0.0017	0.0064
n-Hexane	0.0159	0.0738
Cyclohexane	0.0013	0.0059
Other Hexanes	0.0365	0.1693
Heptanes	0.0040	0.0214
Methylcyclohexane	0.0004	0.0021
2,2,4 Trimethylpentane	0.0000	0.0000
Benzene	0.0000	0.0000
Toluene	0.0001	0.0005
Ethylbenzene	0.0000	0.0000
Xylenes	0.0000	0.0000
C8+ Heavies	0.0009	0.0087
<u>Subtotal</u>	<u>99.89180</u>	<u>99.81200</u>
Oxygen/Argon	0.00	0.00
Alcohols	0.1082	0.1880
<u>Total</u>	<u>100.00000</u>	<u>100.00000</u>

	<u>Total</u>	<u>C6+</u>	<u>C8+</u>	<u>C10+</u>
Calculated Values BTU @ <u>14.65</u>	Sample	Fraction	Fraction	Fraction
LHV Net Dry Real:	1020.8	4548.0	9017.5	9422.9 Btu/scf
Net Wet Real:	1003.0	4468.5	8859.9	9258.2 Btu/scf
HHV Gross Dry Real:	1129.0	4908.7	9703.2	10137.9 Btu/scf
Gross Wet Real:	1109.3	4822.9	9533.6	9960.7 Btu/scf
Other Calculated Values				
Regualr Wobbe Index*	1411.1	2780.9	3907.2	3992.8 Btu/scf
Net Heating Value (60 °F ideal reaction):	20885.3	19346.9	19467.9	19487.0 Btu/lbm
Gross Heating Value (60°F ideal reaction):	23100.6	20879.7	20948.4	20965.5 Btu/lbm
Molar Mass (MW):	18.55907	88.483	179.689	187.871 g/mol
Relative Density (AIR=1):	0.6407	3.0552	6.2042	6.4868 SG
Density:	0.04890	0.23317	0.47351	0.49507 lbm/scf
Compressibility Factor:	0.9973	0.9871	0.9999	1.0000 Z
Liquid Volume real gas @:	<u>14.65</u>	18.0065	0.0219	0 gal/1000 scf

* The Wobbe pressure base in the number considered is based upon the given Pb of the HHV above.
 #DIV/0 or 0 (zero) will appear in the Calculated Value Section when there is no C6+, C8+ or C10+ in the sample to calculate these factors.
 BDL - Below Detection Limit. The H2S LOS has a detection limit of 0.25 ppm. A _ (an underscore) indicates there was no tube pulled for H2S.

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DHA COMPONENT LIST

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 SAMPLE PRES. : 1100 psig PROBE : **NO**
 FLOW PRES. : psig CYLINDER NO. : **ECA-743**
 LAB PRES: psig SAMPLED BY : **JUSTIN STEELE**
 SAMPLE TEMP. : 60 °f SAMPLING COMPANY: **QB ENERGY OPERATING, LLC**
 AMBIENT TEMP.: °f H2S BY STAIN TUBE: **- ppm mol**
 H2O BY STAIN TUBE: **- #/mmcf** CO2 BY STAIN TUBE: **- Mol %**
 FIELD COMMENTS:
 LAB COMMENTS:

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.65	GPM @ 14.73
Helium	---	0.01	0.00	---	---
Hydrogen	---	0.67	0.07	---	---
Oxygen/Argon	---	0.00	0.00	---	---
Nitrogen	---	0.45	0.68	---	---
Carbon Dioxide	---	0.30	0.71	---	---
Methane	P1	86.9431	75.1582	---	---
Ethane	P2	7.3372	11.8882	1.956	1.967
Propane	P3	2.7609	6.5602	0.759	0.763
i-Butane	I4	0.5496	1.7213	0.179	0.180
Methanol	X1	0.1077	0.1860	0.014	0.014
n-Butane	P4	0.5475	1.7147	0.172	0.173
2,2-Dimethylpropane	I5	0.0045	0.0175	0.002	0.002
i-Pentane	I5	0.1557	0.6053	0.057	0.057
n-Pentane	P5	0.1025	0.3985	0.037	0.037
t-Butanol	X4	0.0005	0.0020	0.000	0.000
2,2-Dimethylbutane	I6	0.0029	0.0135	0.001	0.001
Cyclopentane	N5	0.0017	0.0064	0.001	0.001
2,3-Dimethylbutane	I6	0.0043	0.0200	0.002	0.002
2-Methylpentane	I6	0.0186	0.0864	0.008	0.008
3-Methylpentane	I6	0.0079	0.0367	0.003	0.003
n-Hexane	P6	0.0159	0.0738	0.007	0.007
2,2-Dimethylpentane	I7	0.0003	0.0016	0.000	0.000
Methylcyclopentane	N6	0.0028	0.0127	0.001	0.001
2,4-Dimethylpentane	I7	0.0005	0.0027	0.000	0.000
2,2,3-Trimethylbutane	I7	0.0001	0.0005	0.000	0.000
3,3-Dimethylpentane	I7	0.0001	0.0005	0.000	0.000
Cyclohexane	N6	0.0013	0.0059	0.000	0.000
2-Methylhexane	I7	0.0009	0.0049	0.000	0.000
2,3-Dimethylpentane	I7	0.0002	0.0011	0.000	0.000
1,1-Dimethylcyclopentane	N7	0.0001	0.0005	0.000	0.000

3-Methylhexane	I7	0.0006	0.0032	0.000	0.000
1c,3-Dimethylcyclopentane	N7	0.0001	0.0005	0.000	0.000
1t,3-Dimethylcyclopentane	N7	0.0001	0.0005	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0002	0.0011	0.000	0.000
n-Heptane	P7	0.0008	0.0043	0.000	0.000
Methylcyclohexane	N7	0.0004	0.0021	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
Toluene	A7	0.0001	0.0005	0.000	0.000
3-Ethyloctane	I10	0.0001	0.0008	0.000	0.000
n-Undecane	P11	0.0001	0.0009	0.000	0.000
n-Dodecane	P12	0.0001	0.0009	0.000	0.000
n-Tridecane	P13	0.0001	0.0010	0.000	0.000
n-Tetradecane	P14	0.0001	0.0011	0.000	0.000
n-Pentadecane	P15	0.0001	0.0011	0.000	0.000
UnknownC15s	U15	0.0001	0.0011	0.000	0.000
UnknownC16s	U16	0.0001	0.0012	0.000	0.000
TOTAL		100.00000	100.00000	3.1987	3.2161

CALCULATED VALUES**

BTEX COMPONENTS	MOLE%	WT%	BTU @		
			14.65	14.73	
BENZENE	0.0000	0.0000	LHV NET DRY REAL :	1020.8 /scf	1026.4 /scf
TOLUENE	0.0001	0.0005	NET WET REAL :	1003.0 /scf	1008.6 /scf
ETHYLBENZENE	0.0000	0.0000	HHV GROSS DRY REAL :	1129.0 /scf	1135.2 /scf
XYLENES	0.0000	0.0000	GROSS WET REAL :	1109.3 /scf	1115.5 /scf
TOTAL BTEX	0.0001	0.0005	NET HEATING VALUE (60 °F ideal reaction):		20885.3 Btu/lbm
			GROSS HEATING VALUE (60°F ideal reaction):		23100.6 Btu/lbm
			RELATIVE DENSITY (AIR=1):		0.6407
			DENSITY		0.04890 lb/scf
			COMPRESSIBILITY FACTOR :		0.9973
			REGULAR WOBBE INDEX		1411.1

*(DETAILED HYDROCARBON ANALYSIS/NJ 1993)

Mod ASTM D6730, GPA 2261 & GPA 2286.

** (CALC: GPA 2172, GPA 2145 & TP-17 @14.696 & 60 F)

C6+ Fraction of DHA Gas Analysis @60°F, 14.696 psia

Net Dry Ideal BTU	<u>4503.6</u> /scf	Relative Density - SG (Air=1)	<u>3.0552</u>	C6+ factors
Gross Dry Ideal BTU	<u>4860.7</u> /scf	Z Compressibility Factor	<u>0.98713</u>	<u>0.98671</u>
Net Dry Ideal BTU	<u>19346.9</u> /lb	Density Factor	<u>233.173</u> lbm/1000 ft3	
Gross Dry Ideal BTU	<u>20879.7</u> /lb	Molar Mass or MW	<u>88.483</u> g/mol	
		Volume Liquid Ideal gas	<u>0.022</u> scf/gal	<u>24</u>

This hexanes plus fraction may be applied in place of published C6+ factors. The Z & GPM need additional calc for C6+ factors.
#DIV/0 or 0 (zero) will appear in this section when there is no hexanes plus in the sample to calculate C6+ factors.

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