



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

PROJECT NO. :	202408105	ANALYSIS NO. :	03
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	SEPTEMBER 03, 2024 15:09
ACCOUNT NO. :		SAMPLE DATE :	AUGUST 21, 2024 12:30
PRODUCER :	QB ENERGY OPERATING, LLC	CYLINDER NO. :	ECA-737
LEASE NO. :	035705	SAMPLED BY :	RYAN POZORSKI
NAME/DESCRIP :	PCU 297 T62-X11G2 PRODUCTION CASING		

FIELD DATA		SAMPLE TEMP. :	84
SAMPLE PRES. :	900	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	—		
COMMENTS :	<i>SPOT</i>		<i>NO PROBE</i>

<u>Componet</u>	<u>Mole %</u>	<u>Wt %</u>
Helium	0.00	0.00
Hydrogen	0.00	0.00
Carbon Dioxide	3.72	8.53
Nitrogen	0.08	0.12
Methane	86.9558	72.7212
Ethane	5.9584	9.3399
Propane	1.8890	4.3423
Isobutane	0.4357	1.3202
n-Butane	0.3886	1.1774
Isopentane	0.1683	0.6331
n-Pentane	0.1043	0.3923
Cyclopentane	0.0039	0.0143
n-Hexane	0.0403	0.1811
Cyclohexane	0.0179	0.0785
Other Hexanes	0.0838	0.3747
Heptanes	0.0780	0.4059
Methylcyclohexane	0.0571	0.2922
2,2,4 Trimethylpentane	0.0001	0.0006
Benzene	0.0145	0.0591
Toluene	0.0019	0.0091
Ethylbenzene	0.0000	0.0000
Xylenes	0.0001	0.0006
C8+ Heavies	0.0007	0.0048
<u>Subtotal</u>	<u>99.99840</u>	<u>99.99730</u>
Oxygen/Argon	0.00	0.00
Alcohols	0.0016	0.0027
<u>Total</u>	<u>100.00000</u>	<u>100.00000</u>

	Total	C6+	C8+	C10+
Calculated Values BTU @ <u>14.65</u>	Sample	Fraction	Fraction	Fraction
LHV Net Dry Real:	979.0	4636.4	6367.5	7862.8 Btu/scf
Net Wet Real:	961.9	4555.4	6256.2	7725.3 Btu/scf
HHV Gross Dry Real:	1083.1	4987.3	6913.5	8836.6 Btu/scf
Gross Wet Real:	1064.2	4900.1	6792.6	8682.1 Btu/scf
Other Calculated Values				
Regualr Wobbe Index*	1331.7	2788.9	3317.9	3779.2 Btu/scf
Net Heating Value (60 °F ideal reaction):	19379.0	19217.4	18675.2	18336.6 Btu/lbm
Gross Heating Value (60°F ideal reaction):	21441.6	20670.8	20272.4	20592.5 Btu/lbm
Molar Mass (MW):	19.1829	91.639	126.229	159.289 g/mol
Relative Density (AIR=1):	0.6621	3.1639	4.3583	5.4999 SG
Density:	0.05055	0.24149	0.33264	0.41975 lbm/scf
Compressibility Factor:	0.9974	0.9916	0.9988	0.9999 Z
Liquid Volume real gas @:	<u>14.65</u>	17.8819	0.1186	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.

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)

DHA COMPONENT LIST

PRIMARY DB KEY: **05-103-10589** NAME/DESCRIP : **PCU 297 T62-X11G2**
 LEASE #: **035705** **PRODUCTION CASING**
 FIELD/AREA: **PICEANCE CREEK - #68800**

PROJECT NO. : **202408105** ANALYSIS NO. : **03**
 COMPANY NAME : **QB ENERGY OPERATING, LLC** ANALYSIS DATE: **SEPTEMBER 03, 2024 15:09**
 OFFICE / BRANCH: **PARACHUTE** SAMPLE DATE : **AUGUST 21, 2024 12:30**
 CUSTOMER REF: TO:
 PRODUCER : **QB ENERGY OPERATING, LLC** EFFECTIVE DATE:

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

SAMPLE CYCLE: SAMPLE TYPE: **SPOT**
 SAMPLE PRES. : **900** psig PROBE : **NO**
 FLOW PRES. : psig CYLINDER NO. : **ECA-737**
 LAB PRES: psig SAMPLED BY : **RYAN POZORSKI**
 SAMPLE TEMP. : **84** °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	---	0.00	0.00	---	---
Hydrogen	---	0.00	0.00	---	---
Oxygen/Argon	---	0.00	0.00	---	---
Nitrogen	---	0.08	0.12	---	---
Carbon Dioxide	---	3.72	8.53	---	---
Methane	P1	86.9558	72.7212	---	---
Ethane	P2	5.9584	9.3399	1.588	1.597
Propane	P3	1.8890	4.3423	0.519	0.522
i-Butane	I4	0.4357	1.3202	0.142	0.143
Methanol	X1	0.0016	0.0027	0.000	0.000
n-Butane	P4	0.3886	1.1774	0.122	0.123
2,2-Dimethylpropane	I5	0.0040	0.0151	0.002	0.002
i-Pentane	I5	0.1643	0.6180	0.060	0.060
n-Pentane	P5	0.1042	0.3919	0.038	0.038
2,2-Dimethylbutane	I6	0.0050	0.0225	0.002	0.002
Cyclopentane	N5	0.0039	0.0143	0.001	0.001
2,3-Dimethylbutane	I6	0.0082	0.0369	0.003	0.003
2-Methylpentane	I6	0.0337	0.1514	0.014	0.014
3-Methylpentane	I6	0.0198	0.0889	0.008	0.008
UnknownC5s	U5	0.0001	0.0004	0.000	0.000
n-Hexane	P6	0.0403	0.1811	0.017	0.017
2,2-Dimethylpentane	I7	0.0013	0.0068	0.001	0.001
Methylcyclopentane	N6	0.0171	0.0750	0.006	0.006
2,4-Dimethylpentane	I7	0.0020	0.0104	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0005	0.0026	0.000	0.000
Benzene	A6	0.0145	0.0591	0.004	0.004
3,3-Dimethylpentane	I7	0.0008	0.0042	0.000	0.000
Cyclohexane	N6	0.0179	0.0785	0.006	0.006
2-Methylhexane	I7	0.0115	0.0601	0.005	0.005
2,3-Dimethylpentane	I7	0.0028	0.0147	0.001	0.001

1,1-Dimethylcyclopentane	N7	0.0024	0.0123	0.001	0.001
3-Methylhexane	I7	0.0106	0.0554	0.005	0.005
1c,3-Dimethylcyclopentane	N7	0.0035	0.0179	0.002	0.002
1t,3-Dimethylcyclopentane	N7	0.0033	0.0169	0.002	0.002
3-Ethylpentane	I7	0.0005	0.0026	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0053	0.0271	0.002	0.002
2,2,4-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
n-Heptane	P7	0.0327	0.1708	0.015	0.015
1c,2-Dimethylcyclopentane	N7	0.0004	0.0020	0.000	0.000
Methylcyclohexane	N7	0.0571	0.2922	0.023	0.023
1,1,3-Trimethylcyclopentane	N7	0.0001	0.0006	0.000	0.000
Ethylcyclopentane	N7	0.0003	0.0015	0.000	0.000
Toluene	A7	0.0019	0.0091	0.001	0.001
3-Methylheptane	I8	0.0001	0.0006	0.000	0.000
n-Octane	P8	0.0001	0.0006	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0001	0.0006	0.000	0.000
n-Nonane	P9	0.0001	0.0007	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0001	0.0006	0.000	0.000
1,2,3-Trimethylbenzene	A9	0.0001	0.0006	0.000	0.000
1,3-Methyl-n-butylbenzene	A11	0.0001	0.0008	0.000	0.000
n-Dodecane	P12	0.0001	0.0009	0.000	0.000
TOTAL		100.00000	100.00000	2.5907	2.6047

CALCULATED VALUES**

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.65	14.73
BENZENE	0.0145	0.0591	LHV NET DRY REAL :	979.0 /scf	984.4 /scf
TOLUENE	0.0019	0.0091	NET WET REAL :	961.9 /scf	967.3 /scf
ETHYLBENZENE	0.0000	0.0000	HHV GROSS DRY REAL :	1083.1 /scf	1089.0 /scf
XYLENES	0.0001	0.0006	GROSS WET REAL :	1064.2 /scf	1070.1 /scf
TOTAL BTEX	0.0165	0.0688	NET HEATING VALUE (60 °F ideal reaction):		19379.0 Btu/lbm
			GROSS HEATING VALUE (60°F ideal reaction):		21441.6 Btu/lbm
			RELATIVE DENSITY (AIR=1):		0.6621
			DENSITY		0.05055 lb/scf
			COMPRESSIBILITY FACTOR :		0.9974
			REGULAR WOBBE INDEX		1331.7

*(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>4611.8</u> /scf	Relative Density - SG (Air=1)	<u>3.1639</u>	C6+ factors
Gross Dry Ideal BTU	<u>4960.8</u> /scf	Z Compressibility Factor	<u>0.99158</u>	<u>0.9911</u>
Net Dry Ideal BTU	<u>19217.4</u> /lb	Density Factor	<u>241.49</u> lbm/1000 ft3	
Gross Dry Ideal BTU	<u>20670.8</u> /lb	Molar Mass or MW	<u>91.639</u> g/mol	
		Volume Liquid Ideal gas	<u>0.119</u> scf/gal	<u>24.7</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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