





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

PROJECT NO. :	202408105	ANALYSIS NO. :	01
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	SEPTEMBER 03, 2024 11:19
ACCOUNT NO. :		SAMPLE DATE :	AUGUST 21, 2024 12:00
PRODUCER :	QB ENERGY OPERATING, LLC	CYLINDER NO. :	TBI-554
LEASE NO. :	035705	SAMPLED BY :	RYAN POZORSKI
NAME/DESCRIP :	PCU 297 T62-X11G2 SURFACE CASING		

***FIELD DATA***		SAMPLE TEMP. :	84
SAMPLE PRES. :	942	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	0.02	0.00
Carbon Dioxide	2.51	6.02
Nitrogen	0.23	0.35
Methane	89.6512	78.4086
Ethane	5.3277	8.7336
Propane	1.4561	3.5005
Isobutane	0.2444	0.7744
n-Butane	0.2273	0.7202
Isopentane	0.0607	0.2388
n-Pentane	0.0513	0.2018
Cyclopentane	0.0017	0.0065
n-Hexane	0.0307	0.1443
Cyclohexane	0.0127	0.0583
Other Hexanes	0.0491	0.2297
Heptanes	0.0441	0.2400
Methylcyclohexane	0.0195	0.1044
2,2,4 Trimethylpentane	0.0000	0.0000
Benzene	0.0080	0.0341
Toluene	0.0060	0.0302
Ethylbenzene	0.0002	0.0011
Xylenes	0.0016	0.0092
C8+ Heavies	0.0265	0.1722
<u>Subtotal</u>	<u>99.98880</u>	<u>99.97790</u>
Oxygen/Argon	0.01	0.02
Alcohols	0.0012	0.0021
<u>Total</u>	<u>100.00000</u>	<u>100.00000</u>

	<b>Total</b>	<b>C6+</b>	<b>C8+</b>	<b>C10+</b>
<b>Calculated Values BTU @ <u>14.65</u></b>	<b>Sample</b>	<b>Fraction</b>	<b>Fraction</b>	<b>Fraction</b>
LHV Net Dry Real:	961.9	4775.9	5913.9	7577.8 Btu/scf
Net Wet Real:	945.1	4692.4	5810.5	7445.3 Btu/scf
HHV Gross Dry Real:	1065.2	5135.7	6362.6	8152.1 Btu/scf
Gross Wet Real:	1046.6	5045.9	6251.4	8009.6 Btu/scf
<b>Other Calculated Values</b>				
Regualr Wobbe Index*	1340.0	2828.9	3154.2	3590.1 Btu/scf
Net Heating Value (60 °F ideal reaction):	19925.4	19258.1	19616.3	19297.0 Btu/lbm
Gross Heating Value (60°F ideal reaction):	22064.8	20710.5	21105.3	20759.7 Btu/lbm
Molar Mass (MW):	18.34353	94.598	118.029	150.19 g/mol
Relative Density (AIR=1):	0.6327	3.2659	4.0754	5.1855 SG
Density:	0.04833	0.24925	0.31102	0.39578 lbm/scf
Compressibility Factor:	0.9975	0.9924	0.9976	0.9997 Z
Liquid Volume real gas @:	<u>14.65</u>	17.6506	0.0758	0.007
				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** SURFACE CASING  
 FIELD/AREA: **PICEANCE CREEK - #68800**  
  
 PROJECT NO. : **202408105** ANALYSIS NO. : **01**  
 COMPANY NAME : **QB ENERGY OPERATING, LLC** ANALYSIS DATE: **SEPTEMBER 03, 2024 11:19**  
 OFFICE / BRANCH: **PARACHUTE** SAMPLE DATE : **AUGUST 21, 2024 12:00**  
 CUSTOMER REF: TO:  
 PRODUCER : **QB ENERGY OPERATING, LLC** EFFECTIVE DATE:  
**\*\*\*FIELD DATA\*\*\***  
 SAMPLE CYCLE: SAMPLE TYPE: **SPOT**  
 SAMPLE PRES. : **942** psig PROBE : **NO**  
 FLOW PRES. : psig CYLINDER NO. : **TBI-554**  
 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	---	0.01	0.00	---	---
Hydrogen	---	0.02	0.00	---	---
Oxygen/Argon	---	0.01	0.02	---	---
Nitrogen	---	0.23	0.35	---	---
Carbon Dioxide	---	2.51	6.02	---	---
Methane	P1	89.6512	78.4086	---	---
Ethane	P2	5.3277	8.7336	1.420	1.428
Propane	P3	1.4561	3.5005	0.400	0.402
i-Butane	I4	0.2444	0.7744	0.080	0.080
Methanol	X1	0.0012	0.0021	0.000	0.000
n-Butane	P4	0.2273	0.7202	0.071	0.071
2,2-Dimethylpropane	I5	0.0034	0.0134	0.001	0.001
i-Pentane	I5	0.0573	0.2254	0.021	0.021
n-Pentane	P5	0.0513	0.2018	0.019	0.019
2,2-Dimethylbutane	I6	0.0040	0.0188	0.002	0.002
Cyclopentane	N5	0.0017	0.0065	0.001	0.001
2,3-Dimethylbutane	I6	0.0042	0.0197	0.002	0.002
2-Methylpentane	I6	0.0203	0.0954	0.008	0.008
3-Methylpentane	I6	0.0116	0.0545	0.005	0.005
n-Hexane	P6	0.0307	0.1443	0.013	0.013
2,2-Dimethylpentane	I7	0.0012	0.0065	0.001	0.001
Methylcyclopentane	N6	0.0090	0.0413	0.003	0.003
2,4-Dimethylpentane	I7	0.0017	0.0093	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0004	0.0022	0.000	0.000
Benzene	A6	0.0080	0.0341	0.002	0.002
3,3-Dimethylpentane	I7	0.0007	0.0038	0.000	0.000
Cyclohexane	N6	0.0127	0.0583	0.004	0.004
2-Methylhexane	I7	0.0072	0.0393	0.003	0.003
2,3-Dimethylpentane	I7	0.0019	0.0104	0.001	0.001
1,1-Dimethylcyclopentane	N7	0.0015	0.0080	0.001	0.001

3-Methylhexane	I7	0.0065	0.0355	0.003	0.003
1c,3-Dimethylcyclopentane	N7	0.0016	0.0086	0.001	0.001
1t,3-Dimethylcyclopentane	N7	0.0014	0.0075	0.001	0.001
3-Ethylpentane	I7	0.0003	0.0016	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0023	0.0123	0.001	0.001
n-Heptane	P7	0.0161	0.0879	0.007	0.007
1c,2-Dimethylcyclopentane	N7	0.0003	0.0016	0.000	0.000
Methylcyclohexane	N7	0.0195	0.1044	0.008	0.008
2,2-Dimethylhexane	I8	0.0007	0.0044	0.000	0.000
1,1,3-Trimethylcyclopentane	N7	0.0002	0.0012	0.000	0.000
Ethylcyclopentane	N7	0.0006	0.0032	0.000	0.000
2,5-Dimethylhexane	I8	0.0006	0.0038	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0006	0.0038	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0003	0.0019	0.000	0.000
3,3-Dimethylhexane	I8	0.0003	0.0019	0.000	0.000
2,3,4-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
Toluene	A7	0.0060	0.0302	0.002	0.002
2,3-Dimethylhexane	I8	0.0004	0.0025	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0001	0.0006	0.000	0.000
2-Methylheptane	I8	0.0026	0.0162	0.001	0.001
4-Methylheptane	I8	0.0008	0.0050	0.000	0.000
3-Methyl-3-ethylpentane	I8	0.0001	0.0006	0.000	0.000
3,4-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
3-Methylheptane	I8	0.0017	0.0106	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0023	0.0141	0.001	0.001
3-Ethylhexane	I8	0.0001	0.0006	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0010	0.0061	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0005	0.0031	0.000	0.000
3c-Ethylmethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
2,2,4-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0008	0.0049	0.000	0.000
1c,2c,3-Trimethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
1t,3-Dimethylcyclohexane	N8	0.0002	0.0012	0.000	0.000
UnknownC7s	U7	0.0002	0.0011	0.000	0.000
n-Octane	P8	0.0046	0.0286	0.002	0.002
1c,4-Dimethylcyclohexane	N8	0.0004	0.0025	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0002	0.0014	0.000	0.000
2,2-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0005	0.0034	0.000	0.000
2,2,3-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
Ethylcyclohexane	N8	0.0005	0.0031	0.000	0.000
n-Propylcyclopentane	N8	0.0004	0.0025	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
2,5-Dimethylheptane	I9	0.0004	0.0028	0.000	0.000
3,3-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
2,6-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
Ethylbenzene	I8	0.0002	0.0011	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0011	0.0064	0.000	0.000
1,4-Dimethylbenzene (p-Xylene)	A8	0.0003	0.0017	0.000	0.000
4-Methyloctane	I9	0.0002	0.0014	0.000	0.000
2-Methyloctane	I9	0.0003	0.0021	0.000	0.000
3-Methyloctane	I9	0.0001	0.0007	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	0.0003	0.0021	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0002	0.0011	0.000	0.000
i-Butylcyclopentane	N9	0.0002	0.0014	0.000	0.000
n-Nonane	P9	0.0013	0.0091	0.001	0.001
1,1-Methylethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
n-Butylcyclopentane	N9	0.0001	0.0007	0.000	0.000
n-Propylbenzene	A9	0.0001	0.0007	0.000	0.000
1,3-Methylethylbenzene	A9	0.0001	0.0007	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0001	0.0007	0.000	0.000

2,3-Dimethyloctane	I10	0.0001	0.0008	0.000	0.000
5-Methylnonane	I10	0.0001	0.0008	0.000	0.000
2-Methylnonane	I10	0.0001	0.0008	0.000	0.000
3-Methylnonane	I10	0.0001	0.0008	0.000	0.000
t-Butylbenzene	A10	0.0001	0.0007	0.000	0.000
UnknownC9s	U9	0.0003	0.0021	0.000	0.000
n-Decane	P10	0.0004	0.0031	0.000	0.000
1,2-Methyl-i-propylbenzene	A10	0.0001	0.0007	0.000	0.000
UnknownC10s	U10	0.0004	0.0031	0.000	0.000
n-Undecane	P11	0.0002	0.0017	0.000	0.000
1,3-Di-n-propylbenzene	A12	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
<b>TOTAL</b>		<b>100.00000</b>	<b>100.00000</b>	<b>2.0886</b>	<b>2.0997</b>

**CALCULATED VALUES\*\***

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.65	14.73
BENZENE	0.0080	0.0341	LHV NET DRY REAL :	961.9 /scf	967.1 /scf
TOLUENE	0.0060	0.0302	NET WET REAL :	945.1 /scf	950.3 /scf
ETHYLBENZENE	0.0002	0.0011	HHV GROSS DRY REAL :	1065.2 /scf	1071.0 /scf
XYLENES	0.0016	0.0092	GROSS WET REAL :	1046.6 /scf	1052.4 /scf
TOTAL BTEX	0.0158	0.0746	NET HEATING VALUE (60 °F ideal reaction):		19925.4 Btu/lbm
			GROSS HEATING VALUE (60°F ideal reaction):		22064.8 Btu/lbm
			RELATIVE DENSITY (AIR=1):		0.6327
			DENSITY		0.04833 lb/scf
			COMPRESSIBILITY FACTOR :		0.9975
			REGULAR WOBBE INDEX		1340.0

\*(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	4754.2 /scf	Relative Density - SG (Air=1)	3.2659	<b>C6+factors</b>
Gross Dry Ideal BTU	5112.4 /scf	Z Compressibility Factor	0.99235	0.99152
Net Dry Ideal BTU	19258.1 /lb	Density Factor	249.25 lbm/1000 ft3	
Gross Dry Ideal BTU	20710.5 /lb	Molar Mass or MW	94.598 g/mol	
		Volume Liquid Ideal gas	0.076 scf/gal	23.8

**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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