





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

PROJECT NO. :	202507028	ANALYSIS NO. :	02
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	JULY 14, 2025 13:03
ACCOUNT NO. :		SAMPLE DATE :	JULY 1, 2025
PRODUCER :	QB ENERGY OPERATING, LLC	CYLINDER NO. :	ECA-783
LEASE NO. :		SAMPLED BY :	NICK CROY
NAME/DESCRIP :	PCU 297-12A8 INTERMEDIATE CASING		

\*\*\*FIELD DATA\*\*\*

SAMPLE PRES. :	1	SAMPLE TEMP. :	
H2S BY STAIN TUBE:	—	AMBIENT TEMP.:	
COMMENTS :	—		

<u>Componet</u>	<u>Mole %</u>	<u>Wt %</u>
Helium	0.00	0.00
Hydrogen	4.76	0.48
Carbon Dioxide	0.05	0.11
Nitrogen	0.25	0.35
Methane	81.1249	65.3536
Ethane	6.8133	10.2877
Propane	2.6066	5.7719
Isobutane	0.4932	1.4395
n-Butane	0.7588	2.2148
Isopentane	0.3314	1.2007
n-Pentane	0.3517	1.2743
Cyclopentane	0.0355	0.1250
n-Hexane	0.2971	1.2857
Cyclohexane	0.2183	0.9226
Other Hexanes	0.4691	2.0136
Heptanes	0.5413	2.7110
Methylcyclohexane	0.4350	2.1448
2,2,4 Trimethylpentane	0.0003	0.0017
Benzene	0.0041	0.0161
Toluene	0.0149	0.0690
Ethylbenzene	0.0033	0.0176
Xylenes	0.0099	0.0528
C8+ Heavies	0.3436	2.0061
<u>Subtotal</u>	<u>99.91230</u>	<u>99.84850</u>
Oxygen/Argon	0.03	0.05
Alcohols	0.0577	0.1015
<b>Total</b>	<b>100.00000</b>	<b>100.00000</b>

Calculated Values BTU @		Total	C6+	C8+	C10+
	<b>14.65</b>				
LHV	Net Dry Real:	1096.9	4842.8	5817.8	7058.8 Btu/scf
	Net Wet Real:	1077.7	4758.1	5716.1	6935.4 Btu/scf
HHV	Gross Dry Real:	1210.6	5212.8	6264.8	7604.4 Btu/scf
	Gross Wet Real:	1189.4	5121.7	6155.3	7471.5 Btu/scf

Other Calculated Values					
Regualr Wobbe Index*	1461.5	2855.6	3133.9	3442.2	Btu/scf
Net Heating Value (60 °F ideal reaction):	20972.9	19399.7	19890.6	19164.7	Btu/lbm
Gross Heating Value (60°F ideal reaction):	23139.3	20879.8	21416.9	20644.4	Btu/lbm
Molar Mass (MW):	19.91399	95.77	115.838	142.11	g/mol
Relative Density (AIR=1):	0.6867	3.3072	3.9992	4.9066	SG
Density:	0.05247	0.25239	0.30522	0.37448	lbm/scf
Compressibility Factor:	0.9973	0.9931	0.9973	0.9996	Z
Liquid Volume real gas @:	<b>14.65</b>	18.3035	0.9739	0.1705	0.002 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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**EXTENDED NATURAL GAS ANALYSIS (\*DHA)**

**DHA COMPONENT LIST**

PRIMARY DB KEY: **05-103-11165** NAME/DESCRIP : **PCU 297-12A8**  
 LEASE #: INTERMEDIATE CASING  
 FIELD/AREA:

PROJECT NO. : **202507028** ANALYSIS NO. : **02**  
 COMPANY NAME : **QB ENERGY OPERATING, LLC** ANALYSIS DATE: **JULY 14, 2025 13:03**  
 OFFICE / BRANCH: **PARACHUTE, CO** SAMPLE DATE : **JULY 1, 2025**  
 CUSTOMER REF: TO:  
 PRODUCER : **QB ENERGY OPERATING, LLC** EFFECTIVE DATE:

**\*\*\*FIELD DATA\*\*\***

SAMPLE CYCLE: SAMPLE TYPE:  
 SAMPLE PRES. : 1 psig PROBE :  
 FLOW PRES. : psig CYLINDER NO. : **ECA-783**  
 LAB PRES: psig SAMPLED BY : **NICK CROY**  
 SAMPLE TEMP. : °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
Hydrogen	---	4.76	0.48	---	---
Oxygen/Argon	---	0.03	0.05	---	---
Nitrogen	---	0.25	0.35	---	---
Carbon Dioxide	---	0.05	0.11	---	---
Methane	P1	81.1249	65.3536	---	---
Ethane	P2	6.8133	10.2877	1.816	1.826
Propane	P3	2.6066	5.7719	0.716	0.720
i-Butane	I4	0.4932	1.4395	0.161	0.162
Methanol	X1	0.0512	0.0824	0.007	0.007
n-Butane	P4	0.7585	2.2139	0.239	0.240
2,2-Dimethylpropane	I5	0.0033	0.0120	0.001	0.001
i-Pentane	I5	0.3281	1.1887	0.120	0.121
Acetone	X3	0.0061	0.0178	0.002	0.002
i-Propanol	X3	0.0003	0.0009	0.000	0.000
UnknownC4s	U4	0.0003	0.0009	0.000	0.000
n-Pentane	P5	0.3514	1.2732	0.127	0.128
t-Butanol	X4	0.0001	0.0004	0.000	0.000
2,2-Dimethylbutane	I6	0.0098	0.0424	0.004	0.004
Cyclopentane	N5	0.0355	0.1250	0.010	0.010
2,3-Dimethylbutane	I6	0.0339	0.1467	0.014	0.014
2-Methylpentane	I6	0.1645	0.7119	0.068	0.068
3-Methylpentane	I6	0.0984	0.4258	0.040	0.040
UnknownC5s	U5	0.0003	0.0011	0.000	0.000
n-Hexane	P6	0.2971	1.2857	0.122	0.123
2,2-Dimethylpentane	I7	0.0067	0.0337	0.003	0.003
Methylcyclopentane	N6	0.1625	0.6868	0.057	0.057
2,4-Dimethylpentane	I7	0.0141	0.0710	0.007	0.007
2,2,3-Trimethylbutane	I7	0.0022	0.0111	0.001	0.001

Benzene	A6	0.0041	0.0161	0.001	0.001
3,3-Dimethylpentane	I7	0.0037	0.0186	0.002	0.002
Cyclohexane	N6	0.2183	0.9226	0.074	0.074
2-Methylhexane	I7	0.0764	0.3845	0.035	0.035
2,3-Dimethylpentane	I7	0.0182	0.0916	0.008	0.008
1,1-Dimethylcyclopentane	N7	0.0184	0.0907	0.008	0.008
3-Methylhexane	I7	0.0690	0.3472	0.032	0.032
1c,3-Dimethylcyclopentane	N7	0.0315	0.1553	0.014	0.014
1t,3-Dimethylcyclopentane	N7	0.0286	0.1410	0.013	0.013
3-Ethylpentane	I7	0.0033	0.0166	0.001	0.001
1t,2-Dimethylcyclopentane	N7	0.0463	0.2283	0.021	0.021
2,2,4-Trimethylpentane	I8	0.0003	0.0017	0.000	0.000
n-Heptane	P7	0.2088	1.0506	0.096	0.097
1c,2-Dimethylcyclopentane	N7	0.0006	0.0030	0.000	0.000
Methylcyclohexane	N7	0.4350	2.1448	0.174	0.175
2,2-Dimethylhexane	I8	0.0096	0.0551	0.004	0.004
1,1,3-Trimethylcyclopentane	N7	0.0018	0.0101	0.001	0.001
Ethylcyclopentane	N7	0.0117	0.0577	0.005	0.005
2,5-Dimethylhexane	I8	0.0068	0.0390	0.004	0.004
2,2,3-Trimethylpentane	I8	0.0072	0.0413	0.004	0.004
2,4-Dimethylhexane	I8	0.0002	0.0012	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0080	0.0451	0.004	0.004
3,3-Dimethylhexane	I8	0.0021	0.0121	0.001	0.001
2,3,4-Trimethylpentane	I8	0.0002	0.0012	0.000	0.000
2,3,3-Trimethylpentane	I8	0.0003	0.0017	0.000	0.000
Toluene	A7	0.0149	0.0690	0.005	0.005
2,3-Dimethylhexane	I8	0.0060	0.0344	0.003	0.003
2-Methyl-3-ethylpentane	I8	0.0006	0.0035	0.000	0.000
2-Methylheptane	I8	0.0294	0.1686	0.015	0.015
4-Methylheptane	I8	0.0089	0.0511	0.005	0.005
3-Methyl-3-ethylpentane	I8	0.0006	0.0035	0.000	0.000
3,4-Dimethylhexane	I8	0.0008	0.0046	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0004	0.0023	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0003	0.0017	0.000	0.000
3-Methylheptane	I8	0.0203	0.1165	0.010	0.010
1c,2t,3-Trimethylcyclopentane	N8	0.0514	0.2897	0.026	0.026
3-Ethylhexane	I8	0.0010	0.0057	0.001	0.001
1t,4-Dimethylcyclohexane	N8	0.0215	0.1212	0.011	0.011
1,1-Dimethylcyclohexane	N8	0.0053	0.0299	0.002	0.002
2,2,5-Trimethylhexane	I9	0.0005	0.0032	0.000	0.000
3c-Ethylmethylcyclopentane	N8	0.0015	0.0084	0.001	0.001
3t-Ethylmethylcyclopentane	N8	0.0013	0.0073	0.001	0.001
2t-Ethylmethylcyclopentane	N8	0.0017	0.0096	0.001	0.001
1,1-Methylethylcyclopentane	N8	0.0002	0.0011	0.000	0.000
2,2,4-Trimethylhexane	I9	0.0005	0.0032	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0139	0.0783	0.007	0.007
1t,3-Dimethylcyclohexane	N8	0.0004	0.0023	0.000	0.000
n-Octane	P8	0.0652	0.3740	0.033	0.033
1c,4-Dimethylcyclohexane	N8	0.0084	0.0474	0.004	0.004
i-Propylcyclopentane	I8	0.0006	0.0034	0.000	0.000
2,4,4-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0007	0.0045	0.000	0.000
2,2,3,4-Tetramethylpentane	I9	0.0002	0.0013	0.000	0.000
2,3,4-Trimethylhexane	I9	0.0003	0.0019	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
2,2-Dimethylheptane	I9	0.0028	0.0180	0.001	0.001
1,1,4-Trimethylcyclohexane	N9	0.0093	0.0590	0.005	0.005
2,2,3-Trimethylhexane	I9	0.0021	0.0135	0.001	0.001
2,4-Dimethylheptane	I9	0.0004	0.0026	0.000	0.000
4,4-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
Ethylcyclohexane	N8	0.0056	0.0315	0.003	0.003

n-Propylcyclopentane	N8	0.0021	0.0119	0.001	0.001
1c,3c,5-Trimethylcyclohexane	N9	0.0008	0.0051	0.000	0.000
2,5-Dimethylheptane	I9	0.0039	0.0251	0.002	0.002
3,3-Dimethylheptane	I9	0.0007	0.0045	0.000	0.000
3,5-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
2,6-Dimethylheptane	I9	0.0002	0.0013	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0003	0.0019	0.000	0.000
Ethylbenzene	I8	0.0033	0.0176	0.001	0.001
1c,2t,4t-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0069	0.0368	0.003	0.003
1,4-Dimethylbenzene (p-Xylene)	A8	0.0018	0.0096	0.001	0.001
3,4-Dimethylheptane	I9	0.0002	0.0013	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0004	0.0026	0.000	0.000
4-Ethylheptane	I9	0.0003	0.0019	0.000	0.000
4-Methyloctane	I9	0.0020	0.0129	0.001	0.001
2-Methyloctane	I9	0.0031	0.0200	0.002	0.002
1c,2t,3-Trimethylcyclohexane	N9	0.0002	0.0013	0.000	0.000
3-Ethylheptane	I9	0.0002	0.0013	0.000	0.000
3-Methyloctane	I9	0.0005	0.0032	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	0.0028	0.0177	0.002	0.002
1,1,2-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
3,3-Diethylpentane	I9	0.0003	0.0019	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0012	0.0064	0.000	0.000
i-Butylcyclopentane	N9	0.0021	0.0133	0.001	0.001
UnknownC8s	U8	0.0001	0.0006	0.000	0.000
n-Nonane	P9	0.0109	0.0702	0.006	0.006
1,1-Methylethylcyclohexane	N9	0.0007	0.0044	0.000	0.000
i-Propylbenzene	A9	0.0004	0.0024	0.000	0.000
i-Propylcyclohexane	N9	0.0003	0.0019	0.000	0.000
2,2-Dimethyloctane	I10	0.0001	0.0007	0.000	0.000
2,4-Dimethyloctane	I10	0.0005	0.0036	0.000	0.000
2,5-Dimethyloctane	I10	0.0001	0.0007	0.000	0.000
n-Butylcyclopentane	N9	0.0011	0.0070	0.001	0.001
3,3-Dimethyloctane	I10	0.0002	0.0014	0.000	0.000
n-Propylbenzene	A9	0.0009	0.0054	0.000	0.000
3,6-Dimethyloctane	I10	0.0002	0.0014	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0002	0.0014	0.000	0.000
1,3-Methylethylbenzene	A9	0.0003	0.0018	0.000	0.000
1,4-Methylethylbenzene	A9	0.0001	0.0006	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0005	0.0030	0.000	0.000
2,3-Dimethyloctane	I10	0.0001	0.0007	0.000	0.000
5-Methylnonane	I10	0.0003	0.0022	0.000	0.000
1,2-Methylethylbenzene	A9	0.0004	0.0024	0.000	0.000
2-Methylnonane	I10	0.0001	0.0007	0.000	0.000
3-Ethylheptane	I10	0.0001	0.0007	0.000	0.000
3-Methylnonane	I10	0.0003	0.0022	0.000	0.000
t-Butylbenzene	A10	0.0005	0.0034	0.000	0.000
i-Butylcyclohexane	N10	0.0002	0.0014	0.000	0.000
1t-Methyl-2-n-propylcyclohexane	I10	0.0001	0.0007	0.000	0.000
UnknownC9s	U9	0.0022	0.0142	0.001	0.001
n-Decane	P10	0.0014	0.0100	0.001	0.001
1,4-Methyl-i-propylbenzene	A10	0.0001	0.0007	0.000	0.000
1,2-Methyl-i-propylbenzene	A10	0.0002	0.0014	0.000	0.000
3-Ethylnonane	I10	0.0002	0.0016	0.000	0.000
1,3-Diethylbenzene	A10	0.0001	0.0007	0.000	0.000
1,4-Diethylbenzene	A10	0.0001	0.0007	0.000	0.000
n-Butylbenzene	A10	0.0001	0.0007	0.000	0.000
1,2-Methyl-n-propylbenzene	A10	0.0001	0.0007	0.000	0.000
1,3-Dimethyl-4-ethylbenzene	A10	0.0001	0.0007	0.000	0.000
1,2-Dimethyl-4-ethylbenzene	A10	0.0001	0.0007	0.000	0.000
1,3-Dimethyl-2-ethylbenzene	A10	0.0001	0.0007	0.000	0.000

UnknownC10s	U10	0.0023	0.0164	0.001	0.001
n-Undecane	P11	0.0002	0.0016	0.000	0.000
UnknownC11s	U11	0.0004	0.0032	0.000	0.000
<b>TOTAL</b>		<b>100.00000</b>	<b>100.00000</b>	<b>4.1753</b>	<b>4.1976</b>

**CALCULATED VALUES\*\***

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.65	14.73
BENZENE	0.0041	0.0161	LHV NET DRY REAL :	1096.9 /scf	1102.9 /scf
TOLUENE	0.0149	0.0690	NET WET REAL :	1077.7 /scf	1083.7 /scf
ETHYLBENZENE	0.0033	0.0176	HHV GROSS DRY REAL :	1210.6 /scf	1217.2 /scf
XYLENES	0.0099	0.0528	GROSS WET REAL :	1189.4 /scf	1196.0 /scf
<b>TOTAL BTEX</b>	<b>0.0322</b>	<b>0.1555</b>	NET HEATING VALUE (60 °F ideal reaction):		<b>20972.9 Btu/lbm</b>
			GROSS HEATING VALUE (60°F ideal reaction):		<b>23139.3 Btu/lbm</b>
			RELATIVE DENSITY (AIR=1):		0.6867
			DENSITY		0.05247 lb/scf
			COMPRESSIBILITY FACTOR :		0.9973
			REGULAR WOBBE INDEX		1461.5

\*(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>4824.5</u> /scf	Relative Density - SG (Air=1)	<u>3.3072</u>	<b>C6+ factors</b>
Gross Dry Ideal BTU	<u>5193.1</u> /scf	Z Compressibility Factor	<u>0.99311</u>	<u>0.99259</u>
Net Dry Ideal BTU	<u>19399.7</u> /lb	Density Factor	<u>252.39</u> lbm/1000 ft3	
Gross Dry Ideal BTU	<u>20879.8</u> /lb	Molar Mass or MW	<u>95.77</u> g/mol	
		Volume Liquid Ideal gas	<u>0.977</u> scf/gal	<u>23.7</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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