



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

PROJECT NO. :	202502080	ANALYSIS NO. :	02
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	FEBRUARY 27, 2025 12:07
ACCOUNT NO. :		SAMPLE DATE :	FEBRUARY 18, 2025
PRODUCER :	QB ENERGY OPERATING, LLC	CYLINDER NO. :	3115
LEASE NO. :		SAMPLED BY :	MIKE KELLEY
NAME/DESCRIP :	110180056 596-29A 18 CASING		

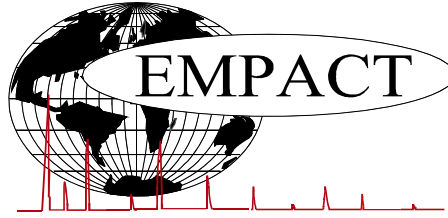
FIELD DATA		SAMPLE TEMP. :	33
SAMPLE PRES. :	234	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	—		
COMMENTS :	<i>SPOT</i>		<i>NO PROBE</i>

<u>Componet</u>	<u>Mole %</u>	<u>Wt %</u>
Helium	0.00	0.00
Hydrogen	1.21	0.13
Carbon Dioxide	4.28	10.00
Nitrogen	0.06	0.09
Methane	86.8787	74.0301
Ethane	4.9740	7.9442
Propane	1.2897	3.0207
Isobutane	0.3610	1.1145
n-Butane	0.2804	0.8656
Isopentane	0.2101	0.8051
n-Pentane	0.1141	0.4372
Cyclopentane	0.0062	0.0231
n-Hexane	0.0497	0.2275
Cyclohexane	0.0202	0.0903
Other Hexanes	0.1406	0.6409
Heptanes	0.0488	0.2587
Methylcyclohexane	0.0201	0.1049
2,2,4 Trimethylpentane	0.0001	0.0006
Benzene	0.0210	0.0871
Toluene	0.0097	0.0475
Ethylbenzene	0.0001	0.0006
Xylenes	0.0004	0.0023
C8+ Heavies	0.0083	0.0505
<u>Subtotal</u>	<u>99.98320</u>	<u>99.97140</u>
Oxygen/Argon	0.00	0.00
Alcohols	0.0168	0.0286
<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 @	14.65	Sample	Fraction	Fraction	Fraction
LHV Net Dry Real:	948.8	4512.4	5693.7	#DIV/0!	Btu/scf
Net Wet Real:	932.2	4433.5	5594.2	#DIV/0!	Btu/scf
HHV Gross Dry Real:	1050.4	4851.8	6129.7	#DIV/0!	Btu/scf
Gross Wet Real:	1032.0	4767.0	6022.5	#DIV/0!	Btu/scf
Other Calculated Values					
Regualr Wobbe Index*	1304.2	2746.6	3090.6	#DIV/0!	Btu/scf
Net Heating Value (60 °F ideal reaction):	19143.1	19178.3	19769.8	#DIV/0!	Btu/lbm
Gross Heating Value (60°F ideal reaction):	21195.9	20619.7	21284.3	#DIV/0!	Btu/lbm
Molar Mass (MW):	18.82749	89.149	113.905	#DIV/0!	g/mol
Relative Density (AIR=1):	0.6495	3.0777	3.9332	#DIV/0!	SG
Density:	0.04961	0.23493	0.30017	#DIV/0!	lbm/scf
Compressibility Factor:	0.9975	0.9900	0.9968	#DIV/0!	Z
Liquid Volume real gas @:	14.65	17.6137	0.1256	0.003	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:	05-045-18091	NAME/DESCRIP :	110180056 596-29A 18
LEASE #:		CASING	
FIELD/AREA:			
PROJECT NO. :	202502080	ANALYSIS NO. :	02
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	FEBRUARY 27, 2025 12:07
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	FEBRUARY 18, 2025
CUSTOMER REF:		TO:	
PRODUCER :	QB ENERGY OPERATING, LLC	EFFECTIVE DATE:	
FIELD DATA			
SAMPLE CYCLE:		SAMPLE TYPE:	SPOT
SAMPLE PRES. :	234 psig	PROBE :	NO
FLOW PRES. :	psig	CYLINDER NO. :	3115
LAB PRES:	psig	SAMPLED BY :	MIKE KELLEY
SAMPLE TEMP. :	33 °f	SAMPLING COMPANY:	QB ENERGY
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 @	GPM @
				14.65	14.73
Hydrogen	---	1.21	0.13	---	---
Nitrogen	---	0.06	0.09	---	---
Carbon Dioxide	---	4.28	10.00	---	---
Methane	P1	86.8787	74.0301	---	---
Ethane	P2	4.9740	7.9442	1.326	1.333
Propane	P3	1.2897	3.0207	0.354	0.356
i-Butane	I4	0.3610	1.1145	0.118	0.119
Methanol	X1	0.0168	0.0286	0.002	0.002
n-Butane	P4	0.2804	0.8656	0.088	0.088
2,2-Dimethylpropane	I5	0.0065	0.0249	0.002	0.002
i-Pentane	I5	0.2036	0.7802	0.074	0.074
n-Pentane	P5	0.1141	0.4372	0.041	0.041
2,2-Dimethylbutane	I6	0.0111	0.0508	0.005	0.005
Cyclopentane	N5	0.0062	0.0231	0.002	0.002
2,3-Dimethylbutane	I6	0.0158	0.0723	0.006	0.006
2-Methylpentane	I6	0.0568	0.2600	0.024	0.024
3-Methylpentane	I6	0.0311	0.1424	0.013	0.013
n-Hexane	P6	0.0497	0.2275	0.020	0.020
2,2-Dimethylpentane	I7	0.0014	0.0074	0.001	0.001
Methylcyclopentane	N6	0.0256	0.1145	0.009	0.009
2,4-Dimethylpentane	I7	0.0032	0.0171	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0010	0.0053	0.000	0.000
Benzene	A6	0.0210	0.0871	0.006	0.006
3,3-Dimethylpentane	I7	0.0010	0.0053	0.000	0.000
Cyclohexane	N6	0.0202	0.0903	0.007	0.007
2-Methylhexane	I7	0.0099	0.0527	0.005	0.005
2,3-Dimethylpentane	I7	0.0026	0.0139	0.001	0.001
1,1-Dimethylcyclopentane	N7	0.0020	0.0104	0.001	0.001
3-Methylhexane	I7	0.0083	0.0442	0.004	0.004
1c,3-Dimethylcyclopentane	N7	0.0024	0.0125	0.001	0.001
1t,3-Dimethylcyclopentane	N7	0.0021	0.0109	0.001	0.001
3-Ethylpentane	I7	0.0003	0.0016	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0033	0.0172	0.002	0.002
2,2,4-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
UnknownC6s	U6	0.0002	0.0009	0.000	0.000
n-Heptane	P7	0.0105	0.0559	0.005	0.005
1c,2-Dimethylcyclopentane	N7	0.0002	0.0011	0.000	0.000

Methylcyclohexane	N7	0.0201	0.1049	0.008	0.008
2,2-Dimethylhexane	I8	0.0004	0.0024	0.000	0.000
1,1,3-Trimethylcyclopentane	N7	0.0001	0.0006	0.000	0.000
Ethylcyclopentane	N7	0.0005	0.0026	0.000	0.000
2,5-Dimethylhexane	I8	0.0004	0.0024	0.000	0.000
2,4-Dimethylhexane	I8	0.0004	0.0024	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0002	0.0012	0.000	0.000
3,3-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
Toluene	A7	0.0097	0.0475	0.003	0.003
2,3-Dimethylhexane	I8	0.0003	0.0018	0.000	0.000
2-Methylheptane	I8	0.0010	0.0061	0.001	0.001
4-Methylheptane	I8	0.0003	0.0018	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	0.0008	0.0048	0.000	0.000
1c,2t,3-Trimethylcyclopentane	N8	0.0010	0.0060	0.001	0.001
3-Ethylhexane	I8	0.0001	0.0006	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0005	0.0030	0.000	0.000
1,1-Dimethylcyclohexane	N8	0.0002	0.0012	0.000	0.000
3c-Ethylmethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0003	0.0018	0.000	0.000
n-Octane	P8	0.0011	0.0067	0.001	0.001
1c,4-Dimethylcyclohexane	N8	0.0002	0.0012	0.000	0.000
2,2-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
2,2,3-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
Ethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
n-Propylcyclopentane	N8	0.0001	0.0006	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
2,5-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
Ethylbenzene	I8	0.0001	0.0006	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0003	0.0017	0.000	0.000
1,4-Dimethylbenzene (p-Xylene)	A8	0.0001	0.0006	0.000	0.000
TOTAL		100.00000	100.00000	2.1327	2.1440

CALCULATED VALUES**

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.65	14.73
BENZENE	0.0210	0.0871	LHV NET DRY REAL :	948.8 /scf	954.0 /scf
TOLUENE	0.0097	0.0475	NET WET REAL :	932.2 /scf	937.4 /scf
ETHYLBENZENE	0.0001	0.0006	HHV GROSS DRY REAL :	1050.4 /scf	1056.2 /scf
XYLENES	0.0004	0.0023	GROSS WET REAL :	1032.0 /scf	1037.8 /scf
TOTAL BTEX	0.0312	0.1375	NET HEATING VALUE (60 °F ideal reaction):		19143.1 Btu/lbm
			GROSS HEATING VALUE (60°F ideal reaction):		21195.9 Btu/lbm
			RELATIVE DENSITY (AIR=1):		0.6495
			DENSITY		0.04961 lb/scf
			COMPRESSIBILITY FACTOR :		0.9975
			REGULAR WOBBE INDEX		1304.2

*(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>4481.4</u> /scf	Relative Density - SG (Air=1)	<u>3.0777</u>	C6+ factors
Gross Dry Ideal BTU	<u>4818.5</u> /scf	Z Compressibility Factor	<u>0.99003</u>	<u>0.98944</u>
Net Dry Ideal BTU	<u>19178.3</u> /lb	Density Factor	<u>234.928</u> lbm/1000 ft ³	
Gross Dry Ideal BTU	<u>20619.7</u> /lb	Molar Mass or MW	<u>89.149</u> g/mol	
		Volume Liquid Ideal gas	<u>0.126</u> scf/gal	<u>25.3</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.

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.