



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

PROJECT NO. :	202508022	ANALYSIS NO. :	02
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	AUGUST 10, 2025 14:13
ACCOUNT NO. :		SAMPLE DATE :	AUGUST 04, 2025
PRODUCER :		CYLINDER NO. :	ECA-717
LEASE NO. :		SAMPLED BY :	NICK CROY
NAME/DESCRIP :	YCF XOM 2-22-1 SURFACE CASING		

FIELD DATA		SAMPLE TEMP. :	
SAMPLE PRES. :	790	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	—		
COMMENTS :	—		

<u>Componet</u>	<u>Mole %</u>	<u>Wt %</u>
Helium	0.01	0.00
Hydrogen	0.08	0.01
Carbon Dioxide	0.06	0.14
Nitrogen	0.42	0.64
Methane	90.2136	78.4727
Ethane	5.0020	8.1553
Propane	2.3142	5.5331
Isobutane	0.5372	1.6930
n-Butane	0.6259	1.9726
Isopentane	0.2227	0.8712
n-Pentane	0.1734	0.6784
Cyclopentane	0.0102	0.0388
n-Hexane	0.0604	0.2822
Cyclohexane	0.0167	0.0762
Other Hexanes	0.1129	0.5253
Heptanes	0.0617	0.3337
Methylcyclohexane	0.0142	0.0756
2,2,4 Trimethylpentane	0.0000	0.0000
Benzene	0.0029	0.0123
Toluene	0.0008	0.0040
Ethylbenzene	0.0001	0.0006
Xylenes	0.0007	0.0041
C8+ Heavies	0.0603	0.4805
<u>Subtotal</u>	<u>99.99990</u>	<u>99.99960</u>
Oxygen/Argon	0.00	0.00
Alcohols	0.0001	0.0004
<u>Total</u>	<u>100.00000</u>	<u>100.00000</u>

Calculated Values BTU @		Total	C6+	C8+	C10+
	14.65				
LHV	Net Dry Real:	1020.2	5092.2	7369.0	8295.9 Btu/scf
	Net Wet Real:	1002.4	5003.2	7240.2	8150.9 Btu/scf
HHV	Gross Dry Real:	1128.3	5491.5	7962.5	8974.9 Btu/scf
	Gross Wet Real:	1108.6	5395.5	7823.3	8818.0 Btu/scf

Other Calculated Values					
Regualr Wobbe Index*	1415.9	2941.8	3553.4	3786.2	Btu/scf
Net Heating Value (60 °F ideal reaction):	21026.5	19193.3	18764.7	18399.3	Btu/lbm
Gross Heating Value (60°F ideal reaction):	23259.2	20701.1	20273.3	19903.1	Btu/lbm
Molar Mass (MW):	18.44289	100.019	146.164	163.742	g/mol
Relative Density (AIR=1):	0.6357	3.4532	5.0465	5.6532	SG
Density:	0.04860	0.26357	0.38515	0.43150	lbm/scf
Compressibility Factor:	0.9974	0.9924	0.9994	0.9999	Z
Liquid Volume real gas @:	14.65	17.8908	0.1376	0.0259	0.0199 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: **05-103-10975**
LEASE #:
FIELD/AREA:

NAME/DESCRIP : **YCF XOM 2-22-1
SURFACE CASING**

PROJECT NO. : **202508022**
COMPANY NAME : **QB ENERGY OPERATING, LLC**
OFFICE / BRANCH: **PARACHUTE, CO**
CUSTOMER REF:
PRODUCER :

ANALYSIS NO. : **02**
ANALYSIS DATE: **AUGUST 10, 2025 14:13**
SAMPLE DATE : **AUGUST 04, 2025**
TO:
EFFECTIVE DATE:

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

SAMPLE CYCLE:
SAMPLE PRES. : **790** **psig**
FLOW PRES. : **psig**
LAB PRES: **psig**
SAMPLE TEMP. : **°f**
AMBIENT TEMP.: **°f**
H2O BY STAIN TUBE: **-** **#/mmcf**
FIELD COMMENTS:
LAB COMMENTS:

SAMPLE TYPE:
PROBE :
CYLINDER NO. : **ECA-717**
SAMPLED BY : **NICK CROY**
SAMPLING COMPANY: **QB ENERGY OPERATING LLC**
H2S BY STAIN TUBE: **-** **ppm mol**
CO2 BY STAIN TUBE: **-** **Mol %**

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.65	GPM @ 14.73
Helium	---	0.01	0.00	---	---
Hydrogen	---	0.08	0.01	---	---
Nitrogen	---	0.42	0.64	---	---
Carbon Dioxide	---	0.06	0.14	---	---
Methane	P1	90.2136	78.4727	---	---
Ethane	P2	5.0020	8.1553	1.333	1.341
Propane	P3	2.3142	5.5331	0.636	0.639
i-Butane	I4	0.5372	1.6930	0.175	0.176
n-Butane	P4	0.6259	1.9726	0.197	0.198
2,2-Dimethylpropane	I5	0.0044	0.0172	0.002	0.002
i-Pentane	I5	0.2183	0.8540	0.080	0.080
n-Pentane	P5	0.1734	0.6784	0.063	0.063
t-Butanol	X4	0.0001	0.0004	0.000	0.000
2,2-Dimethylbutane	I6	0.0043	0.0201	0.002	0.002
Cyclopentane	N5	0.0102	0.0388	0.003	0.003
2,3-Dimethylbutane	I6	0.0093	0.0434	0.004	0.004
2-Methylpentane	I6	0.0531	0.2481	0.022	0.022
3-Methylpentane	I6	0.0262	0.1224	0.011	0.011
n-Hexane	P6	0.0604	0.2822	0.025	0.025
2,2-Dimethylpentane	I7	0.0011	0.0060	0.001	0.001
Methylcyclopentane	N6	0.0200	0.0913	0.007	0.007
2,4-Dimethylpentane	I7	0.0021	0.0114	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0003	0.0016	0.000	0.000
Benzene	A6	0.0029	0.0123	0.001	0.001
3,3-Dimethylpentane	I7	0.0005	0.0027	0.000	0.000
Cyclohexane	N6	0.0167	0.0762	0.006	0.006
2-Methylhexane	I7	0.0098	0.0533	0.005	0.005
2,3-Dimethylpentane	I7	0.0029	0.0158	0.001	0.001

1,1-Dimethylcyclopentane	N7	0.0015	0.0080	0.001	0.001
3-Methylhexane	I7	0.0086	0.0467	0.004	0.004
1c,3-Dimethylcyclopentane	N7	0.0029	0.0155	0.001	0.001
1t,3-Dimethylcyclopentane	N7	0.0025	0.0133	0.001	0.001
3-Ethylpentane	I7	0.0005	0.0027	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0041	0.0219	0.002	0.002
n-Heptane	P7	0.0190	0.1032	0.009	0.009
1c,2-Dimethylcyclopentane	N7	0.0049	0.0261	0.002	0.002
Methylcyclohexane	N7	0.0142	0.0756	0.006	0.006
2,2-Dimethylhexane	I8	0.0008	0.0049	0.000	0.000
1,1,3-Trimethylcyclopentane	N7	0.0003	0.0018	0.000	0.000
Ethylcyclopentane	N7	0.0007	0.0037	0.000	0.000
2,5-Dimethylhexane	I8	0.0006	0.0037	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0005	0.0031	0.000	0.000
2,4-Dimethylhexane	I8	0.0002	0.0013	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0007	0.0043	0.000	0.000
3,3-Dimethylhexane	I8	0.0002	0.0013	0.000	0.000
2,3,4-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
Toluene	A7	0.0008	0.0040	0.000	0.000
2,3-Dimethylhexane	I8	0.0005	0.0031	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0002	0.0013	0.000	0.000
2-Methylheptane	I8	0.0030	0.0186	0.002	0.002
4-Methylheptane	I8	0.0007	0.0043	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	0.0015	0.0093	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0016	0.0098	0.001	0.001
3-Ethylhexane	I8	0.0002	0.0013	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0007	0.0043	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
3t-Ethylmethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0006	0.0036	0.000	0.000
1t,3-Dimethylcyclohexane	N8	0.0013	0.0079	0.001	0.001
n-Octane	P8	0.0027	0.0167	0.001	0.001
1c,4-Dimethylcyclohexane	N8	0.0002	0.0012	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
2,2,3,4-Tetramethylpentane	I9	0.0001	0.0007	0.000	0.000
2,3,4-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
2,2-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0003	0.0021	0.000	0.000
2,2,3-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
Ethylcyclohexane	N8	0.0005	0.0030	0.000	0.000
n-Propylcyclopentane	N8	0.0002	0.0012	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0002	0.0014	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	0.0005	0.0029	0.000	0.000
1,4-Dimethylbenzene (p-Xylene)	A8	0.0001	0.0006	0.000	0.000
4-Methyloctane	I9	0.0001	0.0007	0.000	0.000
2-Methyloctane	I9	0.0002	0.0014	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	0.0002	0.0014	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0001	0.0006	0.000	0.000
n-Nonane	P9	0.0008	0.0056	0.000	0.000
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	0.0002	0.0013	0.000	0.000
1,4-Methylethylbenzene	A9	0.0001	0.0007	0.000	0.000

1,3,5-Trimethylbenzene	A9	0.0003	0.0020	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
1,2-Methylethylbenzene	A9	0.0001	0.0007	0.000	0.000
2-Methylnonane	I10	0.0001	0.0008	0.000	0.000
3-Methylnonane	I10	0.0002	0.0015	0.000	0.000
t-Butylbenzene	A10	0.0005	0.0036	0.000	0.000
n-Decane	P10	0.0014	0.0108	0.001	0.001
1,2,3-Trimethylbenzene	A9	0.0001	0.0007	0.000	0.000
Sec-Butylcyclohexane	A10	0.0003	0.0023	0.000	0.000
1,2-Methyl-i-propylbenzene	A10	0.0001	0.0007	0.000	0.000
3-Ethylnonane	I10	0.0003	0.0026	0.000	0.000
1,3-Diethylbenzene	A10	0.0002	0.0015	0.000	0.000
1,4-Diethylbenzene	A10	0.0001	0.0007	0.000	0.000
n-Butylbenzene	A10	0.0002	0.0015	0.000	0.000
1,3-Dimethyl-5-ethylbenzene	A10	0.0001	0.0007	0.000	0.000
1,2-Diethylbenzene	A10	0.0002	0.0015	0.000	0.000
t-Decahydronaphthalene	A9	0.0001	0.0008	0.000	0.000
1,2-Methyl-n-propylbenzene	A10	0.0003	0.0022	0.000	0.000
1,3-Dimethyl-4-ethylbenzene	A10	0.0006	0.0044	0.000	0.000
1,2-Dimethyl-4-ethylbenzene	A10	0.0002	0.0015	0.000	0.000
1,3-Dimethyl-2-ethylbenzene	A10	0.0004	0.0029	0.000	0.000
1,2-Dimethyl-3-ethylbenzene	A10	0.0001	0.0007	0.000	0.000
1,2-Ethyl-i-propylbenzene	A10	0.0002	0.0016	0.000	0.000
1,4-Methyl-t-butylbenzene	A11	0.0002	0.0016	0.000	0.000
UnknownC10s	U10	0.0001	0.0008	0.000	0.000
n-Undecane	P11	0.0046	0.0390	0.003	0.003
1,4-Ethyl-i-propylbenzene	A11	0.0002	0.0016	0.000	0.000
1,2,4,5-Tetramethylbenzene	A11	0.0002	0.0015	0.000	0.000
1,2-Methyl-n-butylbenzene	A11	0.0002	0.0016	0.000	0.000
1,2,3,5-Tetramethylbenzene	A11	0.0002	0.0015	0.000	0.000
1,2-Methyl-t-butylbenzene	A11	0.0002	0.0016	0.000	0.000
5-Methylindan	A11	0.0004	0.0029	0.000	0.000
1,2-Ethyl-n-propylbenzene	A11	0.0003	0.0024	0.000	0.000
2-Methylindan	A11	0.0001	0.0007	0.000	0.000
1,3-Methyl-n-butylbenzene	A11	0.0001	0.0008	0.000	0.000
1,3-Di-i-propylbenzene	A11	0.0003	0.0027	0.000	0.000
sec-Pentylbenzene	A11	0.0004	0.0032	0.000	0.000
n-Pentylbenzene	A11	0.0005	0.0040	0.000	0.000
1,2-Di-n-propylbenzene	A11	0.0006	0.0053	0.000	0.000
1,4-Di-i-propylbenzene	A11	0.0002	0.0017	0.000	0.000
Tetrahydronaphthalene	A10	0.0003	0.0022	0.000	0.000
Naphthalene	A10	0.0009	0.0062	0.001	0.001
1-t-Butyl-3,5-dimethylbenzene	A12	0.0003	0.0027	0.000	0.000
UnknownC11s	U11	0.0007	0.0059	0.000	0.000
n-Dodecane	P12	0.0059	0.0545	0.004	0.004
1,3,5-Triethylbenzene	A12	0.0011	0.0097	0.001	0.001
1,2,4-Triethylbenzene	A12	0.0003	0.0027	0.000	0.000
1,4-Methyl-n-pentylbenzene	A12	0.0005	0.0044	0.000	0.000
n-Hexylbenzene	A12	0.0007	0.0062	0.000	0.000
1,2,3,4,5-Pentamethylbenzene	A13	0.0010	0.0080	0.001	0.001
2-Methylnaphthalene	A11	0.0002	0.0015	0.000	0.000
1-Methylnaphthalene	A11	0.0002	0.0015	0.000	0.000
UnknownC12s	U12	0.0023	0.0195	0.002	0.002
n-Tridecane	P13	0.0031	0.0310	0.002	0.002
UnknownC13s	U13	0.0034	0.0340	0.003	0.003
n-Tetradecane	P14	0.0004	0.0043	0.000	0.000
UnknownC14s	U14	0.0018	0.0194	0.001	0.001
n-Pentadecane	P15	0.0001	0.0011	0.000	0.000
UnknownC15s	U15	0.0008	0.0092	0.001	0.001

n-Hexadecane	P16	0.0001	0.0013	0.000	0.000
UnknownC16s	U16	0.0001	0.0013	0.000	0.000
n-Heneicosane	P21	0.0002	0.0032	0.000	0.000
TOTAL		100.00000	100.00000	2.6268	2.6407

CALCULATED VALUES**

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.65	14.73
BENZENE	0.0029	0.0123	LHV NET DRY REAL :	1020.2 /scf	1025.8 /scf
TOLUENE	0.0008	0.0040	NET WET REAL :	1002.4 /scf	1008.0 /scf
ETHYLBENZENE	0.0001	0.0006	HHV GROSS DRY REAL :	1128.3 /scf	1134.5 /scf
XYLENES	0.0007	0.0041	GROSS WET REAL :	1108.6 /scf	1114.8 /scf
TOTAL BTEX	0.0045	0.0210	NET HEATING VALUE (60 °F ideal reaction):		21026.5 Btu/lbm
			GROSS HEATING VALUE (60°F ideal reaction):		23259.2 Btu/lbm
			RELATIVE DENSITY (AIR=1):		0.6357
			DENSITY		0.04860 lb/scf
			COMPRESSIBILITY FACTOR :		0.9974
			REGULAR WOBBE INDEX		1415.9

*(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>5069.1</u> /scf	Relative Density - SG (Air=1)	<u>3.4532</u>	C6+factors
Gross Dry Ideal BTU	<u>5466.6</u> /scf	Z Compressibility Factor	<u>0.99235</u>	<u>0.99087</u>
Net Dry Ideal BTU	<u>19193.3</u> /lb	Density Factor	<u>263.571</u> lbm/1000 ft3	
Gross Dry Ideal BTU	<u>20701.1</u> /lb	Molar Mass or MW	<u>100.019</u> g/mol	
		Volume Liquid Ideal gas	<u>0.138</u> scf/gal	<u>21.8</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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