

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY: **05-045-14659** NAME/DESCRIP : **110165709 EF 12C D31**
 LEASE #: **PRODUCTION CASING**
 FIELD/AREA

PROJECT NO. : **202507063** ANALYSIS NO. : **02**
 COMPANY NAME : **QB ENERGY OPERATING, LLC** ANALYSIS DATE: **AUGUST 05, 2025 16:58**
 OFFICE / BRANCH: **PARACHUTE, CO** SAMPLE DATE : **JUNE 25, 2025**
 CUSTOMER REF: **TO:**
 PRODUCER : **QB ENERGY OPERATING, LLC** EFFECTIVE DATE:

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

SAMPLE CYCLE: **SAMPLE TYPE: SPOT**
 SAMPLE PRES. : **377 psig** PROBE : **NO PROBE**
 FLOW PRES. : **psig** CYLINDER NO. : **ECA-715**
 LAB PRES: **psig** SAMPLED BY : **MIKE KELLEY**
 SAMPLE TEMP. : **76 °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	MOLE %	MASS %	GPM @	
			14.65	14.73
ALCOHOLS	0.0189	0.0334	0.0020	0.0020
HELIUM	0.00	0.00	---	---
HYDROGEN	0.00	0.00	---	---
OXYGEN/ARGON	0.01	0.02	---	---
NITROGEN	0.11	0.17	---	---
CARBON DIOXIDE	4.04	9.55	---	---
METHANE	89.2660	76.9301	---	---
ETHANE	4.6738	7.5497	1.2461	1.2529
PROPANE	1.0190	2.4138	0.2798	0.2813
I-BUTANE	0.2666	0.8324	0.0869	0.0874
N-BUTANE	0.1755	0.5479	0.0550	0.0553
I-PENTANE	0.1051	0.4069	0.0390	0.0392
N-PENTANE	0.0506	0.1961	0.0180	0.0181
HEXANES PLUS	0.2647	1.3503	0.1020	0.1023
TOTALS	100.0000	100.0000	1.8288	1.8385

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0131	0.0550
TOLUENE	0.0171	0.0847
ETHYLBENZENE	0.0007	0.0040
XYLENES	0.0054	0.0307
TOTAL BTEX	0.0363	0.1744

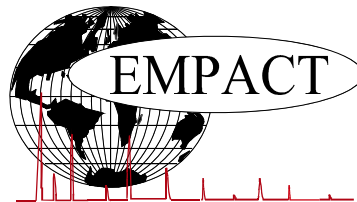
	CALCULATED VALUES**	
	14.65	14.73
LHV NET DRY REAL :	941.2 /scf	946.4 /scf
NET WET REAL :	924.7 /scf	929.9 /scf
HHV GROSS DRY REAL :	1042.5 /scf	1048.2 /scf
GROSS WET REAL :	1024.3 /scf	1030.0 /scf
NET HEATING VALUE (60 °F ideal reaction):		19221.5 Btu/lbm
GROSS HEATING VALUE (60°F ideal reaction):		21290.2 Btu/lbm
RELATIVE DENSITY (AIR=1):		0.6417
DENSITY		0.04905 lbm/scf
COMPRESSIBILITY FACTOR :		0.9976
REGULAR WOBBE INDEX		1302.3

**(DETAILED HYDROCARBON ANALYSIS/NJ 1993)*

Mod ASTM D6730, GPA 2261 & GPA 2286.

*** (CALC: GPA 2172, GPA 2145 & TP-17 @14.696 & 60 F)*

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)
GLYCALC INFORMATION**

PROJECT NO. :	202507063	ANALYSIS NO. :	02
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	AUGUST 05, 2025 16:58
ACCOUNT NO. :		SAMPLE DATE :	JUNE 25, 2025
PRODUCER :	QB ENERGY OPERATING, LLC	CYLINDER NO. :	ECA-715
LEASE NO. :		SAMPLED BY :	MIKE KELLEY
NAME/DESCRIP :	110165709 EF 12C D31 PRODUCTION CASING		

FIELD DATA

SAMPLE PRES. :	377	SAMPLE TEMP. :	76
H2S BY STAIN TUBE:	—	AMBIENT TEMP.:	
COMMENTS :	—		

ppm mol
SPOT NO PROBE

<u>Componet</u>	<u>Mole %</u>	<u>Wt %</u>
Helium	0.00	0.00
Hydrogen	0.00	0.00
Carbon Dioxide	4.04	9.55
Nitrogen	0.11	0.17
Methane	89.2660	76.9301
Ethane	4.6738	7.5497
Propane	1.0190	2.4138
Isobutane	0.2666	0.8324
n-Butane	0.1755	0.5479
Isopentane	0.1024	0.3968
n-Pentane	0.0506	0.1961
Cyclopentane	0.0027	0.0101
n-Hexane	0.0257	0.1190
Cyclohexane	0.0146	0.0660
Other Hexanes	0.0691	0.3184
Heptanes	0.0521	0.2792
Methylcyclohexane	0.0279	0.1471
2,2,4 Trimethylpentane	0.0000	0.0000
Benzene	0.0131	0.0550
Toluene	0.0171	0.0847
Ethylbenzene	0.0007	0.0040
Xylenes	0.0054	0.0307
C8+ Heavies	0.0390	0.2462
<u>Subtotal</u>	<u>99.97110</u>	<u>99.94660</u>
Oxygen/Argon	0.01	0.02
Alcohols	0.0189	0.0334
<u>Total</u>	<u>100.00000</u>	<u>100.00000</u>

Calculated Values BTU @		Total	C6+	C8+	C10+
	LHV Net Dry Real:	941.2	4766.9	5780.8	7160.9 Btu/scf
	Net Wet Real:	924.7	4683.6	5679.7	7035.7 Btu/scf
	HHV Gross Dry Real:	1042.5	5117.5	6210.3	7703.1 Btu/scf
	Gross Wet Real:	1024.3	5028.0	6101.7	7568.4 Btu/scf

Other Calculated Values

Regualr Wobbe Index*	1302.3	2814.0	3102.0	3459.0 Btu/scf
Net Heating Value (60 °F ideal reaction):	19221.5	19173.3	19492.2	19222.2 Btu/lbm
Gross Heating Value (60°F ideal reaction):	21290.2	20585.4	20940.2	20678.3 Btu/lbm
Molar Mass (MW):	18.61401	95	116.273	144.41 g/mol
Relative Density (AIR=1):	0.6417	3.2807	4.0145	4.9861 SG
Density:	0.04905	0.25036	0.30640	0.38054 lbm/scf
Compressibility Factor:	0.9976	0.9929	0.9977	0.9996 Z
Liquid Volume real gas @:	17.5708	0.1017	0.014	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.

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EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

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 FLOW PRES. : psig CYLINDER NO. : **ECA-715**
 LAB PRES: psig SAMPLED BY : **MIKE KELLEY**
 SAMPLE TEMP. : **76** °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
Oxygen/Argon	---	0.01	0.02	---	---
Nitrogen	---	0.11	0.17	---	---
Carbon Dioxide	---	4.04	9.55	---	---
Methane	P1	89.2660	76.9301	---	---
Ethane	P2	4.6738	7.5497	1.246	1.253
Propane	P3	1.0190	2.4138	0.280	0.281
i-Butane	I4	0.2666	0.8324	0.087	0.087
Methanol	X1	0.0183	0.0315	0.002	0.002
n-Butane	P4	0.1755	0.5479	0.055	0.055
2,2-Dimethylpropane	I5	0.0043	0.0166	0.002	0.002
i-Pentane	I5	0.0981	0.3802	0.036	0.036
Acetone	X3	0.0006	0.0019	0.000	0.000
n-Pentane	P5	0.0506	0.1961	0.018	0.018
2,2-Dimethylbutane	I6	0.0057	0.0264	0.002	0.002
Cyclopentane	N5	0.0027	0.0101	0.001	0.001
2,3-Dimethylbutane	I6	0.0073	0.0338	0.003	0.003
2-Methylpentane	I6	0.0262	0.1213	0.011	0.011
3-Methylpentane	I6	0.0150	0.0695	0.006	0.006
n-Hexane	P6	0.0257	0.1190	0.011	0.011
2,2-Dimethylpentane	I7	0.0015	0.0081	0.001	0.001
Methylcyclopentane	N6	0.0149	0.0674	0.005	0.005
2,4-Dimethylpentane	I7	0.0021	0.0113	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0007	0.0038	0.000	0.000
Benzene	A6	0.0131	0.0550	0.004	0.004
3,3-Dimethylpentane	I7	0.0009	0.0048	0.000	0.000
Cyclohexane	N6	0.0146	0.0660	0.005	0.005
2-Methylhexane	I7	0.0087	0.0468	0.004	0.004
2,3-Dimethylpentane	I7	0.0023	0.0124	0.001	0.001

1,1-Dimethylcyclopentane	N7	0.0018	0.0095	0.001	0.001
3-Methylhexane	I7	0.0080	0.0431	0.004	0.004
1c,3-Dimethylcyclopentane	N7	0.0024	0.0127	0.001	0.001
1t,3-Dimethylcyclopentane	N7	0.0022	0.0116	0.001	0.001
3-Ethylpentane	I7	0.0004	0.0021	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0034	0.0179	0.002	0.002
n-Heptane	P7	0.0145	0.0781	0.007	0.007
1c,2-Dimethylcyclopentane	N7	0.0021	0.0111	0.001	0.001
Methylcyclohexane	N7	0.0279	0.1471	0.011	0.011
2,2-Dimethylhexane	I8	0.0007	0.0043	0.000	0.000
1,1,3-Trimethylcyclopentane	N7	0.0002	0.0012	0.000	0.000
Ethylcyclopentane	N7	0.0009	0.0047	0.000	0.000
2,5-Dimethylhexane	I8	0.0010	0.0061	0.001	0.001
2,2,3-Trimethylpentane	I8	0.0007	0.0043	0.000	0.000
2,4-Dimethylhexane	I8	0.0002	0.0012	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0005	0.0030	0.000	0.000
3,3-Dimethylhexane	I8	0.0003	0.0018	0.000	0.000
Toluene	A7	0.0171	0.0847	0.006	0.006
2,3-Dimethylhexane	I8	0.0006	0.0037	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0001	0.0006	0.000	0.000
2-Methylheptane	I8	0.0035	0.0215	0.002	0.002
4-Methylheptane	I8	0.0011	0.0068	0.001	0.001
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
1c,2c,4-Trimethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
3-Methylheptane	I8	0.0029	0.0178	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0036	0.0217	0.002	0.002
3-Ethylhexane	I8	0.0004	0.0025	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0017	0.0103	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0007	0.0042	0.000	0.000
2,2,5-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
3c-Ethylmethylcyclopentane	N8	0.0002	0.0012	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
2,2,4-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0011	0.0066	0.001	0.001
1t,3-Dimethylcyclohexane	N8	0.0003	0.0018	0.000	0.000
n-Octane	P8	0.0061	0.0374	0.003	0.003
1c,4-Dimethylcyclohexane	N8	0.0008	0.0048	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
2,2-Dimethylheptane	I9	0.0004	0.0027	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0008	0.0054	0.000	0.000
2,2,3-Trimethylhexane	I9	0.0003	0.0020	0.000	0.000
2,4-Dimethylheptane	I9	0.0002	0.0014	0.000	0.000
4,4-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
Ethylcyclohexane	N8	0.0008	0.0048	0.000	0.000
n-Propylcyclopentane	N8	0.0005	0.0030	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0002	0.0013	0.000	0.000
2,5-Dimethylheptane	I9	0.0008	0.0055	0.000	0.000
3,3-Dimethylheptane	I9	0.0002	0.0014	0.000	0.000
3,5-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
2,6-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
Ethylbenzene	I8	0.0007	0.0040	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0037	0.0211	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0012	0.0068	0.000	0.000
4-Methyloctane	I9	0.0004	0.0027	0.000	0.000
2-Methyloctane	I9	0.0006	0.0041	0.000	0.000
3-Methyloctane	I9	0.0001	0.0007	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	0.0006	0.0041	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0005	0.0028	0.000	0.000

i-Butylcyclopentane	N9	0.0003	0.0020	0.000	0.000
n-Nonane	P9	0.0018	0.0124	0.001	0.001
1,1-Methylethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
i-Propylbenzene	A9	0.0001	0.0006	0.000	0.000
2,4-Dimethyloctane	I10	0.0001	0.0007	0.000	0.000
n-Butylcyclopentane	N9	0.0002	0.0013	0.000	0.000
n-Propylbenzene	A9	0.0002	0.0013	0.000	0.000
3-Methyl-5-ethylheptane	I10	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	0.0006	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0002	0.0013	0.000	0.000
2,3-Dimethyloctane	I10	0.0001	0.0007	0.000	0.000
5-Methylnonane	I10	0.0001	0.0007	0.000	0.000
1,2-Methylethylbenzene	A9	0.0001	0.0006	0.000	0.000
3-Methylnonane	I10	0.0001	0.0007	0.000	0.000
t-Butylbenzene	A10	0.0001	0.0007	0.000	0.000
UnknownC9s	U9	0.0005	0.0034	0.000	0.000
n-Decane	P10	0.0004	0.0031	0.000	0.000
UnknownC10s	U10	0.0004	0.0031	0.000	0.000
n-Undecane	P11	0.0001	0.0009	0.000	0.000
n-Dodecane	P12	0.0001	0.0009	0.000	0.000
TOTAL		100.00000	100.00000	1.8288	1.8385

CALCULATED VALUES**

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.65	14.73
BENZENE	0.0131	0.0550	LHV NET DRY REAL :	941.2 /scf	946.4 /scf
TOLUENE	0.0171	0.0847	NET WET REAL :	924.7 /scf	929.9 /scf
ETHYLBENZENE	0.0007	0.0040	HHV GROSS DRY REAL :	1042.5 /scf	1048.2 /scf
XYLENES	0.0054	0.0307	GROSS WET REAL :	1024.3 /scf	1030.0 /scf
TOTAL BTEX	0.0363	0.1744	NET HEATING VALUE (60 °F ideal reaction):		19221.5 Btu/lbm
			GROSS HEATING VALUE (60°F ideal reaction):		21290.2 Btu/lbm
			RELATIVE DENSITY (AIR=1):		0.6417
			DENSITY		0.04905 lb/scf
			COMPRESSIBILITY FACTOR :		0.9976
			REGULAR WOBBE INDEX		1302.3

*(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	4747.8 /scf	Relative Density - SG (Air=1)	3.2807	C6+ factors
Gross Dry Ideal BTU	5097 /scf	Z Compressibility Factor	0.99288	0.9922
Net Dry Ideal BTU	19173.3 /lb	Density Factor	250.359 lbm/1000 ft3	
Gross Dry Ideal BTU	20585.4 /lb	Molar Mass or MW	95 g/mol	
		Volume Liquid Ideal gas	0.102 scf/gal	24.5

**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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