EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY:	**05-103-10819**	NAME/DESCRIP :	**PCU 296-7A4**
LEASE #:			**PRODUCTION CASING**
FIELD/AREA:			

PROJECT NO. :	**202509066**	ANALYSIS NO. :	**01**
COMPANY NAME :	**QB ENERGY OPERATING, LLC**	ANALYSIS DATE:	SEPTEMBER 19, 2025 12:27
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	SEPTEMBER 09, 2025
CUSTOMER REF:		TO:	
PRODUCER :		EFFECTIVE DATE:	

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

SAMPLE CYCLE:		SAMPLE TYPE:	
SAMPLE PRES. :	2140 psig	PROBE :	
FLOW PRES. :	psig	CYLINDER NO. :	ECA-739
LAB PRES:	psig	SAMPLED BY :	NICK CROY
SAMPLE TEMP. :	ºf	SAMPLING COMPANY:	QB ENERGY
AMBIENT TEMP.:	ºf	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	GPM @ 14.73
ALCOHOLS	0.0001	0.0002	0.0000	0.0000
HELIUM	0.00	0.00	---	---
HYDROGEN	0.01	0.00	---	---
OXYGEN/ARGON	0.04	0.07	---	---
NITROGEN	0.18	0.28	---	---
CARBON DIOXIDE	7.11	17.08	---	---
METHANE	91.1685	79.8077	---	---
ETHANE	1.3515	2.2175	0.3606	0.3626
PROPANE	0.0703	0.1692	0.0190	0.0191
I-BUTANE	0.0171	0.0542	0.0060	0.0060
N-BUTANE	0.0080	0.0254	0.0030	0.0030
I-PENTANE	0.0026	0.0103	0.0010	0.0010
N-PENTANE	0.0000	0.0000	0.0000	0.0000
HEXANES PLUS	0.0419	0.2855	0.0130	0.0130
TOTALS	100.00000	100.00000	0.4026	0.4047

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0053	0.0226
TOLUENE	0.0054	0.0272
ETHYLBENZENE	0.0002	0.0011
XYLENES	0.0024	0.0139
TOTAL BTEX	0.0133	0.0648

**(DETAILED HYDROCARBON ANALYSIS/NJ 1993)*
Mod ASTM D6730,GPA 2261 & GPA 2286.

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

CALCULATED VALUES**

	BTU @	14.65	14.73
LHV	NET DRY REAL :	854.2 **/scf**	858.8 **/scf**
	NET WET REAL :	839.3 **/scf**	843.9 **/scf**
HHV	GROSS DRY REAL :	948.3 **/scf**	953.5 **/scf**
	GROSS WET REAL :	931.7 **/scf**	936.9 **/scf**

NET HEATING VALUE (60 °F ideal reaction):	17724.7 **Btu/lbm**
GROSS HEATING VALUE (60°F ideal reaction):	19675.4 **Btu/lbm**
RELATIVE DENSITY (AIR=1):	0.6317
DENSITY	0.04828 **lbm/scf**
COMPRESSIBILITY FACTOR :	0.9978
REGULAR WOBBE INDEX	1194.3

EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	202509066	ANALYSIS NO. :	01
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	SEPTEMBER 19, 2025 12:27
ACCOUNT NO. :		SAMPLE DATE :	SEPTEMBER 09, 2025
PRODUCER :		CYLINDER NO. :	ECA-739
LEASE NO. :		SAMPLED BY :	NICK CROY
NAME/DESCRIP :	PCU 296-7A4 PRODUCTION CASING		
FIELD DATA		SAMPLE TEMP. :	
SAMPLE PRES. :	2140	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm mol*		
COMMENTS :			

Componet	Mole %	Wt %
Helium	0.00	0.00
Hydrogen	0.01	0.00
Carbon Dioxide	7.11	17.08
Nitrogen	0.18	0.28
Methane	91.1685	79.8077
Ethane	1.3515	2.2175
Propane	0.0703	0.1692
Isobutane	0.0171	0.0542
n-Butane	0.0080	0.0254
Isopentane	0.0025	0.0099
n-Pentane	0.0000	0.0000
Cyclopentane	0.0001	0.0004
n-Hexane	0.0004	0.0019
Cyclohexane	0.0012	0.0055
Other Hexanes	0.0015	0.0070
Heptanes	0.0015	0.0079
Methylcyclohexane	0.0016	0.0086
2,2,4 Trimethylpentane	0.0000	0.0000
Benzene	0.0053	0.0226
Toluene	0.0054	0.0272
Ethylbenzene	0.0002	0.0011
Xylenes	0.0024	0.0139
C8+ Heavies	0.0224	0.1898
Subtotal	99.95990	99.92980
Oxygen/Argon	0.04	0.07
Alcohols	0.0001	0.0002
Total	100.00000	100.00000

Calculated Values BTU @ **14.65**		**Total Sample**	**C6+ Fraction**	**C8+ Fraction**	**C10+ Fraction**	
LHV	Net Dry Real:	854.2	6174.9	7512.2	8273.2	**Btu/scf**
	Net Wet Real:	839.3	6067.0	7380.9	8128.6	**Btu/scf**
HHV	Gross Dry Real:	948.3	6622.6	8100.5	8942.8	**Btu/scf**
	Gross Wet Real:	931.7	6506.8	7958.9	8786.5	**Btu/scf**
Other Calculated Values						
Regualr Wobbe Index*		1194.3	3191.4	3565.1	3768.6	**Btu/scf**
Net Heating Value (60 °F ideal reaction):		17724.7	18579.3	18740.2	18775.6	**Btu/lbm**
Gross Heating Value (60°F ideal reaction):		19675.4	19922.8	20203.9	20288.8	**Btu/lbm**
Molar Mass (MW):		18.32448	125.079	150.375	164.098	**g/mol**
Relative Density (AIR=1):		0.6317	4.3185	5.1916	5.6652	**SG**
Density:		0.04828	0.32962	0.39625	0.43241	**lbm/scf**
Compressiblity Factor:		0.9978	0.9983	0.9996	0.9999	**Z**
Liquid Volume real gas @:	**14.65**	17.0006	0.013	0.009	0.008	**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 uderscore) indicates there was no tube pulled for H2S.

EMPACT Analytical Systems Inc. 365 S Main St Brighton, CO 80601 303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

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AMBIENT TEMP.:	ºf	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	---	0.01	0.00	---	---
Oxygen/Argon	---	0.04	0.07	---	---
Nitrogen	---	0.18	0.28	---	---
Carbon Dioxide	---	7.11	17.08	---	---
Methane	P1	91.1685	79.8077	---	---
Ethane	P2	1.3515	2.2175	0.361	0.363
Propane	P3	0.0703	0.1692	0.019	0.019
i-Butane	I4	0.0171	0.0542	0.006	0.006
Methanol	X1	0.0001	0.0002	0.000	0.000
n-Butane	P4	0.0080	0.0254	0.003	0.003
2,2-Dimethylpropane	I5	0.0005	0.0020	0.000	0.000
i-Pentane	I5	0.0020	0.0079	0.001	0.001
2,2-Dimethylbutane	I6	0.0003	0.0014	0.000	0.000
Cyclopentane	N5	0.0001	0.0004	0.000	0.000
2,3-Dimethylbutane	I6	0.0001	0.0005	0.000	0.000
2-Methylpentane	I6	0.0004	0.0019	0.000	0.000
3-Methylpentane	I6	0.0002	0.0009	0.000	0.000
n-Hexane	P6	0.0004	0.0019	0.000	0.000
2,2-Dimethylpentane	I7	0.0001	0.0005	0.000	0.000
Methylcyclopentane	N6	0.0005	0.0023	0.000	0.000
Benzene	A6	0.0053	0.0226	0.001	0.001
Cyclohexane	N6	0.0012	0.0055	0.000	0.000
2-Methylhexane	I7	0.0002	0.0011	0.000	0.000
1,1-Dimethylcyclopentane	N7	0.0001	0.0005	0.000	0.000
3-Methylhexane	I7	0.0002	0.0011	0.000	0.000
1c,3-Dimethylcyclopentane	N7	0.0001	0.0005	0.000	0.000
1t,3-Dimethylcyclopentane	N7	0.0001	0.0005	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0001	0.0005	0.000	0.000
n-Heptane	P7	0.0004	0.0022	0.000	0.000

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Methylcyclohexane	N7	0.0016	0.0086	0.001	0.001
Ethylcyclopentane	N7	0.0001	0.0005	0.000	0.000
2,5-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
Toluene	A7	0.0054	0.0272	0.002	0.002
2-Methylheptane	I8	0.0002	0.0013	0.000	0.000
4-Methylheptane	I8	0.0001	0.0006	0.000	0.000
3-Methylheptane	I8	0.0002	0.0013	0.000	0.000
1c,2t,3-Trimethylcyclopentane	N8	0.0003	0.0019	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
1,1-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
UnknownC7s	U7	0.0001	0.0005	0.000	0.000
n-Octane	P8	0.0005	0.0031	0.000	0.000
1c,4-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	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
Ethylbenzene	I8	0.0002	0.0011	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0016	0.0093	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0006	0.0035	0.000	0.000
4-Methyloctane	I9	0.0001	0.0007	0.000	0.000
2-Methyloctane	I9	0.0001	0.0007	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	0.0001	0.0007	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0002	0.0011	0.000	0.000
i-Butylcyclopentane	N9	0.0001	0.0007	0.000	0.000
n-Nonane	P9	0.0006	0.0042	0.000	0.000
n-Butylcyclopentane	N9	0.0001	0.0007	0.000	0.000
n-Propylbenzene	A9	0.0001	0.0006	0.000	0.000
1,3-Methylethylbenzene	A9	0.0001	0.0006	0.000	0.000
1,4-Methylethylbenzene	A9	0.0001	0.0006	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0004	0.0026	0.000	0.000
5-Methylnonane	I10	0.0001	0.0008	0.000	0.000
1,2-Methylethylbenzene	A9	0.0001	0.0006	0.000	0.000
3-Methylnonane	I10	0.0001	0.0008	0.000	0.000
t-Butylbenzene	A10	0.0003	0.0022	0.000	0.000
UnknownC9s	U9	0.0002	0.0014	0.000	0.000
n-Decane	P10	0.0009	0.0070	0.001	0.001
3-Ethylnonane	I10	0.0001	0.0009	0.000	0.000
1,3-Diethylbenzene	A10	0.0002	0.0015	0.000	0.000
1,3-Methyl-n-propylbenzene	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-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	0.0001	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	0.0004	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	0.0001	0.0008	0.000	0.000
1,4-Methyl-t-butylbenzene	A11	0.0001	0.0008	0.000	0.000
UnknownC10s	U10	0.0003	0.0023	0.000	0.000
n-Undecane	P11	0.0038	0.0324	0.003	0.003
1,4-Ethyl-i-propylbenzene	A11	0.0001	0.0008	0.000	0.000
1,2,3,5-Tetramethylbenzene	A11	0.0001	0.0007	0.000	0.000
1,2-Ethyl-n-propylbenzene	A11	0.0002	0.0016	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	0.0001	0.0009	0.000	0.000
sec-Pentylbenzene	A11	0.0001	0.0008	0.000	0.000
n-Pentylbenzene	A11	0.0001	0.0008	0.000	0.000

1,2-Di-n-propylbenzene	A11	0.0001	0.0009	0.000	0.000
1,4-Di-i-propylbenzene	A11	0.0001	0.0009	0.000	0.000
Tetrahydronaphthalene	A10	0.0001	0.0007	0.000	0.000
Naphthalene	A10	0.0002	0.0014	0.000	0.000
UnknownC11s	U11	0.0009	0.0077	0.001	0.001
n-Dodecane	P12	0.0016	0.0149	0.001	0.001
1,3,5-Triethylbenzene	A12	0.0003	0.0027	0.000	0.000
1,2,4-Triethylbenzene	A12	0.0001	0.0009	0.000	0.000
1,4-Methyl-n-pentylbenzene	A12	0.0001	0.0009	0.000	0.000
n-Hexylbenzene	A12	0.0002	0.0017	0.000	0.000
1,2,3,4,5-Pentamethylbenzene	A13	0.0004	0.0032	0.000	0.000
2-Methylnaphthalene	A11	0.0001	0.0008	0.000	0.000
UnknownC12s	U12	0.0015	0.0128	0.001	0.001
n-Tridecane	P13	0.0009	0.0091	0.001	0.001
UnknownC13s	U13	0.0006	0.0061	0.000	0.000
n-Tetradecane	P14	0.0005	0.0054	0.000	0.000
UnknownC14s	U14	0.0003	0.0033	0.000	0.000
n-Pentadecane	P15	0.0003	0.0035	0.000	0.000
UnknownC15s	U15	0.0001	0.0011	0.000	0.000
n-Hexadecane	P16	0.0002	0.0025	0.000	0.000
UnknownC16s	U16	0.0003	0.0037	0.000	0.000
n-Heptadecane	P17	0.0001	0.0013	0.000	0.000
UnknownC17s	U17	0.0002	0.0026	0.000	0.000
UnknownC18s	U18	0.0003	0.0041	0.000	0.000
UnknownC19s	U19	0.0001	0.0015	0.000	0.000
TOTAL		100.00000	100.00000	0.4026	0.4047

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0053	0.0226
TOLUENE	0.0054	0.0272
ETHYLBENZENE	0.0002	0.0011
XYLENES	0.0024	0.0139
TOTAL BTEX	0.0133	0.0648

*(DETAILED HYDROCARBON ANALYSIS/NJ 1993)
Mod ASTM D6730,GPA 2261 & GPA 2286.

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

CALCULATED VALUES**

	BTU @	14.65	14.73
LHV	NET DRY REAL :	854.2 /scf	858.8 /scf
	NET WET REAL :	839.3 /scf	843.9 /scf
HHV	GROSS DRY REAL :	948.3 /scf	953.5 /scf
	GROSS WET REAL :	931.7 /scf	936.9 /scf

NET HEATING VALUE (60 °F ideal reaction):	17724.7	Btu/lbm
GROSS HEATING VALUE (60°F ideal reaction):	19675.4	Btu/lbm
RELATIVE DENSITY (AIR=1):	0.6317	
DENSITY	0.04828	lb/scf
COMPRESSIBILITY FACTOR :	0.9978	
REGULAR WOBBE INDEX	1194.3	

C6+ Fraction of DHA Gas Analysis @60°F, 14.696 psia

Net Dry Ideal BTU	6183.8 /scf	Relative Density - SG (Air=1)	4.3185	***C6+factors***
Gross Dry Ideal BTU	6632.1 /scf	**Z** Compressiblity Factor	0.9983	0.99737
Net Dry Ideal BTU	18579.3 /lb	Density Factor	329.619 lbm/1000 ft3	
Gross Dry Ideal BTU	19922.8 /lb	Molar Mass or MW	125.079 g/mol	
		Volume Liquid Ideal gas	0.013 scf/gal	21.1

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.