EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY:	**05-103-10457**	NAME/DESCRIP :	**PCU T78X-12G3 SURFACE CSG**
LEASE #:			
FIELD/AREA:			
PROJECT NO. :	**202505076**	ANALYSIS NO. :	**02**
COMPANY NAME :	**QB ENERGY OPERATING, LLC**	ANALYSIS DATE:	MAY 19, 2025 16:45
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	MAY 1, 2025
CUSTOMER REF:		TO:	
PRODUCER :	QB ENERGY OPERATING LLC	EFFECTIVE DATE:	
FIELD DATA			
SAMPLE CYCLE:		SAMPLE TYPE:	
SAMPLE PRES. :	769 psig	PROBE :	
FLOW PRES. :	psig	CYLINDER NO. :	157
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	0.0003	0.0005	0.0000	0.0000
HELIUM	0.00	0.00	---	---
HYDROGEN	0.00	0.00	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.06	0.09	---	---
CARBON DIOXIDE	4.76	11.06	---	---
METHANE	88.1763	74.6965	---	---
ETHANE	4.8013	7.6235	1.2802	1.2872
PROPANE	1.1840	2.7569	0.3248	0.3266
I-BUTANE	0.2957	0.9076	0.0969	0.0975
N-BUTANE	0.2372	0.7280	0.0750	0.0754
I-PENTANE	0.1282	0.4880	0.0470	0.0472
N-PENTANE	0.0744	0.2835	0.0270	0.0271
HEXANES PLUS	0.2826	1.3655	0.1110	0.1113
TOTALS	100.00000	100.00000	1.9619	1.9723

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0152	0.0627
TOLUENE	0.0039	0.0190
ETHYLBENZENE	0.0000	0.0000
XYLENES	0.0000	0.0000
TOTAL BTEX	0.0191	0.0817

*(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 :	942.6 /scf	947.7 /scf
	NET WET REAL :	926.1 /scf	931.2 /scf
HHV	GROSS DRY REAL :	1043.9 /scf	1049.6 /scf
	GROSS WET REAL :	1025.7 /scf	1031.4 /scf

NET HEATING VALUE (60 °F ideal reaction):	18907.6	Btu/lbm
GROSS HEATING VALUE (60°F ideal reaction):	20937.8	Btu/lbm
RELATIVE DENSITY (AIR=1):	0.6537	
DENSITY	0.04990	lbm/scf
COMPRESSIBILITY FACTOR :	0.9975	
REGULAR WOBBE INDEX	1292.0	

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EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	202505076	ANALYSIS NO. :	02
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	MAY 19, 2025 16:45
ACCOUNT NO. :		SAMPLE DATE :	MAY 1, 2025
PRODUCER :	QB ENERGY OPERATING LLC	CYLINDER NO. :	157
LEASE NO. :		SAMPLED BY :	NICK CROY
NAME/DESCRIP :	PCU T78X-12G3 SURFACE CSG		
FIELD DATA		SAMPLE TEMP. :	
SAMPLE PRES. :	769	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm mol*		
COMMENTS :			

Componet	Mole %	Wt %
Helium	0.00	0.00
Hydrogen	0.00	0.00
Carbon Dioxide	4.76	11.06
Nitrogen	0.06	0.09
Methane	88.1763	74.6965
Ethane	4.8013	7.6235
Propane	1.1840	2.7569
Isobutane	0.2957	0.9076
n-Butane	0.2372	0.7280
Isopentane	0.1242	0.4732
n-Pentane	0.0744	0.2835
Cyclopentane	0.0040	0.0148
n-Hexane	0.0383	0.1743
Cyclohexane	0.0211	0.0938
Other Hexanes	0.0848	0.3838
Heptanes	0.0668	0.3520
Methylcyclohexane	0.0497	0.2577
2,2,4 Trimethylpentane	0.0001	0.0006
Benzene	0.0152	0.0627
Toluene	0.0039	0.0190
Ethylbenzene	0.0000	0.0000
Xylenes	0.0000	0.0000
C8+ Heavies	0.0027	0.0216
Subtotal	99.99970	99.99950
Oxygen/Argon	0.00	0.00
Alcohols	0.0003	0.0005
Total	100.00000	100.00000

Calculated Values BTU @ **14.65**		**Total Sample**	**C6+ Fraction**	**C8+ Fraction**	**C10+ Fraction**	
LHV	Net Dry Real:	942.6	4619.2	7220.8	9189.7	**Btu/scf**
	Net Wet Real:	926.1	4538.5	7094.6	9029.1	**Btu/scf**
HHV	Gross Dry Real:	1043.9	4966.3	7772.0	9877.5	**Btu/scf**
	Gross Wet Real:	1025.7	4879.5	7636.1	9704.8	**Btu/scf**
Other Calculated Values						
Regualr Wobbe Index*		1292.0	2779.4	3426.6	3933.2	**Btu/scf**
Net Heating Value (60 °F ideal reaction):		18907.6	19186.7	19203.7	19145.5	**Btu/lbm**
Gross Heating Value (60°F ideal reaction):		20937.8	20627.8	20670.4	20578.8	**Btu/lbm**
Molar Mass (MW):		18.93771	91.488	149.51	183.789	**g/mol**
Relative Density (AIR=1):		0.6537	3.1588	5.1621	6.3459	**SG**
Density:		0.04990	0.24108	0.39398	0.48431	**lbm/scf**
Compressiblity Factor:		0.9975	0.9916	0.9986	1.0000	**Z**
Liquid Volume real gas @:	**14.65**	17.6346	0.1107	0.001	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 uderscore) indicates there was no tube pulled for H2S.

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EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PRIMARY DB KEY:	**05-103-10457**	NAME/DESCRIP :	**PCU T78X-12G3**
LEASE #:			**SURFACE CSG**
FIELD/AREA:			
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COMPANY NAME :	**QB ENERGY OPERATING, LLC**	ANALYSIS DATE:	MAY 19, 2025 16:45
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	MAY 1, 2025
CUSTOMER REF:		TO:	
PRODUCER :	QB ENERGY OPERATING LLC	EFFECTIVE DATE:	
FIELD DATA			
SAMPLE CYCLE:		SAMPLE TYPE:	
SAMPLE PRES. :	769 psig	PROBE :	
FLOW PRES. :	psig	CYLINDER NO. :	157
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	PIANO #	MOLE %	MASS %	GPM @ **14.65**	GPM @ **14.73**
Nitrogen	---	0.06	0.09	---	---
Carbon Dioxide	---	4.76	11.06	---	---
Methane	P1	88.1763	74.6965	---	---
Ethane	P2	4.8013	7.6235	1.280	1.287
Propane	P3	1.1840	2.7569	0.325	0.327
i-Butane	I4	0.2957	0.9076	0.097	0.098
Methanol	X1	0.0003	0.0005	0.000	0.000
n-Butane	P4	0.2372	0.7280	0.075	0.075
2,2-Dimethylpropane	I5	0.0041	0.0156	0.002	0.002
i-Pentane	I5	0.1201	0.4576	0.044	0.044
n-Pentane	P5	0.0744	0.2835	0.027	0.027
2,2-Dimethylbutane	I6	0.0054	0.0246	0.002	0.002
Cyclopentane	N5	0.0040	0.0148	0.001	0.001
2,3-Dimethylbutane	I6	0.0084	0.0382	0.003	0.003
2-Methylpentane	I6	0.0326	0.1483	0.013	0.013
3-Methylpentane	I6	0.0186	0.0847	0.008	0.008
n-Hexane	P6	0.0383	0.1743	0.016	0.016
2,2-Dimethylpentane	I7	0.0008	0.0042	0.000	0.000
Methylcyclopentane	N6	0.0198	0.0880	0.007	0.007
2,4-Dimethylpentane	I7	0.0024	0.0127	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0005	0.0026	0.000	0.000
Benzene	A6	0.0152	0.0627	0.004	0.004
3,3-Dimethylpentane	I7	0.0008	0.0042	0.000	0.000
Cyclohexane	N6	0.0211	0.0938	0.007	0.007
2-Methylhexane	I7	0.0078	0.0413	0.004	0.004
2,3-Dimethylpentane	I7	0.0052	0.0275	0.002	0.002
1,1-Dimethylcyclopentane	N7	0.0024	0.0125	0.001	0.001
3-Methylhexane	I7	0.0094	0.0497	0.004	0.004

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1c,3-Dimethylcyclopentane	N7	0.0033	0.0171	0.002	0.002
1t,3-Dimethylcyclopentane	N7	0.0030	0.0156	0.001	0.001
3-Ethylpentane	I7	0.0006	0.0032	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0046	0.0239	0.002	0.002
2,2,4-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
n-Heptane	P7	0.0221	0.1169	0.010	0.010
1c,2-Dimethylcyclopentane	N7	0.0013	0.0068	0.001	0.001
Methylcyclohexane	N7	0.0497	0.2577	0.020	0.020
2,2-Dimethylhexane	I8	0.0012	0.0072	0.001	0.001
1,1,3-Trimethylcyclopentane	N7	0.0004	0.0024	0.000	0.000
Ethylcyclopentane	N7	0.0022	0.0114	0.001	0.001
Toluene	A7	0.0039	0.0190	0.001	0.001
t-Butylbenzene	A10	0.0001	0.0007	0.000	0.000
UnknownC9s	U9	0.0001	0.0007	0.000	0.000
UnknownC10s	U10	0.0002	0.0015	0.000	0.000
n-Dodecane	P12	0.0001	0.0009	0.000	0.000
n-Tridecane	P13	0.0002	0.0020	0.000	0.000
UnknownC13s	U13	0.0002	0.0020	0.000	0.000
n-Tetradecane	P14	0.0002	0.0021	0.000	0.000
UnknownC14s	U14	0.0001	0.0011	0.000	0.000
n-Pentadecane	P15	0.0001	0.0011	0.000	0.000
UnknownC15s	U15	0.0001	0.0011	0.000	0.000
n-Hexadecane	P16	0.0001	0.0012	0.000	0.000
TOTAL		100.00000	100.00000	1.9619	1.9723

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0152	0.0627
TOLUENE	0.0039	0.0190
ETHYLBENZENE	0.0000	0.0000
XYLENES	0.0000	0.0000
TOTAL BTEX	0.0191	0.0817

**(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 :	942.6 /scf	947.7 /scf	
	NET WET REAL :	926.1 /scf	931.2 /scf	
HHV	GROSS DRY REAL :	1043.9 /scf	1049.6 /scf	
	GROSS WET REAL :	1025.7 /scf	1031.4 /scf	
	NET HEATING VALUE (60 °F ideal reaction):		18907.6	Btu/lbm
	GROSS HEATING VALUE (60°F ideal reaction):		20937.8	Btu/lbm
	RELATIVE DENSITY (AIR=1):		0.6537	
	DENSITY		0.04990	lb/scf
	COMPRESSIBILITY FACTOR :		0.9975	
	REGULAR WOBBE INDEX		1292.0	

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

Net Dry Ideal BTU	4594.6 /scf	Relative Density - SG (Air=1)	3.1588		***C6+factors***
Gross Dry Ideal BTU	4939.8 /scf	**Z** Compressiblity Factor	0.99156		0.991
Net Dry Ideal BTU	19186.7 /lb	Density Factor	241.084	lbm/1000 ft3	
Gross Dry Ideal BTU	20627.8 /lb	Molar Mass or MW	91.488	g/mol	
		Volume Liquid Ideal gas	0.111	scf/gal	25.1

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.