



EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY: 05-103-09997	NAME/DESCRIP: PCU 8-1 4602
LEASE #: _____	SURFACE CSG
FIELD/AREA: _____	
PROJECT NO. : 202505077	ANALYSIS NO. : 01
COMPANY NAME : QB ENERGY OPERATING, LLC	ANALYSIS DATE: MAY 19, 2025 18:30
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. : 112 psig	PROBE : _____
FLOW PRES. : _____ psig	CYLINDER NO. : TBI572
LAB PRES: _____ psig	SAMPLED BY : NICK CROY
SAMPLE TEMP. : _____ °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: _____	

<u>COMPONENT</u>	<u>MOLE %</u>	<u>MASS %</u>	<u>GPM @ 14.65</u>	<u>GPM @ 14.73</u>
ALCOHOLS	0.0004	0.0005	0.0000	0.0000
HELIUM	0.00	0.00	---	---
HYDROGEN	1.77	0.13	---	---
OXYGEN/ARGON	0.02	0.02	---	---
NITROGEN	98.0645	99.7491	---	---
CARBON DIOXIDE	0.00	0.00	---	---
METHANE	0.1337	0.0779	---	---
ETHANE	0.0069	0.0075	0.0020	0.0020
PROPANE	0.0010	0.0016	0.0000	0.0000
I-BUTANE	0.0005	0.0010	0.0000	0.0000
N-BUTANE	0.0003	0.0006	0.0000	0.0000
I-PENTANE	0.0002	0.0005	0.0000	0.0000
N-PENTANE	0.0001	0.0002	0.0000	0.0000
HEXANES PLUS	0.0024	0.0111	0.0000	0.0000
<u>TOTALS</u>	<u>100.00000</u>	<u>100.00000</u>	<u>0.0020</u>	<u>0.0020</u>

<u>BTEX COMPONENTS</u>	<u>MOLE%</u>	<u>WT%</u>
BENZENE	0.0001	0.0003
TOLUENE	0.0003	0.0010
ETHYLBENZENE	0.0000	0.0000
XYLENES	0.0001	0.0004
<u>TOTAL BTEX</u>	<u>0.0005</u>	<u>0.0017</u>

	<u>CALCULATED VALUES**</u>	
<u>BTU @</u>	<u>14.65</u>	<u>14.73</u>
LHV NET DRY REAL :	6.1 /scf	6.1 /scf
NET WET REAL :	6.0 /scf	6.0 /scf
HHV GROSS DRY REAL :	7.2 /scf	7.2 /scf
GROSS WET REAL :	7.1 /scf	7.1 /scf
NET HEATING VALUE (60 °F ideal reaction):		88.3 Btu/lbm
GROSS HEATING VALUE (60°F ideal reaction):		102.8 Btu/lbm
RELATIVE DENSITY (AIR=1):		0.9507
DENSITY		0.07258 lbm/scf
COMPRESSIBILITY FACTOR :		0.9997
REGULAR WOBBE INDEX		7.4

*(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. :	202505077	ANALYSIS NO. :	01
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	MAY 19, 2025 18:30
ACCOUNT NO. :		SAMPLE DATE :	MAY 1, 2025
PRODUCER :	QB ENERGY OPERATING LLC	CYLINDER NO. :	TBI572
LEASE NO. :		SAMPLED BY :	NICK CROY
NAME/DESCRIP :	PCU 8-1 4602 SURFACE CSG		

FIELD DATA		SAMPLE TEMP. :	
SAMPLE PRES. :	112	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	— ppm mol		
COMMENTS :			

<u>Componet</u>	<u>Mole %</u>	<u>Wt %</u>
Helium	0.00	0.00
Hydrogen	1.77	0.13
Carbon Dioxide	0.00	0.00
Nitrogen	98.0645	99.7491
Methane	0.1337	0.0779
Ethane	0.0069	0.0075
Propane	0.0010	0.0016
Isobutane	0.0005	0.0010
n-Butane	0.0003	0.0006
Isopentane	0.0002	0.0005
n-Pentane	0.0001	0.0002
Cyclopentane	0.0000	0.0000
n-Hexane	0.0001	0.0003
Cyclohexane	0.0001	0.0003
Other Hexanes	0.0001	0.0003
Heptanes	0.0003	0.0012
Methylcyclohexane	0.0002	0.0007
2,2,4 Trimethylpentane	0.0000	0.0000
Benzene	0.0001	0.0003
Toluene	0.0003	0.0010
Ethylbenzene	0.0000	0.0000
Xylenes	0.0001	0.0004
C8+ Heavies	0.0011	0.0066
<u>Subtotal</u>	<u>99.97960</u>	<u>99.97950</u>
Oxygen/Argon	0.02	0.02
Alcohols	0.0004	0.0005
<u>Total</u>	<u>100.00000</u>	<u>100.00000</u>

	Total	C6+	C8+	C10+
Calculated Values BTU @ <u>14.65</u>	Sample	Fraction	Fraction	Fraction
LHV Net Dry Real:	6.1	6372.3	8198.8	9095.7 Btu/scf
Net Wet Real:	6.0	6260.9	8055.5	8936.7 Btu/scf
HHV Gross Dry Real:	7.2	6864.3	8875.4	9869.3 Btu/scf
Gross Wet Real:	7.1	6744.3	8720.2	9696.8 Btu/scf
Other Calculated Values				
Regualr Wobbe Index*	7.4	3273.4	3753.9	3969.7 Btu/scf
Net Heating Value (60 °F ideal reaction):	88.3	18913.1	19072.2	18954.6 Btu/lbm
Gross Heating Value (60°F ideal reaction):	102.8	20361.1	20629.9	20550.4 Btu/lbm
Molar Mass (MW):	27.54111	127.574	162.814	180.127 g/mol
Relative Density (AIR=1):	0.9507	4.4050	5.6216	6.2194 SG
Density:	0.07258	0.33618	0.42904	0.47466 lbm/scf
Compressibility Factor:	0.9997	0.9977	0.9997	1.0000 Z
Liquid Volume real gas @: <u>14.65</u>	10.9127	0	0	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

PRIMARY DB KEY: **05-103-09997** NAME/DESCRIP : **PCU 8-1 4602**
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 PROJECT NO. : **202505077** ANALYSIS NO. : **01**
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 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. : 112 psig PROBE :
 FLOW PRES. : psig CYLINDER NO. : TBI572
 LAB PRES: psig SAMPLED BY : NICK CROY
 SAMPLE TEMP. : °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 @ 14.65	GPM @ 14.73
Hydrogen	---	1.77	0.13	---	---
Oxygen/Argon	---	0.02	0.02	---	---
Nitrogen	---	98.0645	99.7491	---	---
Methane	P1	0.1337	0.0779	---	---
Ethane	P2	0.0069	0.0075	0.002	0.002
Propane	P3	0.0010	0.0016	0.000	0.000
i-Butane	I4	0.0005	0.0010	0.000	0.000
Methanol	X1	0.0004	0.0005	0.000	0.000
n-Butane	P4	0.0002	0.0004	0.000	0.000
i-Pentane	I5	0.0002	0.0005	0.000	0.000
UnknownC4s	U4	0.0001	0.0002	0.000	0.000
n-Pentane	P5	0.0001	0.0002	0.000	0.000
2-Methylpentane	I6	0.0001	0.0003	0.000	0.000
n-Hexane	P6	0.0001	0.0003	0.000	0.000
Benzene	A6	0.0001	0.0003	0.000	0.000
Cyclohexane	N6	0.0001	0.0003	0.000	0.000
2-Methylhexane	I7	0.0001	0.0004	0.000	0.000
3-Methylhexane	I7	0.0001	0.0004	0.000	0.000
n-Heptane	P7	0.0001	0.0004	0.000	0.000
Methylcyclohexane	N7	0.0002	0.0007	0.000	0.000
Toluene	A7	0.0003	0.0010	0.000	0.000
1c,2t,3-Trimethylcyclopentane	N8	0.0001	0.0004	0.000	0.000
n-Octane	P8	0.0001	0.0004	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0001	0.0004	0.000	0.000
UnknownC10s	U10	0.0001	0.0005	0.000	0.000

n-Undecane	P11	0.0001	0.0006	0.000	0.000
2-Methylindan	A11	0.0001	0.0005	0.000	0.000
n-Dodecane	P12	0.0001	0.0006	0.000	0.000
n-Tridecane	P13	0.0001	0.0006	0.000	0.000
n-Tetradecane	P14	0.0001	0.0007	0.000	0.000
n-Pentadecane	P15	0.0003	0.0023	0.000	0.000
TOTAL		100.00000	100.00000	0.0020	0.0020

CALCULATED VALUES**

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.65	14.73
BENZENE	0.0001	0.0003	LHV NET DRY REAL :	6.1 /scf	6.1 /scf
TOLUENE	0.0003	0.0010	NET WET REAL :	6.0 /scf	6.0 /scf
ETHYLBENZENE	0.0000	0.0000	HHV GROSS DRY REAL :	7.2 /scf	7.2 /scf
XYLENES	0.0001	0.0004	GROSS WET REAL :	7.1 /scf	7.1 /scf
TOTAL BTEX	0.0005	0.0017	NET HEATING VALUE (60 °F ideal reaction):		88.3 Btu/lbm
			GROSS HEATING VALUE (60°F ideal reaction):		102.8 Btu/lbm
			RELATIVE DENSITY (AIR=1):		0.9507
			DENSITY		0.07258 lb/scf
			COMPRESSIBILITY FACTOR :		0.9997
			REGULAR WOBBE INDEX		7.4

*(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	6377.9 /scf	Relative Density - SG (Air=1)	4.405	C6+ factors
Gross Dry Ideal BTU	6870.3 /scf	Z Compressibility Factor	0.99774	0.99642
Net Dry Ideal BTU	18913.1 /lb	Density Factor	336.182 lbm/1000 ft3	
Gross Dry Ideal BTU	20361.1 /lb	Molar Mass or MW	127.574 g/mol	
		Volume Liquid Ideal gas	0 scf/gal	20.8

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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