EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY: **05-103-10810** NAME/DESCRIP : **PCU 297-15A2**
LEASE #: **PRODUCTION CSG**
FIELD/AREA:

PROJECT NO. : **202505078** ANALYSIS NO. : **01**
COMPANY NAME : **QB ENERGY OPERATING, LLC** ANALYSIS DATE: MAY 20, 2025 06:40
OFFICE / BRANCH: PARACHUTE, CO SAMPLE DATE : MAY 2, 2025
CUSTOMER REF: TO:
PRODUCER : QB ENERGY OPERATING LLC EFFECTIVE DATE:

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

SAMPLE CYCLE: SAMPLE TYPE:
SAMPLE PRES. : 402 psig PROBE :
FLOW PRES. : psig CYLINDER NO. : ECA-784
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	0.0802	0.1470	0.0100	0.0100
HELIUM	0.00	0.00	---	---
HYDROGEN	7.07	0.81	---	---
OXYGEN/ARGON	0.86	1.57	---	---
NITROGEN	3.26	5.22	---	---
CARBON DIOXIDE	0.21	0.53	---	---
METHANE	80.7752	74.1088	---	---
ETHANE	4.9641	8.5365	1.3226	1.3298
PROPANE	1.4577	3.6760	0.4006	0.4028
I-BUTANE	0.3455	1.1484	0.1129	0.1135
N-BUTANE	0.3172	1.0543	0.0999	0.1004
I-PENTANE	0.1702	0.7015	0.0619	0.0623
N-PENTANE	0.1172	0.4836	0.0420	0.0422
HEXANES PLUS	0.3727	2.0139	0.1510	0.1515
TOTALS	100.00000	100.00000	2.2009	2.2125

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0003	0.0013
TOLUENE	0.0009	0.0048
ETHYLBENZENE	0.0001	0.0006
XYLENES	0.0006	0.0036
TOTAL BTEX	0.0019	0.0103

**(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 :	914.9 /scf	919.9 /scf
	NET WET REAL :	898.9 /scf	903.9 /scf
HHV	GROSS DRY REAL :	1013.7 /scf	1019.3 /scf
	GROSS WET REAL :	996.0 /scf	1001.6 /scf

NET HEATING VALUE (60 °F ideal reaction):	19899.0	Btu/lbm
GROSS HEATING VALUE (60°F ideal reaction):	22053.1	Btu/lbm
RELATIVE DENSITY (AIR=1):	0.6029	
DENSITY	0.04608	lbm/scf
COMPRESSIBILITY FACTOR :	0.9979	
REGULAR WOBBE INDEX	1306.9	

EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	202505078	ANALYSIS NO. :	01
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	MAY 20, 2025 06:40
ACCOUNT NO. :		SAMPLE DATE :	MAY 2, 2025
PRODUCER :	QB ENERGY OPERATING LLC	CYLINDER NO. :	ECA-784
LEASE NO. :		SAMPLED BY :	NICK CROY
NAME/DESCRIP :	PCU 297-15A2 PRODUCTION CSG		
FIELD DATA		SAMPLE TEMP. :	
SAMPLE PRES. :	402	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm mol*		
COMMENTS :			

Componet	Mole %	Wt %
Helium	0.00	0.00
Hydrogen	7.07	0.81
Carbon Dioxide	0.21	0.53
Nitrogen	3.26	5.22
Methane	80.7752	74.1088
Ethane	4.9641	8.5365
Propane	1.4577	3.6760
Isobutane	0.3455	1.1484
n-Butane	0.3172	1.0543
Isopentane	0.1635	0.6746
n-Pentane	0.1172	0.4836
Cyclopentane	0.0067	0.0269
n-Hexane	0.0675	0.3327
Cyclohexane	0.0274	0.1319
Other Hexanes	0.1349	0.6609
Heptanes	0.0833	0.4758
Methylcyclohexane	0.0274	0.1538
2,2,4 Trimethylpentane	0.0001	0.0006
Benzene	0.0003	0.0013
Toluene	0.0009	0.0048
Ethylbenzene	0.0001	0.0006
Xylenes	0.0006	0.0036
C8+ Heavies	0.0302	0.2479
Subtotal	99.05980	98.28300
Oxygen/Argon	0.86	1.57
Alcohols	0.0802	0.1470
Total	100.00000	100.00000

Calculated Values BTU @ **14.65**		**Total Sample**	**C6+ Fraction**	**C8+ Fraction**	**C10+ Fraction**	
LHV	Net Dry Real:	914.9	4805.1	7112.2	8602.5	**Btu/scf**
	Net Wet Real:	898.9	4721.1	6987.9	8452.1	**Btu/scf**
HHV	Gross Dry Real:	1013.7	5178.6	7654.9	9264.9	**Btu/scf**
	Gross Wet Real:	996.0	5088.1	7521.1	9102.9	**Btu/scf**
Other Calculated Values						
Regualr Wobbe Index*		1306.9	2850.3	3451.9	3826.7	**Btu/scf**
Net Heating Value (60 °F ideal reaction):		19899.0	19258.8	18696.1	18541.1	**Btu/lbm**
Gross Heating Value (60°F ideal reaction):		22053.1	20749.8	20118.6	19959.9	**Btu/lbm**
Molar Mass (MW):		17.48754	94.528	143.066	170.816	**g/mol**
Relative Density (AIR=1):		0.6029	3.2641	4.9397	5.8978	**SG**
Density:		0.04608	0.24910	0.37700	0.45012	**lbm/scf**
Compressiblity Factor:		0.9979	0.9913	0.9991	0.9999	**Z**
Liquid Volume real gas @:	**14.65**	16.9129	0.1505	0.012	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

PRIMARY DB KEY:	**05-103-10810**	NAME/DESCRIP :	**PCU 297-15A2**
LEASE #:			**PRODUCTION CSG**
FIELD/AREA:			
PROJECT NO. :	**202505078**	ANALYSIS NO. :	**01**
COMPANY NAME :	**QB ENERGY OPERATING, LLC**	ANALYSIS DATE:	MAY 20, 2025 06:40
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	MAY 2, 2025
CUSTOMER REF:		TO:	
PRODUCER :	QB ENERGY OPERATING LLC	EFFECTIVE DATE:	
FIELD DATA			
SAMPLE CYCLE:		SAMPLE TYPE:	
SAMPLE PRES. :	402 psig	PROBE :	
FLOW PRES. :	psig	CYLINDER NO. :	ECA-784
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**
Hydrogen	---	7.07	0.81	---	---
Oxygen/Argon	---	0.86	1.57	---	---
Nitrogen	---	3.26	5.22	---	---
Carbon Dioxide	---	0.21	0.53	---	---
Methane	P1	80.7752	74.1088	---	---
Ethane	P2	4.9641	8.5365	1.323	1.330
Propane	P3	1.4577	3.6760	0.401	0.403
i-Butane	I4	0.3455	1.1484	0.113	0.114
Methanol	X1	0.0802	0.1470	0.010	0.010
n-Butane	P4	0.3172	1.0543	0.100	0.100
2,2-Dimethylpropane	I5	0.0049	0.0202	0.002	0.002
i-Pentane	I5	0.1586	0.6544	0.058	0.058
n-Pentane	P5	0.1172	0.4836	0.042	0.042
2,2-Dimethylbutane	I6	0.0078	0.0384	0.003	0.003
Cyclopentane	N5	0.0067	0.0269	0.002	0.002
2,3-Dimethylbutane	I6	0.0123	0.0606	0.005	0.005
2-Methylpentane	I6	0.0517	0.2548	0.021	0.021
3-Methylpentane	I6	0.0294	0.1449	0.012	0.012
n-Hexane	P6	0.0675	0.3327	0.028	0.028
2,2-Dimethylpentane	I7	0.0018	0.0103	0.001	0.001
Methylcyclopentane	N6	0.0337	0.1622	0.012	0.012
2,4-Dimethylpentane	I7	0.0038	0.0218	0.002	0.002
2,2,3-Trimethylbutane	I7	0.0009	0.0052	0.000	0.000
Benzene	A6	0.0003	0.0013	0.000	0.000
3,3-Dimethylpentane	I7	0.0012	0.0069	0.001	0.001
Cyclohexane	N6	0.0274	0.1319	0.009	0.009

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

2-Methylhexane	I7	0.0127	0.0728	0.006	0.006
2,3-Dimethylpentane	I7	0.0062	0.0355	0.003	0.003
1,1-Dimethylcyclopentane	N7	0.0028	0.0157	0.001	0.001
3-Methylhexane	I7	0.0130	0.0745	0.006	0.006
1c,3-Dimethylcyclopentane	N7	0.0041	0.0230	0.002	0.002
1t,3-Dimethylcyclopentane	N7	0.0036	0.0202	0.002	0.002
3-Ethylpentane	I7	0.0008	0.0046	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0052	0.0292	0.002	0.002
2,2,4-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
n-Heptane	P7	0.0254	0.1455	0.012	0.012
Methylcyclohexane	N7	0.0274	0.1538	0.011	0.011
2,2-Dimethylhexane	I8	0.0006	0.0040	0.000	0.000
1,1,3-Trimethylcyclopentane	N7	0.0005	0.0032	0.000	0.000
Ethylcyclopentane	N7	0.0008	0.0045	0.000	0.000
2,5-Dimethylhexane	I8	0.0009	0.0059	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0008	0.0052	0.000	0.000
2,4-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0005	0.0032	0.000	0.000
3,3-Dimethylhexane	I8	0.0002	0.0013	0.000	0.000
Toluene	A7	0.0009	0.0048	0.000	0.000
2,3-Dimethylhexane	I8	0.0002	0.0013	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0001	0.0006	0.000	0.000
2-Methylheptane	I8	0.0018	0.0118	0.001	0.001
4-Methylheptane	I8	0.0005	0.0033	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	0.0005	0.0033	0.000	0.000
1c,2t,3-Trimethylcyclopentane	N8	0.0015	0.0096	0.001	0.001
3-Ethylhexane	I8	0.0002	0.0013	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0005	0.0032	0.000	0.000
1,1-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
3c-Ethylmethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0002	0.0013	0.000	0.000
1t,3-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
UnknownC7s	U7	0.0005	0.0029	0.000	0.000
n-Octane	P8	0.0014	0.0092	0.001	0.001
1c,4-Dimethylcyclohexane	N8	0.0002	0.0013	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
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	0.0003	0.0018	0.000	0.000
1,4-Dimethylbenzene (p-Xylene)	A8	0.0001	0.0006	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	0.0012	0.000	0.000
n-Nonane	P9	0.0002	0.0015	0.000	0.000
i-Propylbenzene	A9	0.0001	0.0007	0.000	0.000
i-Propylcyclohexane	N9	0.0001	0.0007	0.000	0.000
n-Propylbenzene	A9	0.0001	0.0007	0.000	0.000
3,6-Dimethyloctane	I10	0.0003	0.0025	0.000	0.000
1,3-Methylethylbenzene	A9	0.0012	0.0082	0.001	0.001
1,4-Methylethylbenzene	A9	0.0005	0.0034	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0007	0.0048	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	0.0004	0.0033	0.000	0.000
3-Methylnonane	I10	0.0001	0.0008	0.000	0.000
t-Butylbenzene	A10	0.0019	0.0146	0.001	0.001

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

i-Butylcyclohexane	N10	0.0001	0.0008	0.000	0.000
i-Butylbenzene	A10	0.0001	0.0007	0.000	0.000
sec-Butylbenzene	A10	0.0001	0.0007	0.000	0.000
UnknownC9s	U9	0.0001	0.0007	0.000	0.000
n-Decane	P10	0.0005	0.0041	0.000	0.000
1,2,3-Trimethylbenzene	A9	0.0004	0.0027	0.000	0.000
1,2-Methyl-i-propylbenzene	A10	0.0001	0.0007	0.000	0.000
1,4-Diethylbenzene	A10	0.0001	0.0007	0.000	0.000
1,4-Methyl-n-propylbenzene	A10	0.0001	0.0007	0.000	0.000
1,3-Dimethyl-5-ethylbenzene	A10	0.0001	0.0007	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
1,4-Methyl-t-butylbenzene	A11	0.0001	0.0009	0.000	0.000
UnknownC10s	U10	0.0003	0.0025	0.000	0.000
n-Undecane	P11	0.0006	0.0054	0.000	0.000
1,4-Ethyl-i-propylbenzene	A11	0.0001	0.0009	0.000	0.000
1,2,4,5-Tetramethylbenzene	A11	0.0001	0.0007	0.000	0.000
4-Methylindan	A11	0.0001	0.0007	0.000	0.000
2-Methylindan	A11	0.0001	0.0007	0.000	0.000
n-Pentylbenzene	A11	0.0001	0.0009	0.000	0.000
1,4-Di-i-propylbenzene	A11	0.0001	0.0009	0.000	0.000
Naphthalene	A10	0.0001	0.0007	0.000	0.000
1-t-Butyl-3,5-dimethylbenzene	A12	0.0001	0.0009	0.000	0.000
UnknownC11s	U11	0.0001	0.0009	0.000	0.000
n-Dodecane	P12	0.0008	0.0078	0.001	0.001
1,3,5-Triethylbenzene	A12	0.0002	0.0018	0.000	0.000
1,4-Methyl-n-pentylbenzene	A12	0.0002	0.0018	0.000	0.000
n-Hexylbenzene	A12	0.0002	0.0018	0.000	0.000
1,2,3,4,5-Pentamethylbenzene	A13	0.0003	0.0025	0.000	0.000
2-Methylnaphthalene	A11	0.0004	0.0033	0.000	0.000
UnknownC12s	U12	0.0005	0.0045	0.000	0.000
n-Tridecane	P13	0.0011	0.0116	0.001	0.001
UnknownC13s	U13	0.0009	0.0095	0.001	0.001
n-Tetradecane	P14	0.0011	0.0125	0.001	0.001
UnknownC14s	U14	0.0008	0.0091	0.001	0.001
n-Pentadecane	P15	0.0008	0.0097	0.001	0.001
UnknownC15s	U15	0.0012	0.0146	0.001	0.001
n-Hexadecane	P16	0.0004	0.0052	0.000	0.000
UnknownC16s	U16	0.0003	0.0039	0.000	0.000
n-Heptadecane	P17	0.0001	0.0014	0.000	0.000
UnknownC17s	U17	0.0001	0.0014	0.000	0.000
TOTAL		100.00000	100.00000	2.2009	2.2125

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0003	0.0013
TOLUENE	0.0009	0.0048
ETHYLBENZENE	0.0001	0.0006
XYLENES	0.0006	0.0036
TOTAL BTEX	0.0019	0.0103

**(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 :	914.9	/scf	919.9	/scf
	NET WET REAL :	898.9	/scf	903.9	/scf
HHV	GROSS DRY REAL :	1013.7	/scf	1019.3	/scf
	GROSS WET REAL :	996.0	/scf	1001.6	/scf
	NET HEATING VALUE (60 °F ideal reaction):			19899.0	Btu/lbm
	GROSS HEATING VALUE (60°F ideal reaction):			22053.1	Btu/lbm
	RELATIVE DENSITY (AIR=1):			0.6029	
	DENSITY			0.04608	lb/scf
	COMPRESSIBILITY FACTOR :			0.9979	
	REGULAR WOBBE INDEX			1306.9	

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

Net Dry Ideal BTU	4778.1 /scf	Relative Density - SG (Air=1)	3.2641	***C6+factors***
Gross Dry Ideal BTU	5149.5 /scf	**Z** Compressiblity Factor	0.99127	0.99054
Net Dry Ideal BTU	19258.8 /lb	Density Factor	249.103 lbm/1000 ft3	
Gross Dry Ideal BTU	20749.8 /lb	Molar Mass or MW	94.528 g/mol	
		Volume Liquid Ideal gas	0.151 scf/gal	23.1

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.