EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY:	**05-103-10810**	NAME/DESCRIP :	**PCU 297-15A2**
LEASE #:			**SURFACE CSG**
FIELD/AREA:			
PROJECT NO. :	**202505078**	ANALYSIS NO. :	**02**
COMPANY NAME :	**QB ENERGY OPERATING, LLC**	ANALYSIS DATE:	MAY 20, 2025 08:23
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. :	319 psig	PROBE :	
FLOW PRES. :	psig	CYLINDER NO. :	ECA-760
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
HELIUM	0.00	0.00	---	---
HYDROGEN	1.01	0.11	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.08	0.13	---	---
CARBON DIOXIDE	0.02	0.05	---	---
METHANE	91.0813	82.3268	---	---
ETHANE	4.7960	8.1253	1.2781	1.2851
PROPANE	1.7204	4.2743	0.4727	0.4753
I-BUTANE	0.3662	1.1992	0.1199	0.1206
N-BUTANE	0.3822	1.2516	0.1199	0.1206
I-PENTANE	0.1541	0.6257	0.0560	0.0563
N-PENTANE	0.1058	0.4301	0.0380	0.0382
HEXANES PLUS	0.2840	1.4770	0.1100	0.1103
TOTALS	100.00000	100.00000	2.1946	2.2064

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0079	0.0348
TOLUENE	0.0107	0.0556
ETHYLBENZENE	0.0002	0.0012
XYLENES	0.0026	0.0156
TOTAL BTEX	0.0214	0.1072

CALCULATED VALUES**

	BTU @	14.65	14.73
LHV	NET DRY REAL :	992.6 /scf	998.0 /scf
	NET WET REAL :	975.2 /scf	980.6 /scf
HHV	GROSS DRY REAL :	1098.9 /scf	1104.9 /scf
	GROSS WET REAL :	1079.7 /scf	1085.7 /scf

NET HEATING VALUE (60 °F ideal reaction):	21248.3 **Btu/lbm**
GROSS HEATING VALUE (60°F ideal reaction):	23524.9 **Btu/lbm**
RELATIVE DENSITY (AIR=1):	0.6121
DENSITY	0.04677 **lbm/scf**
COMPRESSIBILITY FACTOR :	0.9976
REGULAR WOBBE INDEX	1405.5

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

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

EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	202505078	ANALYSIS NO. :	02
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	MAY 20, 2025 08:23
ACCOUNT NO. :		SAMPLE DATE :	MAY 2, 2025
PRODUCER :	QB ENERGY OPERATING LLC	CYLINDER NO. :	ECA-760
LEASE NO. :		SAMPLED BY :	NICK CROY
NAME/DESCRIP :	PCU 297-15A2 SURFACE CSG		
FIELD DATA		SAMPLE TEMP. :	
SAMPLE PRES. :	319	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm mol*		
COMMENTS :			

Componet	Mole %	Wt %
Helium	0.00	0.00
Hydrogen	1.01	0.11
Carbon Dioxide	0.02	0.05
Nitrogen	0.08	0.13
Methane	91.0813	82.3268
Ethane	4.7960	8.1253
Propane	1.7204	4.2743
Isobutane	0.3662	1.1992
n-Butane	0.3822	1.2516
Isopentane	0.1485	0.6036
n-Pentane	0.1058	0.4301
Cyclopentane	0.0056	0.0221
n-Hexane	0.0425	0.2063
Cyclohexane	0.0233	0.1105
Other Hexanes	0.0902	0.4353
Heptanes	0.0507	0.2847
Methylcyclohexane	0.0340	0.1881
2,2,4 Trimethylpentane	0.0001	0.0006
Benzene	0.0079	0.0348
Toluene	0.0107	0.0556
Ethylbenzene	0.0002	0.0012
Xylenes	0.0026	0.0156
C8+ Heavies	0.0218	0.1443
Subtotal	100.00000	100.00000
Oxygen/Argon	0.00	0.00
Total	100.00000	100.00000

Calculated Values BTU @ 14.65		**Total Sample**	**C6+ Fraction**	**C8+ Fraction**	**C10+ Fraction**	
LHV	Net Dry Real:	992.6	4662.7	5817.2	8540.2	**Btu/scf**
	Net Wet Real:	975.2	4581.2	5715.5	8390.9	**Btu/scf**
HHV	Gross Dry Real:	1098.9	5013.2	6252.7	9175.6	**Btu/scf**
	Gross Wet Real:	1079.7	4925.6	6143.4	9015.2	**Btu/scf**
Other Calculated Values						
Regualr Wobbe Index*		1405.5	2793.3	3122.5	3787.7	**Btu/scf**
Net Heating Value (60 °F ideal reaction):		21248.3	19253.2	19785.5	19206.5	**Btu/lbm**
Gross Heating Value (60°F ideal reaction):		23524.9	20699.9	21268.1	20638.0	**Btu/lbm**
Molar Mass (MW):		17.74857	92.313	116.27	170.999	**g/mol**
Relative Density (AIR=1):		0.6121	3.1880	4.0143	5.9041	**SG**
Density:		0.04677	0.24328	0.30640	0.45061	**lbm/scf**
Compressiblity Factor:		0.9976	0.9918	0.9974	0.9999	**Z**
Liquid Volume real gas @:	**14.65**	17.6446	0.1097	0.007	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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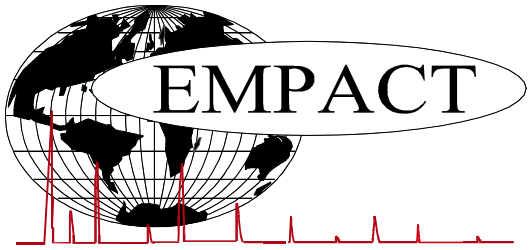

EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

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FIELD DATA			
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SAMPLE PRES. :	319 psig	PROBE :	
FLOW PRES. :	psig	CYLINDER NO. :	ECA-760
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	---	1.01	0.11	---	---
Nitrogen	---	0.08	0.13	---	---
Carbon Dioxide	---	0.02	0.05	---	---
Methane	P1	91.0813	82.3268	---	---
Ethane	P2	4.7960	8.1253	1.278	1.285
Propane	P3	1.7204	4.2743	0.473	0.475
i-Butane	I4	0.3662	1.1992	0.120	0.121
n-Butane	P4	0.3822	1.2516	0.120	0.121
2,2-Dimethylpropane	I5	0.0038	0.0154	0.001	0.001
i-Pentane	I5	0.1447	0.5882	0.053	0.053
n-Pentane	P5	0.1058	0.4301	0.038	0.038
2,2-Dimethylbutane	I6	0.0049	0.0238	0.002	0.002
Cyclopentane	N5	0.0056	0.0221	0.002	0.002
2,3-Dimethylbutane	I6	0.0084	0.0408	0.003	0.003
2-Methylpentane	I6	0.0351	0.1704	0.015	0.015
3-Methylpentane	I6	0.0187	0.0908	0.008	0.008
n-Hexane	P6	0.0425	0.2063	0.017	0.017
2,2-Dimethylpentane	I7	0.0007	0.0039	0.000	0.000
Methylcyclopentane	N6	0.0231	0.1095	0.008	0.008
2,4-Dimethylpentane	I7	0.0020	0.0113	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0004	0.0023	0.000	0.000
Benzene	A6	0.0079	0.0348	0.002	0.002
3,3-Dimethylpentane	I7	0.0006	0.0034	0.000	0.000
Cyclohexane	N6	0.0233	0.1105	0.008	0.008
2-Methylhexane	I7	0.0064	0.0361	0.003	0.003
2,3-Dimethylpentane	I7	0.0034	0.0192	0.002	0.002
1,1-Dimethylcyclopentane	N7	0.0019	0.0105	0.001	0.001

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3-Methylhexane	I7	0.0069	0.0389	0.003	0.003
1c,3-Dimethylcyclopentane	N7	0.0030	0.0166	0.001	0.001
1t,3-Dimethylcyclopentane	N7	0.0027	0.0149	0.001	0.001
3-Ethylpentane	I7	0.0006	0.0034	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0039	0.0216	0.002	0.002
2,2,4-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
n-Heptane	P7	0.0152	0.0858	0.007	0.007
1c,2-Dimethylcyclopentane	N7	0.0017	0.0094	0.001	0.001
Methylcyclohexane	N7	0.0340	0.1881	0.014	0.014
2,2-Dimethylhexane	I8	0.0005	0.0032	0.000	0.000
1,1,3-Trimethylcyclopentane	N7	0.0003	0.0019	0.000	0.000
Ethylcyclopentane	N7	0.0010	0.0055	0.000	0.000
2,5-Dimethylhexane	I8	0.0006	0.0039	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0006	0.0039	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	0.0107	0.0556	0.004	0.004
2,3-Dimethylhexane	I8	0.0003	0.0019	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0001	0.0006	0.000	0.000
2-Methylheptane	I8	0.0020	0.0129	0.001	0.001
4-Methylheptane	I8	0.0006	0.0039	0.000	0.000
3-Methyl-3-ethylpentane	I8	0.0001	0.0006	0.000	0.000
3-Methylheptane	I8	0.0009	0.0058	0.000	0.000
1c,2t,3-Trimethylcyclopentane	N8	0.0033	0.0209	0.002	0.002
3-Ethylhexane	I8	0.0005	0.0032	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0015	0.0095	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0004	0.0025	0.000	0.000
3c-Ethylmethylcyclopentane	N8	0.0001	0.0006	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
1t,2-Dimethylcyclohexane	N8	0.0009	0.0057	0.000	0.000
1t,3-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
n-Octane	P8	0.0036	0.0232	0.002	0.002
1c,4-Dimethylcyclohexane	N8	0.0005	0.0032	0.000	0.000
2,2-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0006	0.0043	0.000	0.000
2,2,3-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
2,4-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
Ethylcyclohexane	N8	0.0003	0.0019	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
2,5-Dimethylheptane	I9	0.0002	0.0015	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
Ethylbenzene	I8	0.0002	0.0012	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0018	0.0108	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0005	0.0030	0.000	0.000
3,4-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
4-Methyloctane	I9	0.0001	0.0007	0.000	0.000
2-Methyloctane	I9	0.0002	0.0015	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	0.0002	0.0014	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0003	0.0018	0.000	0.000
i-Butylcyclopentane	N9	0.0001	0.0007	0.000	0.000
n-Nonane	P9	0.0005	0.0036	0.000	0.000
1,1-Methylethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
n-Butylcyclopentane	N9	0.0001	0.0007	0.000	0.000
1,3-Methylethylbenzene	A9	0.0001	0.0007	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0001	0.0007	0.000	0.000
t-Butylbenzene	A10	0.0001	0.0007	0.000	0.000

UnknownC9s	U9	0.0001	0.0007	0.000	0.000
n-Decane	P10	0.0002	0.0016	0.000	0.000
UnknownC10s	U10	0.0001	0.0008	0.000	0.000
n-Undecane	P11	0.0001	0.0009	0.000	0.000
n-Tridecane	P13	0.0001	0.0010	0.000	0.000
n-Tetradecane	P14	0.0001	0.0011	0.000	0.000
n-Pentadecane	P15	0.0001	0.0012	0.000	0.000
n-Hexadecane	P16	0.0001	0.0013	0.000	0.000
TOTAL		100.00000	100.00000	2.1946	2.2064

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0079	0.0348
TOLUENE	0.0107	0.0556
ETHYLBENZENE	0.0002	0.0012
XYLENES	0.0026	0.0156
TOTAL BTEX	0.0214	0.1072

**(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 :	992.6 /scf	998.0 /scf
	NET WET REAL :	975.2 /scf	980.6 /scf
HHV	GROSS DRY REAL :	1098.9 /scf	1104.9 /scf
	GROSS WET REAL :	1079.7 /scf	1085.7 /scf

NET HEATING VALUE (60 °F ideal reaction):	21248.3 Btu/lbm
GROSS HEATING VALUE (60°F ideal reaction):	23524.9 Btu/lbm
RELATIVE DENSITY (AIR=1):	0.6121
DENSITY	0.04677 lb/scf
COMPRESSIBILITY FACTOR :	0.9976
REGULAR WOBBE INDEX	1405.5

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

Net Dry Ideal BTU	4638.8 /scf	Relative Density - SG (Air=1)	3.188	***C6+factors***
Gross Dry Ideal BTU	4987.5 /scf	**Z** Compressiblity Factor	0.99175	0.99104
Net Dry Ideal BTU	19253.2 /lb	Density Factor	243.277 lbm/1000 ft3	
Gross Dry Ideal BTU	20699.9 /lb	Molar Mass or MW	92.313 g/mol	
		Volume Liquid Ideal gas	0.11 scf/gal	24

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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