EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY:	**05-045-18087**	NAME/DESCRIP :	**110180057 596-29C 21**
LEASE #:			**BRAIDEN HEAD**
FIELD/AREA:			

PROJECT NO. :	**202502080**	ANALYSIS NO. :	**03**
COMPANY NAME :	**QB ENERGY OPERATING, LLC**	ANALYSIS DATE:	FEBRUARY 27, 2025 14:15
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	FEBRUARY 18, 2025
CUSTOMER REF:		TO:	
PRODUCER :	QB ENERGY OPERATING, LLC	EFFECTIVE DATE:	

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

SAMPLE CYCLE:			SAMPLE TYPE:	SPOT
SAMPLE PRES. :	128	psig	PROBE :	NO
FLOW PRES. :		psig	CYLINDER NO. :	ECA-810
LAB PRES:		psig	SAMPLED BY :	MIKE KELLEY
SAMPLE TEMP. :	33	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	0.00	0.00	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.06	0.09	---	---
CARBON DIOXIDE	4.81	11.10	---	---
METHANE	87.9377	73.9560	---	---
ETHANE	4.8096	7.5816	1.2822	1.2892
PROPANE	1.2702	2.9363	0.3488	0.3507
I-BUTANE	0.2986	0.9098	0.0969	0.0975
N-BUTANE	0.2089	0.6365	0.0660	0.0663
I-PENTANE	0.1255	0.4743	0.0460	0.0462
N-PENTANE	0.0690	0.2610	0.0250	0.0251
HEXANES PLUS	0.4105	2.0545	0.1670	0.1675
TOTALS	100.00000	100.00000	2.0319	2.0425

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0189	0.0774
TOLUENE	0.0371	0.1792
ETHYLBENZENE	0.0014	0.0078
XYLENES	0.0098	0.0545
TOTAL BTEX	0.0672	0.3189

**(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 :	948.1	**/scf**	953.3	**/scf**
	NET WET REAL :	931.5	**/scf**	936.7	**/scf**
HHV	GROSS DRY REAL :	1049.4	**/scf**	1055.2	**/scf**
	GROSS WET REAL :	1031.1	**/scf**	1036.9	**/scf**
	NET HEATING VALUE (60 °F ideal reaction):			18882.8	**Btu/lbm**
	GROSS HEATING VALUE (60°F ideal reaction):			20904.4	**Btu/lbm**
	RELATIVE DENSITY (AIR=1):			0.6583	
	DENSITY			0.05026	**lbm/scf**
	COMPRESSIBILITY FACTOR :			0.9975	
	REGULAR WOBBE INDEX			1294.3	

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EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	202502080	ANALYSIS NO. :	03
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	FEBRUARY 27, 2025 14:15
ACCOUNT NO. :		SAMPLE DATE :	FEBRUARY 18, 2025
PRODUCER :	QB ENERGY OPERATING, LLC	CYLINDER NO. :	ECA-810
LEASE NO. :		SAMPLED BY :	MIKE KELLEY
NAME/DESCRIP :	110180057 596-29C 21 BRAIDEN HEAD		
FIELD DATA		SAMPLE TEMP. :	33
SAMPLE PRES. :	128	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm mol*		
COMMENTS :	***SPOT*** ***NO PROBE***		

Componet	Mole %	Wt %
Helium	0.00	0.00
Hydrogen	0.00	0.00
Carbon Dioxide	4.81	11.10
Nitrogen	0.06	0.09
Methane	87.9377	73.9560
Ethane	4.8096	7.5816
Propane	1.2702	2.9363
Isobutane	0.2986	0.9098
n-Butane	0.2089	0.6365
Isopentane	0.1219	0.4611
n-Pentane	0.0690	0.2610
Cyclopentane	0.0036	0.0132
n-Hexane	0.0367	0.1658
Cyclohexane	0.0197	0.0869
Other Hexanes	0.0905	0.4068
Heptanes	0.0815	0.4267
Methylcyclohexane	0.0484	0.2491
2,2,4 Trimethylpentane	0.0001	0.0006
Benzene	0.0189	0.0774
Toluene	0.0371	0.1792
Ethylbenzene	0.0014	0.0078
Xylenes	0.0098	0.0545
C8+ Heavies	0.0664	0.3997
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:	948.1	4778.5	5665.6	8556.5	**Btu/scf**
	Net Wet Real:	931.5	4695.0	5566.6	8406.9	**Btu/scf**
HHV	Gross Dry Real:	1049.4	5127.2	6086.8	9208.4	**Btu/scf**
	Gross Wet Real:	1031.1	5037.6	5980.4	9047.4	**Btu/scf**
Other Calculated Values						
Regualr Wobbe Index*		1294.3	2813.9	3075.7	3902.1	**Btu/scf**
Net Heating Value (60 °F ideal reaction):		18882.8	19151.1	19567.5	20835.7	**Btu/lbm**
Gross Heating Value (60°F ideal reaction):		20904.4	20548.8	21026.6	22423.2	**Btu/lbm**
Molar Mass (MW):		19.07455	95.459	113.505	162.272	**g/mol**
Relative Density (AIR=1):		0.6583	3.2962	3.9194	5.6028	**SG**
Density:		0.05026	0.25155	0.29912	0.42761	**lbm/scf**
Compressiblity Factor:		0.9975	0.9933	0.9973	0.9999	**Z**
Liquid Volume real gas @:	**14.65**	17.6735	0.1665	0.0349	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:	**05-045-18087**	NAME/DESCRIP :	**110180057 596-29C 21**
LEASE #:			**BRAIDEN HEAD**
FIELD/AREA:			
PROJECT NO. :	**202502080**	ANALYSIS NO. :	**03**
COMPANY NAME :	**QB ENERGY OPERATING, LLC**	ANALYSIS DATE:	FEBRUARY 27, 2025 14:15
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	FEBRUARY 18, 2025
CUSTOMER REF:		TO:	
PRODUCER :	QB ENERGY OPERATING, LLC	EFFECTIVE DATE:	
FIELD DATA			
SAMPLE CYCLE:		SAMPLE TYPE:	SPOT
SAMPLE PRES. :	128 psig	PROBE :	NO
FLOW PRES. :	psig	CYLINDER NO. :	ECA-810
LAB PRES:	psig	SAMPLED BY :	MIKE KELLEY
SAMPLE TEMP. :	33 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	---	4.81	11.10	---	---
Methane	P1	87.9377	73.9560	---	---
Ethane	P2	4.8096	7.5816	1.282	1.289
Propane	P3	1.2702	2.9363	0.349	0.351
i-Butane	I4	0.2986	0.9098	0.097	0.098
n-Butane	P4	0.2089	0.6365	0.066	0.066
2,2-Dimethylpropane	I5	0.0046	0.0174	0.002	0.002
i-Pentane	I5	0.1173	0.4437	0.043	0.043
n-Pentane	P5	0.0690	0.2610	0.025	0.025
2,2-Dimethylbutane	I6	0.0061	0.0276	0.003	0.003
Cyclopentane	N5	0.0036	0.0132	0.001	0.001
2,3-Dimethylbutane	I6	0.0095	0.0429	0.004	0.004
2-Methylpentane	I6	0.0352	0.1590	0.015	0.015
3-Methylpentane	I6	0.0203	0.0917	0.008	0.008
n-Hexane	P6	0.0367	0.1658	0.015	0.015
2,2-Dimethylpentane	I7	0.0014	0.0073	0.001	0.001
Methylcyclopentane	N6	0.0194	0.0856	0.007	0.007
2,4-Dimethylpentane	I7	0.0030	0.0158	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0008	0.0042	0.000	0.000
Benzene	A6	0.0189	0.0774	0.005	0.005
3,3-Dimethylpentane	I7	0.0012	0.0063	0.001	0.001
Cyclohexane	N6	0.0197	0.0869	0.007	0.007
2-Methylhexane	I7	0.0147	0.0772	0.007	0.007
2,3-Dimethylpentane	I7	0.0038	0.0200	0.002	0.002
1,1-Dimethylcyclopentane	N7	0.0026	0.0134	0.001	0.001

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3-Methylhexane	I7	0.0136	0.0715	0.006	0.006
1c,3-Dimethylcyclopentane	N7	0.0035	0.0180	0.002	0.002
1t,3-Dimethylcyclopentane	N7	0.0032	0.0165	0.001	0.001
3-Ethylpentane	I7	0.0005	0.0026	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0051	0.0263	0.002	0.002
2,2,4-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
n-Heptane	P7	0.0257	0.1350	0.012	0.012
1c,2-Dimethylcyclopentane	N7	0.0004	0.0020	0.000	0.000
Methylcyclohexane	N7	0.0484	0.2491	0.019	0.019
2,2-Dimethylhexane	I8	0.0013	0.0078	0.001	0.001
1,1,3-Trimethylcyclopentane	N7	0.0004	0.0024	0.000	0.000
Ethylcyclopentane	N7	0.0015	0.0077	0.001	0.001
2,5-Dimethylhexane	I8	0.0019	0.0114	0.001	0.001
2,2,3-Trimethylpentane	I8	0.0017	0.0102	0.001	0.001
2,4-Dimethylhexane	I8	0.0003	0.0018	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0008	0.0047	0.000	0.000
3,3-Dimethylhexane	I8	0.0006	0.0036	0.000	0.000
2,3,3-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
Toluene	A7	0.0371	0.1792	0.012	0.012
2,3-Dimethylhexane	I8	0.0013	0.0078	0.001	0.001
2-Methyl-3-ethylpentane	I8	0.0002	0.0012	0.000	0.000
2-Methylheptane	I8	0.0077	0.0461	0.004	0.004
4-Methylheptane	I8	0.0026	0.0156	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0003	0.0018	0.000	0.000
3,4-Dimethylhexane	I8	0.0002	0.0012	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
3-Methylheptane	I8	0.0066	0.0395	0.003	0.003
1c,2t,3-Trimethylcyclopentane	N8	0.0079	0.0464	0.004	0.004
3-Ethylhexane	I8	0.0005	0.0030	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0033	0.0194	0.002	0.002
1,1-Dimethylcyclohexane	N8	0.0014	0.0082	0.001	0.001
2,2,5-Trimethylhexane	I9	0.0002	0.0014	0.000	0.000
3c-Ethylmethylcyclopentane	N8	0.0003	0.0018	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0003	0.0018	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0002	0.0011	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
2,2,4-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0024	0.0141	0.001	0.001
1t,3-Dimethylcyclohexane	N8	0.0002	0.0011	0.000	0.000
UnknownC7s	U7	0.0001	0.0005	0.000	0.000
n-Octane	P8	0.0151	0.0904	0.008	0.008
1c,4-Dimethylcyclohexane	N8	0.0021	0.0124	0.001	0.001
i-Propylcyclopentane	I8	0.0001	0.0006	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0002	0.0014	0.000	0.000
2,2,3,4-Tetramethylpentane	I9	0.0001	0.0007	0.000	0.000
2,3,4-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
2,2-Dimethylheptane	I9	0.0006	0.0040	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0015	0.0099	0.001	0.001
2,2,3-Trimethylhexane	I9	0.0005	0.0034	0.000	0.000
2,4-Dimethylheptane	I9	0.0002	0.0014	0.000	0.000
Ethylcyclohexane	N8	0.0007	0.0041	0.000	0.000
n-Propylcyclopentane	N8	0.0006	0.0035	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0003	0.0020	0.000	0.000
2,5-Dimethylheptane	I9	0.0008	0.0054	0.000	0.000
3,3-Dimethylheptane	I9	0.0002	0.0014	0.000	0.000
2,6-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
Ethylbenzene	I8	0.0014	0.0078	0.001	0.001

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1,3-Dimethylbenzene (m-Xylene)	A8	0.0068	0.0378	0.003	0.003
1,4-Dimethylbenzene (p-Xylene)	A8	0.0027	0.0150	0.001	0.001
3,4-Dimethylheptane (2)	I9	0.0001	0.0007	0.000	0.000
1c,2t,3-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0003	0.0017	0.000	0.000
UnknownC9s	U9	0.0001	0.0007	0.000	0.000
1,2,3-Trimethylbenzene	A9	0.0001	0.0006	0.000	0.000
1,3-Di-n-propylbenzene	A12	0.0001	0.0008	0.000	0.000
TOTAL		100.00000	100.00000	2.0319	2.0425

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0189	0.0774
TOLUENE	0.0371	0.1792
ETHYLBENZENE	0.0014	0.0078
XYLENES	0.0098	0.0545
TOTAL BTEX	0.0672	0.3189

**(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 :	948.1 /scf	953.3 /scf
	NET WET REAL :	931.5 /scf	936.7 /scf
HHV	GROSS DRY REAL :	1049.4 /scf	1055.2 /scf
	GROSS WET REAL :	1031.1 /scf	1036.9 /scf
	NET HEATING VALUE (60 °F ideal reaction):		18882.8 Btu/lbm
	GROSS HEATING VALUE (60°F ideal reaction):		20904.4 Btu/lbm
	RELATIVE DENSITY (AIR=1):		0.6583
	DENSITY		0.05026 lb/scf
	COMPRESSIBILITY FACTOR :		0.9975
	REGULAR WOBBE INDEX		1294.3

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

Net Dry Ideal BTU	4761.4 /scf	Relative Density - SG (Air=1)	3.2962		***C6+factors***
Gross Dry Ideal BTU	5108.8 /scf	**Z** Compressiblity Factor	0.9933		0.9926
Net Dry Ideal BTU	19151.1 /lb	Density Factor	251.553	lbm/1000 ft3	
Gross Dry Ideal BTU	20548.8 /lb	Molar Mass or MW	95.459	g/mol	
		Volume Liquid Ideal gas	0.167	scf/gal	24.5

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.