EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY:	**05-045-15814**	NAME/DESCRIP :	**300105282 PI19 FEDERAL 20-13BB**
LEASE #:	**COC-70835**		**BRADEN HEAD**
FIELD/AREA:			

PROJECT NO. :	**202505074**	ANALYSIS NO. :	**01**
COMPANY NAME :	**QB ENERGY OPERATING, LLC**	ANALYSIS DATE:	MAY 18, 2025 19:28
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	MAY 6, 2025
CUSTOMER REF:		TO:	
PRODUCER :	QB ENERGY OPERATING LLC	EFFECTIVE DATE:	

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

SAMPLE CYCLE:			SAMPLE TYPE:	SPOT
SAMPLE PRES. :	245	psig	PROBE :	NO
FLOW PRES. :		psig	CYLINDER NO. :	ECA-792
LAB PRES:		psig	SAMPLED BY :	MIKE KELLEY
SAMPLE TEMP. :	55	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	0.04	0.01	---	---
HYDROGEN	0.00	0.00	---	---
OXYGEN/ARGON	0.01	0.02	---	---
NITROGEN	1.65	2.80	---	---
CARBON DIOXIDE	0.02	0.05	---	---
METHANE	96.8744	94.2506	---	---
ETHANE	1.1667	2.1276	0.3107	0.3124
PROPANE	0.1598	0.4273	0.0440	0.0442
I-BUTANE	0.0320	0.1128	0.0100	0.0100
N-BUTANE	0.0240	0.0846	0.0080	0.0080
I-PENTANE	0.0093	0.0407	0.0030	0.0030
N-PENTANE	0.0040	0.0175	0.0010	0.0010
HEXANES PLUS	0.0098	0.0589	0.0010	0.0010
TOTALS	100.00000	100.00000	0.3777	0.3796

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0001	0.0005
TOLUENE	0.0002	0.0011
ETHYLBENZENE	0.0000	0.0000
XYLENES	0.0005	0.0033
TOTAL BTEX	0.0008	0.0049

CALCULATED VALUES**

	BTU @	14.65	14.73
LHV	NET DRY REAL :	904.8 /scf	909.7 /scf
	NET WET REAL :	889.0 /scf	893.9 /scf
HHV	GROSS DRY REAL :	1004.4 /scf	1009.9 /scf
	GROSS WET REAL :	986.8 /scf	992.3 /scf

NET HEATING VALUE (60 °F ideal reaction):	20855.2 **Btu/lbm**
GROSS HEATING VALUE (60°F ideal reaction):	23152.3 **Btu/lbm**
RELATIVE DENSITY (AIR=1):	0.5691
DENSITY	0.04345 **lbm/scf**
COMPRESSIBILITY FACTOR :	0.9980
REGULAR WOBBE INDEX	1332.9

**(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. :	202505074	ANALYSIS NO. :	01
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	MAY 18, 2025 19:28
ACCOUNT NO. :		SAMPLE DATE :	MAY 6, 2025
PRODUCER :	QB ENERGY OPERATING LLC	CYLINDER NO. :	ECA-792
LEASE NO. :	COC-70835	SAMPLED BY :	MIKE KELLEY
NAME/DESCRIP :	300105282 PI19 FEDERAL 20-13BB BRADEN HEAD		
FIELD DATA		SAMPLE TEMP. :	55
SAMPLE PRES. :	245	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm mol*		
COMMENTS :	***SPOT*** ***NO PROBE***		

Componet	Mole %	Wt %
Helium	0.04	0.01
Hydrogen	0.00	0.00
Carbon Dioxide	0.02	0.05
Nitrogen	1.65	2.80
Methane	96.8744	94.2506
Ethane	1.1667	2.1276
Propane	0.1598	0.4273
Isobutane	0.0320	0.1128
n-Butane	0.0240	0.0846
Isopentane	0.0093	0.0407
n-Pentane	0.0040	0.0175
Cyclopentane	0.0000	0.0000
n-Hexane	0.0004	0.0021
Cyclohexane	0.0002	0.0010
Other Hexanes	0.0042	0.0219
Heptanes	0.0015	0.0090
Methylcyclohexane	0.0004	0.0024
2,2,4 Trimethylpentane	0.0000	0.0000
Benzene	0.0001	0.0005
Toluene	0.0002	0.0011
Ethylbenzene	0.0000	0.0000
Xylenes	0.0005	0.0033
C8+ Heavies	0.0023	0.0176
Subtotal	99.99000	99.98000
Oxygen/Argon	0.01	0.02
Total	100.00000	100.00000

Calculated Values BTU @ **14.65**		**Total Sample**	**C6+ Fraction**	**C8+ Fraction**	**C10+ Fraction**	
LHV	Net Dry Real:	904.8	4988.0	6013.5	7001.7	**Btu/scf**
	Net Wet Real:	889.0	4900.8	5908.4	6879.3	**Btu/scf**
HHV	Gross Dry Real:	1004.4	5365.2	6446.0	7513.3	**Btu/scf**
	Gross Wet Real:	986.8	5271.4	6333.3	7382.0	**Btu/scf**
Other Calculated Values						
Regualr Wobbe Index*		1332.9	2894.0	3161.4	3438.1	**Btu/scf**
Net Heating Value (60 °F ideal reaction):		20855.2	19302.4	19410.4	19384.1	**Btu/lbm**
Gross Heating Value (60°F ideal reaction):		23152.3	20761.5	20810.1	20803.6	**Btu/lbm**
Molar Mass (MW):		16.48999	98.62	120.799	139.057	**g/mol**
Relative Density (AIR=1):		0.5691	3.4047	4.1711	4.8013	**SG**
Density:		0.04345	0.25988	0.31832	0.36644	**lbm/scf**
Compressiblity Factor:		0.9980	0.9922	0.9985	0.9996	**Z**
Liquid Volume real gas @:	**14.65**	16.895	0.001	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 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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FLOW PRES. :	psig	CYLINDER NO. :	ECA-792
LAB PRES:	psig	SAMPLED BY :	MIKE KELLEY
SAMPLE TEMP. :	55 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**
Helium	---	0.04	0.01	---	---
Oxygen/Argon	---	0.01	0.02	---	---
Nitrogen	---	1.65	2.80	---	---
Carbon Dioxide	---	0.02	0.05	---	---
Methane	P1	96.8744	94.2506	---	---
Ethane	P2	1.1667	2.1276	0.311	0.312
Propane	P3	0.1598	0.4273	0.044	0.044
i-Butane	I4	0.0320	0.1128	0.010	0.010
n-Butane	P4	0.0240	0.0846	0.008	0.008
2,2-Dimethylpropane	I5	0.0013	0.0057	0.000	0.000
i-Pentane	I5	0.0080	0.0350	0.003	0.003
n-Pentane	P5	0.0040	0.0175	0.001	0.001
2,2-Dimethylbutane	I6	0.0007	0.0036	0.000	0.000
2,3-Dimethylbutane	I6	0.0005	0.0026	0.000	0.000
2-Methylpentane	I6	0.0019	0.0100	0.001	0.001
3-Methylpentane	I6	0.0009	0.0047	0.000	0.000
n-Hexane	P6	0.0004	0.0021	0.000	0.000
2,2-Dimethylpentane	I7	0.0001	0.0006	0.000	0.000
Methylcyclopentane	N6	0.0002	0.0010	0.000	0.000
2,4-Dimethylpentane	I7	0.0002	0.0012	0.000	0.000
2,2,3-Trimethylbutane	I7	0.0001	0.0006	0.000	0.000
Benzene	A6	0.0001	0.0005	0.000	0.000
3,3-Dimethylpentane	I7	0.0001	0.0006	0.000	0.000
Cyclohexane	N6	0.0002	0.0010	0.000	0.000
2-Methylhexane	I7	0.0003	0.0018	0.000	0.000
2,3-Dimethylpentane	I7	0.0001	0.0006	0.000	0.000
1,1-Dimethylcyclopentane	N7	0.0001	0.0006	0.000	0.000
3-Methylhexane	I7	0.0003	0.0018	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0001	0.0006	0.000	0.000
n-Heptane	P7	0.0001	0.0006	0.000	0.000

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Methylcyclohexane	N7	0.0004	0.0024	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0001	0.0007	0.000	0.000
Toluene	A7	0.0002	0.0011	0.000	0.000
2-Methylheptane	I8	0.0001	0.0007	0.000	0.000
4-Methylheptane	I8	0.0001	0.0007	0.000	0.000
1c,2t,3-Trimethylcyclopentane	N8	0.0001	0.0007	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0001	0.0007	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0001	0.0007	0.000	0.000
n-Octane	P8	0.0002	0.0014	0.000	0.000
2,2-Dimethylheptane	I9	0.0001	0.0008	0.000	0.000
Ethylcyclohexane	N8	0.0001	0.0007	0.000	0.000
2,5-Dimethylheptane	I9	0.0001	0.0008	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0003	0.0019	0.000	0.000
1,4-Dimethylbenzene (p-Xylene)	A8	0.0001	0.0007	0.000	0.000
4-Methyloctane	I9	0.0001	0.0008	0.000	0.000
2-Methyloctane	I9	0.0001	0.0008	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	0.0001	0.0008	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0001	0.0007	0.000	0.000
n-Nonane	P9	0.0002	0.0016	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
5-Methylnonane	I10	0.0001	0.0009	0.000	0.000
2-Methylnonane	I10	0.0001	0.0009	0.000	0.000
t-Butylbenzene	A10	0.0001	0.0008	0.000	0.000
n-Decane	P10	0.0001	0.0009	0.000	0.000
1,3-Methyl-i-propylbenzene	A10	0.0001	0.0008	0.000	0.000
TOTAL		100.00000	100.00000	0.3777	0.3796

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0001	0.0005
TOLUENE	0.0002	0.0011
ETHYLBENZENE	0.0000	0.0000
XYLENES	0.0005	0.0033
TOTAL BTEX	0.0008	0.0049

*(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 :	904.8	/scf	909.7	/scf
	NET WET REAL :	889.0	/scf	893.9	/scf
HHV	GROSS DRY REAL :	1004.4	/scf	1009.9	/scf
	GROSS WET REAL :	986.8	/scf	992.3	/scf
	NET HEATING VALUE (60 °F ideal reaction):			20855.2	Btu/lbm
	GROSS HEATING VALUE (60°F ideal reaction):			23152.3	Btu/lbm
	RELATIVE DENSITY (AIR=1):			0.5691	
	DENSITY			0.04345	lb/scf
	COMPRESSIBILITY FACTOR :			0.9980	
	REGULAR WOBBE INDEX			1332.9	

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

Net Dry Ideal BTU	4964.4 /scf	Relative Density - SG (Air=1)	3.4047		***C6+factors***
Gross Dry Ideal BTU	5339.9 /scf	**Z** Compressiblity Factor	0.99216		0.99067
Net Dry Ideal BTU	19302.4 /lb	Density Factor	259.884	lbm/1000 ft3	
Gross Dry Ideal BTU	20761.5 /lb	Molar Mass or MW	98.62	g/mol	
		Volume Liquid Ideal gas	0.001	scf/gal	23.3

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.