EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

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

PROJECT NO. : **202502080** ANALYSIS NO. : **04**
COMPANY NAME : **QB ENERGY OPERATING, LLC** ANALYSIS DATE: FEBRUARY 27, 2025 16:46
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. : 331 psig PROBE : NO
FLOW PRES. : psig CYLINDER NO. : ECA-798
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
ALCOHOLS	0.0010	0.0035	0.0000	0.0000
HELIUM	0.00	0.00	---	---
HYDROGEN	1.20	0.13	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.06	0.09	---	---
CARBON DIOXIDE	4.13	9.72	---	---
METHANE	87.1864	74.8034	---	---
ETHANE	4.9985	8.0382	1.3321	1.3394
PROPANE	1.1596	2.7347	0.3188	0.3205
I-BUTANE	0.3061	0.9515	0.0999	0.1005
N-BUTANE	0.5168	1.6065	0.1629	0.1637
I-PENTANE	0.1444	0.5568	0.0530	0.0532
N-PENTANE	0.0728	0.2809	0.0260	0.0261
HEXANES PLUS	0.2244	1.0845	0.0890	0.0892
TOTALS	100.00000	100.00000	2.0817	2.0926

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0129	0.0539
TOLUENE	0.0093	0.0458
ETHYLBENZENE	0.0001	0.0006
XYLENES	0.0008	0.0045
TOTAL BTEX	0.0231	0.1048

**(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 :	945.9 /scf	951.0 /scf
	NET WET REAL :	929.4 /scf	934.5 /scf
HHV	GROSS DRY REAL :	1047.5 /scf	1053.2 /scf
	GROSS WET REAL :	1029.2 /scf	1034.9 /scf

NET HEATING VALUE (60 °F ideal reaction):	19218.9	**Btu/lbm**
GROSS HEATING VALUE (60°F ideal reaction):	21283.2	**Btu/lbm**
RELATIVE DENSITY (AIR=1):	0.6453	
DENSITY	0.04927	**lbm/scf**
COMPRESSIBILITY FACTOR :	0.9975	
REGULAR WOBBE INDEX	1304.9	

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EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	202502080	ANALYSIS NO. :	04
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	FEBRUARY 27, 2025 16:46
ACCOUNT NO. :		SAMPLE DATE :	FEBRUARY 18, 2025
PRODUCER :	QB ENERGY OPERATING, LLC	CYLINDER NO. :	ECA-798
LEASE NO. :		SAMPLED BY :	MIKE KELLEY
NAME/DESCRIP :	110180057 596-29C 21 CASING		
FIELD DATA		SAMPLE TEMP. :	33
SAMPLE PRES. :	331	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm mol*		
COMMENTS :	*SPOT* *NO PROBE*		

Componet	Mole %	Wt %
Helium	0.00	0.00
Hydrogen	1.20	0.13
Carbon Dioxide	4.13	9.72
Nitrogen	0.06	0.09
Methane	87.1864	74.8034
Ethane	4.9985	8.0382
Propane	1.1596	2.7347
Isobutane	0.3061	0.9515
n-Butane	0.5168	1.6065
Isopentane	0.1405	0.5421
n-Pentane	0.0728	0.2809
Cyclopentane	0.0039	0.0147
n-Hexane	0.0327	0.1507
Cyclohexane	0.0139	0.0626
Other Hexanes	0.0867	0.3977
Heptanes	0.0403	0.2149
Methylcyclohexane	0.0181	0.0950
2,2,4 Trimethylpentane	0.0001	0.0006
Benzene	0.0129	0.0539
Toluene	0.0093	0.0458
Ethylbenzene	0.0001	0.0006
Xylenes	0.0008	0.0045
C8+ Heavies	0.0095	0.0582
Subtotal	99.99900	99.99650
Oxygen/Argon	0.00	0.00
Alcohols	0.0010	0.0035
Total	100.00000	100.00000

Calculated Values BTU @ **14.65**		**Total Sample**	**C6+ Fraction**	**C8+ Fraction**	**C10+ Fraction**	
LHV	Net Dry Real:	945.9	4566.5	5667.6	#DIV/0!	**Btu/scf**
	Net Wet Real:	929.4	4486.7	5568.5	#DIV/0!	**Btu/scf**
HHV	Gross Dry Real:	1047.5	4908.6	6097.4	#DIV/0!	**Btu/scf**
	Gross Wet Real:	1029.2	4822.8	5990.8	#DIV/0!	**Btu/scf**
Other Calculated Values						
Regualr Wobbe Index*		1304.9	2761.7	3081.4	#DIV/0!	**Btu/scf**
Net Heating Value (60 °F ideal reaction):		19218.9	19185.6	19762.4	#DIV/0!	**Btu/lbm**
Gross Heating Value (60°F ideal reaction):		21283.2	20622.7	21263.7	#DIV/0!	**Btu/lbm**
Molar Mass (MW):		18.69824	90.381	113.403	#DIV/0!	**g/mol**
Relative Density (AIR=1):		0.6453	3.1205	3.9158	#DIV/0!	**SG**
Density:		0.04927	0.23817	0.29883	#DIV/0!	**lbm/scf**
Compressiblity Factor:		0.9975	0.9908	0.9969	#DIV/0!	**Z**
Liquid Volume real gas @:	**14.65**	17.5888	0.0887	0.003	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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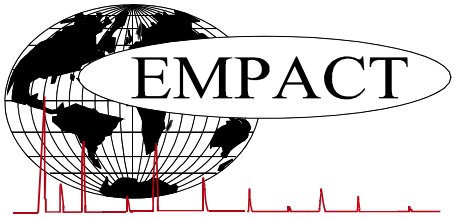

EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PRIMARY DB KEY:	**05-045-18087**	NAME/DESCRIP :	**110180057 596-29C 21**
LEASE #:			**CASING**
FIELD/AREA:			
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CUSTOMER REF:		TO:	
PRODUCER :	QB ENERGY OPERATING, LLC	EFFECTIVE DATE:	
FIELD DATA			
SAMPLE CYCLE:		SAMPLE TYPE:	SPOT
SAMPLE PRES. :	331 psig	PROBE :	NO
FLOW PRES. :	psig	CYLINDER NO. :	ECA-798
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**
Hydrogen	---	1.20	0.13	---	---
Nitrogen	---	0.06	0.09	---	---
Carbon Dioxide	---	4.13	9.72	---	---
Methane	P1	87.1864	74.8034	---	---
Ethane	P2	4.9985	8.0382	1.332	1.339
Propane	P3	1.1596	2.7347	0.319	0.321
i-Butane	I4	0.3061	0.9515	0.100	0.101
n-Butane	P4	0.2244	0.6976	0.071	0.071
2,2-Dimethylpropane	I5	0.0047	0.0181	0.002	0.002
i-Pentane	I5	0.1358	0.5240	0.050	0.050
i-Propanol	X3	0.0006	0.0019	0.000	0.000
UnknownC4s	U4	0.2924	0.9089	0.092	0.092
n-Pentane	P5	0.0728	0.2809	0.026	0.026
t-Butanol	X4	0.0004	0.0016	0.000	0.000
2,2-Dimethylbutane	I6	0.0063	0.0290	0.003	0.003
Cyclopentane	N5	0.0039	0.0147	0.001	0.001
2,3-Dimethylbutane	I6	0.0097	0.0447	0.004	0.004
2-Methylpentane	I6	0.0350	0.1613	0.014	0.014
3-Methylpentane	I6	0.0193	0.0889	0.008	0.008
n-Hexane	P6	0.0327	0.1507	0.013	0.013
2,2-Dimethylpentane	I7	0.0011	0.0059	0.001	0.001
Methylcyclopentane	N6	0.0164	0.0738	0.006	0.006
2,4-Dimethylpentane	I7	0.0022	0.0118	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0007	0.0037	0.000	0.000
Benzene	A6	0.0129	0.0539	0.004	0.004
3,3-Dimethylpentane	I7	0.0007	0.0037	0.000	0.000
Cyclohexane	N6	0.0139	0.0626	0.005	0.005
2-Methylhexane	I7	0.0077	0.0413	0.004	0.004
2,3-Dimethylpentane	I7	0.0020	0.0107	0.001	0.001
1,1-Dimethylcyclopentane	N7	0.0015	0.0079	0.001	0.001
3-Methylhexane	I7	0.0068	0.0364	0.003	0.003
1c,3-Dimethylcyclopentane	N7	0.0020	0.0105	0.001	0.001
1t,3-Dimethylcyclopentane	N7	0.0017	0.0089	0.001	0.001
3-Ethylpentane	I7	0.0004	0.0021	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0025	0.0131	0.001	0.001
2,2,4-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000

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n-Heptane	P7	0.0100	0.0536	0.005	0.005
1c,2-Dimethylcyclopentane	N7	0.0003	0.0016	0.000	0.000
Methylcyclohexane	N7	0.0181	0.0950	0.007	0.007
2,2-Dimethylhexane	I8	0.0004	0.0025	0.000	0.000
1,1,3-Trimethylcyclopentane	N7	0.0001	0.0006	0.000	0.000
Ethylcyclopentane	N7	0.0005	0.0026	0.000	0.000
2,5-Dimethylhexane	I8	0.0005	0.0031	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0004	0.0025	0.000	0.000
2,4-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0002	0.0012	0.000	0.000
3,3-Dimethylhexane	I8	0.0002	0.0012	0.000	0.000
Toluene	A7	0.0093	0.0458	0.003	0.003
2,3-Dimethylhexane	I8	0.0002	0.0012	0.000	0.000
2-Methylheptane	I8	0.0012	0.0073	0.001	0.001
4-Methylheptane	I8	0.0004	0.0025	0.000	0.000
3-Methylheptane	I8	0.0009	0.0055	0.000	0.000
1c,2t,3-Trimethylcyclopentane	N8	0.0012	0.0072	0.001	0.001
3-Ethylhexane	I8	0.0001	0.0006	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0006	0.0036	0.000	0.000
1,1-Dimethylcyclohexane	N8	0.0003	0.0018	0.000	0.000
2,2,5-Trimethylhexane	I9	0.0001	0.0007	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	0.0003	0.0018	0.000	0.000
UnknownC7s	U7	0.0001	0.0005	0.000	0.000
n-Octane	P8	0.0014	0.0086	0.001	0.001
1c,4-Dimethylcyclohexane	N8	0.0002	0.0012	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
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	0.0001	0.0007	0.000	0.000
Ethylbenzene	I8	0.0001	0.0006	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0005	0.0028	0.000	0.000
1,4-Dimethylbenzene (p-Xylene)	A8	0.0002	0.0011	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0001	0.0006	0.000	0.000
TOTAL		100.00000	100.00000	2.0817	2.0926

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0129	0.0539
TOLUENE	0.0093	0.0458
ETHYLBENZENE	0.0001	0.0006
XYLENES	0.0008	0.0045
TOTAL BTEX	0.0231	0.1048

**(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 :	945.9 /scf	951.0 /scf
	NET WET REAL :	929.4 /scf	934.5 /scf
HHV	GROSS DRY REAL :	1047.5 /scf	1053.2 /scf
	GROSS WET REAL :	1029.2 /scf	1034.9 /scf
	NET HEATING VALUE (60 °F ideal reaction):		19218.9 Btu/lbm
	GROSS HEATING VALUE (60°F ideal reaction):		21283.2 Btu/lbm
	RELATIVE DENSITY (AIR=1):		0.6453
	DENSITY		0.04927 lb/scf
	COMPRESSIBILITY FACTOR :		0.9975
	REGULAR WOBBE INDEX		1304.9

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

Net Dry Ideal BTU	4538.5 /scf	Relative Density - SG (Air=1)	3.1205	***C6+factors***
Gross Dry Ideal BTU	4878.5 /scf	**Z** Compressiblity Factor	0.99075	0.99012
Net Dry Ideal BTU	19185.6 /lb	Density Factor	238.168 lbm/1000 ft3	
Gross Dry Ideal BTU	20622.7 /lb	Molar Mass or MW	90.381 g/mol	
		Volume Liquid Ideal gas	0.089 scf/gal	25.1

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.