EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY:	**05-045-09947**	NAME/DESCRIP :	**M27NW GMR 28-16D**
LEASE #:	**05-045-09947**		**PRODUCTION CASING**
FIELD/AREA:	**MAMM CREEK**		
PROJECT NO. :	**202601073**	ANALYSIS NO. :	**01**
COMPANY NAME :	**QB ENERGY OPERATING, LLC**	ANALYSIS DATE:	JANUARY 26, 2026 07:32
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	JANUARY 14, 2026 9:48
CUSTOMER REF:		TO:	
PRODUCER :	QB ENERGY OPERATING, LLC	EFFECTIVE DATE:	
*****FIELD DATA*****			
SAMPLE CYCLE:		SAMPLE TYPE:	
SAMPLE PRES. :	342 psig	PROBE :	
FLOW PRES. :	psig	CYLINDER NO. :	QB-1004
LAB PRES:	psig	SAMPLED BY :	ERIC CHARLESWORTH
SAMPLE TEMP. :	30 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:	***Possible moisture in sample.***		

COMPONENT	MOLE %	MASS %	GPM @ 14.65	GPM @ 14.73
GLYCOLS	0.0010	0.0041	0.0000	0.0000
ALCOHOLS	0.1329	0.2636	0.0170	0.0171
HELIUM	0.01	0.00	---	---
HYDROGEN	10.68	1.33	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.25	0.43	---	---
CARBON DIOXIDE	0.05	0.14	---	---
METHANE	81.7735	81.2172	---	---
ETHANE	5.4807	10.2028	1.4602	1.4682
PROPANE	1.2515	3.4166	0.3436	0.3455
I-BUTANE	0.1477	0.5315	0.0479	0.0482
N-BUTANE	0.0584	0.2101	0.0180	0.0181
I-PENTANE	0.0027	0.0121	0.0010	0.0010
N-PENTANE	0.0005	0.0022	0.0000	0.0000
HEXANES PLUS	0.1611	2.2398	0.1260	0.1262
TOTALS	100.00000	100.00000	2.0137	2.0243

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0003	0.0014
TOLUENE	0.0010	0.0057
ETHYLBENZENE	0.0001	0.0007
XYLENES	0.0007	0.0046
TOTAL BTEX	0.0021	0.0124

**(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 :	914.2	/scf	919.2	/scf
	NET WET REAL :	898.2	/scf	903.2	/scf
HHV	GROSS DRY REAL :	1014.6	/scf	1020.1	/scf
	GROSS WET REAL :	996.9	/scf	1002.4	/scf
	NET HEATING VALUE (60 °F ideal reaction):			21582.0	Btu/lbm
	GROSS HEATING VALUE (60°F ideal reaction):			23948.4	Btu/lbm
	RELATIVE DENSITY (AIR=1):			0.5569	
	DENSITY			0.04256	lbm/scf
	COMPRESSIBILITY FACTOR :			0.9981	
	REGULAR WOBBE INDEX			1361.2	

EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	202601073	ANALYSIS NO. :	01
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	JANUARY 26, 2026 07:32
ACCOUNT NO. :		SAMPLE DATE :	JANUARY 14, 2026 9:48
PRODUCER :	QB ENERGY OPERATING, LLC	CYLINDER NO. :	QB-1004
LEASE NO. :	05-045-09947	SAMPLED BY :	ERIC CHARLESWORTH
NAME/DESCRIP :	M27NW GMR 28-16D PRODUCTION CASING		
FIELD DATA		SAMPLE TEMP. :	30
SAMPLE PRES. :	342	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm mol*		
COMMENTS :	***Possible moisture in sample.***		

Componet	Mole %	Wt %
Helium	0.01	0.00
Hydrogen	10.68	1.33
Carbon Dioxide	0.05	0.14
Nitrogen	0.25	0.43
Methane	81.7735	81.2172
Ethane	5.4807	10.2028
Propane	1.2515	3.4166
Isobutane	0.1477	0.5315
n-Butane	0.0584	0.2101
Isopentane	0.0027	0.0121
n-Pentane	0.0005	0.0022
Cyclopentane	0.0000	0.0000
n-Hexane	0.0001	0.0006
Cyclohexane	0.0003	0.0016
Other Hexanes	0.0004	0.0023
Heptanes	0.0006	0.0036
Methylcyclohexane	0.0010	0.0061
2,2,4 Trimethylpentane	0.0000	0.0000
Benzene	0.0003	0.0014
Toluene	0.0010	0.0057
Ethylbenzene	0.0001	0.0007
Xylenes	0.0007	0.0046
C8+ Heavies	0.1566	2.2132
Subtotal	99.86610	99.73230
Oxygen/Argon	0.00	0.00
Glycols	0.0010	0.0041
Alcohols	0.1329	0.2636
Total	100.00000	100.00000

Calculated Values BTU @ **14.65**		**Total Sample**	**C6+ Fraction**	**C8+ Fraction**	**C10+ Fraction**	
LHV	Net Dry Real:	914.2	11271.6	11435.2	11583.1	**Btu/scf**
	Net Wet Real:	898.2	11074.6	11235.3	11380.6	**Btu/scf**
HHV	Gross Dry Real:	1014.6	12126.2	12303.7	12463.8	**Btu/scf**
	Gross Wet Real:	996.9	11914.2	12088.6	12245.9	**Btu/scf**
Other Calculated Values						
Regualr Wobbe Index*		1361.2	4369.2	4402.0	4431.7	**Btu/scf**
Net Heating Value (60 °F ideal reaction):		21582.0	21782.3	21812.4	21853.3	**Btu/lbm**
Gross Heating Value (60°F ideal reaction):		23948.4	23432.6	23466.2	23511.0	**Btu/lbm**
Molar Mass (MW):		16.15316	224.486	227.681	230.54	**g/mol**
Relative Density (AIR=1):		0.5569	7.7510	7.8612	7.9594	**SG**
Density:		0.04256	0.59156	0.60000	0.60749	**lbm/scf**
Compressiblity Factor:		0.9981	1.0000	1.0000	1.0000	**Z**
Liquid Volume real gas @:	**14.65**	16.7863	0.1256	0.1256	0.1246	**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.

EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

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H2O BY STAIN TUBE:	- #/mmcf	CO2 BY STAIN TUBE:	- Mol %
FIELD COMMENTS:			
LAB COMMENTS:	***Possible moisture in sample.***		

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ **14.65**	GPM @ **14.73**
Helium	---	0.01	0.00	---	---
Hydrogen	---	10.68	1.33	---	---
Nitrogen	---	0.25	0.43	---	---
Carbon Dioxide	---	0.05	0.14	---	---
Methane	P1	81.7735	81.2172	---	---
Ethane	P2	5.4807	10.2028	1.460	1.468
Propane	P3	1.2515	3.4166	0.344	0.346
i-Butane	I4	0.1477	0.5315	0.048	0.048
Methanol	X1	0.1329	0.2636	0.017	0.017
n-Butane	P4	0.0584	0.2101	0.018	0.018
2,2-Dimethylpropane	I5	0.0008	0.0036	0.000	0.000
i-Pentane	I5	0.0019	0.0085	0.001	0.001
n-Pentane	P5	0.0004	0.0018	0.000	0.000
2-Methylpentane	I6	0.0001	0.0006	0.000	0.000
UnknownC5s	U5	0.0001	0.0004	0.000	0.000
n-Hexane	P6	0.0001	0.0006	0.000	0.000
Methylcyclopentane	N6	0.0002	0.0011	0.000	0.000
Benzene	A6	0.0003	0.0014	0.000	0.000
Cyclohexane	N6	0.0003	0.0016	0.000	0.000
2-Methylhexane	I7	0.0001	0.0006	0.000	0.000
3-Methylhexane	I7	0.0001	0.0006	0.000	0.000
Ethylene glycol	GL2	0.0007	0.0027	0.000	0.000
1t,3-Dimethylcyclopentane	N7	0.0001	0.0006	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0001	0.0006	0.000	0.000
UnknownC6s	U6	0.0001	0.0006	0.000	0.000
n-Heptane	P7	0.0002	0.0012	0.000	0.000
Methylcyclohexane	N7	0.0010	0.0061	0.000	0.000

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Propylene Glycol	GL3	0.0003	0.0014	0.000	0.000
Toluene	A7	0.0010	0.0057	0.000	0.000
2-Methylheptane	I8	0.0001	0.0007	0.000	0.000
3-Methylheptane	I8	0.0001	0.0007	0.000	0.000
1c,2t,3-Trimethylcyclopentane	N8	0.0002	0.0014	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0001	0.0007	0.000	0.000
2,2,5-Trimethylhexane	I9	0.0001	0.0008	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
Ethylbenzene	I8	0.0001	0.0007	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0004	0.0026	0.000	0.000
1,4-Dimethylbenzene (p-Xylene)	A8	0.0001	0.0007	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0002	0.0013	0.000	0.000
i-Butylcyclopentane	N9	0.0011	0.0086	0.001	0.001
n-Nonane	P9	0.0003	0.0024	0.000	0.000
n-Butylcyclopentane	N9	0.0001	0.0008	0.000	0.000
n-Propylbenzene	A9	0.0001	0.0007	0.000	0.000
1,3-Methylethylbenzene	A9	0.0001	0.0007	0.000	0.000
1,4-Methylethylbenzene	A9	0.0001	0.0007	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0002	0.0015	0.000	0.000
5-Methylnonane	I10	0.0001	0.0009	0.000	0.000
1,2-Methylethylbenzene	A9	0.0002	0.0015	0.000	0.000
2-Methylnonane	I10	0.0001	0.0009	0.000	0.000
3-Methylnonane	I10	0.0001	0.0009	0.000	0.000
t-Butylbenzene	A10	0.0003	0.0025	0.000	0.000
UnknownC9s	U9	0.0001	0.0008	0.000	0.000
n-Decane	P10	0.0007	0.0062	0.000	0.000
1,2-Methyl-i-propylbenzene	A10	0.0001	0.0008	0.000	0.000
3-Ethylnonane	I10	0.0001	0.0010	0.000	0.000
1,3-Diethylbenzene	A10	0.0001	0.0008	0.000	0.000
1,3-Methyl-n-propylbenzene	A10	0.0001	0.0008	0.000	0.000
1,4-Diethylbenzene	A10	0.0001	0.0008	0.000	0.000
n-Butylbenzene	A10	0.0001	0.0008	0.000	0.000
1,2-Diethylbenzene	A10	0.0001	0.0008	0.000	0.000
1,2-Methyl-n-propylbenzene	A10	0.0001	0.0008	0.000	0.000
1,3-Dimethyl-4-ethylbenzene	A10	0.0002	0.0017	0.000	0.000
1,2-Dimethyl-4-ethylbenzene	A10	0.0001	0.0008	0.000	0.000
1,3-Dimethyl-2-ethylbenzene	A10	0.0001	0.0008	0.000	0.000
1,2-Ethyl-i-propylbenzene	A10	0.0001	0.0009	0.000	0.000
1,4-Methyl-t-butylbenzene	A11	0.0001	0.0009	0.000	0.000
UnknownC10s	U10	0.0005	0.0044	0.000	0.000
n-Undecane	P11	0.0002	0.0019	0.000	0.000
1,4-Ethyl-i-propylbenzene	A11	0.0002	0.0019	0.000	0.000
1,2,4,5-Tetramethylbenzene	A11	0.0001	0.0008	0.000	0.000
1,2-Methyl-n-butylbenzene	A11	0.0001	0.0009	0.000	0.000
1,2,3,5-Tetramethylbenzene	A11	0.0001	0.0008	0.000	0.000
1,2-Methyl-t-butylbenzene	A11	0.0001	0.0009	0.000	0.000
5-Methylindan	A11	0.0002	0.0016	0.000	0.000
4-Methylindan	A11	0.0001	0.0008	0.000	0.000
1,2-Ethyl-n-propylbenzene	A11	0.0001	0.0009	0.000	0.000
2-Methylindan	A11	0.0003	0.0025	0.000	0.000
1,3-Methyl-n-butylbenzene	A11	0.0002	0.0019	0.000	0.000
1,3-Di-i-propylbenzene	A11	0.0003	0.0030	0.000	0.000
sec-Pentylbenzene	A11	0.0002	0.0019	0.000	0.000
n-Pentylbenzene	A11	0.0001	0.0009	0.000	0.000
1,2-Di-n-propylbenzene	A11	0.0001	0.0010	0.000	0.000
1,4-Di-i-propylbenzene	A11	0.0001	0.0010	0.000	0.000
Tetrahydronaphthalene	A10	0.0002	0.0016	0.000	0.000
Naphthalene	A10	0.0003	0.0024	0.000	0.000

1-t-Butyl-3,5-dimethylbenzene	A12	0.0002	0.0020	0.000	0.000
1,4-Ethyl-t-butylbenzene	A11	0.0003	0.0030	0.000	0.000
1,3-Di-n-propylbenzene	A12	0.0002	0.0020	0.000	0.000
UnknownC11s	U11	0.0011	0.0107	0.001	0.001
n-Dodecane	P12	0.0006	0.0063	0.000	0.000
1,3,5-Triethylbenzene	A12	0.0003	0.0030	0.000	0.000
1,2,4-Triethylbenzene	A12	0.0003	0.0030	0.000	0.000
1,4-Methyl-n-pentylbenzene	A12	0.0004	0.0040	0.000	0.000
n-Hexylbenzene	A12	0.0005	0.0050	0.000	0.000
1,2,3,4,5-Pentamethylbenzene	A13	0.0004	0.0037	0.000	0.000
2-Methylnaphthalene	A11	0.0017	0.0150	0.001	0.001
1-Methylnaphthalene	A11	0.0012	0.0106	0.001	0.001
UnknownC12s	U12	0.0011	0.0107	0.001	0.001
n-Tridecane	P13	0.0028	0.0319	0.002	0.002
UnknownC13s	U13	0.0036	0.0411	0.003	0.003
n-Tetradecane	P14	0.0071	0.0872	0.006	0.006
UnknownC14s	U14	0.0092	0.1130	0.008	0.008
n-Pentadecane	P15	0.0078	0.1026	0.007	0.007
UnknownC15s	U15	0.0113	0.1486	0.010	0.010
n-Hexadecane	P16	0.0058	0.0813	0.005	0.005
UnknownC16s	U16	0.0233	0.3266	0.020	0.020
n-Heptadecane	P17	0.0050	0.0744	0.004	0.004
UnknownC17s	U17	0.0173	0.2575	0.015	0.015
n-Octadecane	P18	0.0045	0.0709	0.004	0.004
UnknownC18s	U18	0.0106	0.1670	0.009	0.009
n-Nonadecane	P19	0.0034	0.0565	0.003	0.003
UnknownC19s	U19	0.0010	0.0167	0.001	0.001
n-Eicosane	P20	0.0020	0.0347	0.002	0.002
UnknownC20s	U20	0.0100	0.1737	0.009	0.009
n-Heneicosane	P21	0.0010	0.0184	0.001	0.001
UnknownC21s	U21	0.0043	0.0789	0.004	0.004
n-Docosane	P22	0.0007	0.0134	0.001	0.001
UnknownC22s	U22	0.0056	0.1077	0.005	0.005
n-Tricosane	P23	0.0001	0.0020	0.000	0.000
UnknownC23s	U23	0.0011	0.0221	0.001	0.001
UnknownC24s	U24	0.0011	0.0231	0.001	0.001
UnknownC25s	U25	0.0003	0.0066	0.000	0.000
TOTAL		100.00000	100.00000	2.0137	2.0243

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	DENSITY			0.04256	lb/scf
	COMPRESSIBILITY FACTOR :			0.9981	
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C6+ Fraction of DHA Gas Analysis @60°F, 14.696 psia

Net Dry Ideal BTU	11306.9 **/scf**	Relative Density - SG (Air=1)	7.751		***C6+factors***
Gross Dry Ideal BTU	12164.2 **/scf**	**Z** Compressiblity Factor	0.99999		0.9998
Net Dry Ideal BTU	21782.3 **/lb**	Density Factor	591.557	**lbm/1000 ft3**	
Gross Dry Ideal BTU	23432.6 **/lb**	Molar Mass or MW	224.486	**g/mol**	
		Volume Liquid Ideal gas	0.126	**scf/gal**	11.6

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.