EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY:	**05-045-14501**	NAME/DESCRIP :	**110180266 M8 PUCKETT 41D-25D CASING**
LEASE #:			
FIELD/AREA:	**GRAND VALLEY**		
PROJECT NO. :	**202511015**	ANALYSIS NO. :	**02**
COMPANY NAME :	**QB ENERGY OPERATING, LLC**	ANALYSIS DATE:	NOVEMBER 19, 2025 08:38
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	OCTOBER 16, 2025
CUSTOMER REF:		TO:	
PRODUCER :	QB ENERGY OPERATING LLC	EFFECTIVE DATE:	

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

SAMPLE CYCLE:			SAMPLE TYPE:	SPOT
SAMPLE PRES. :	622	psig	PROBE :	NO
FLOW PRES. :		psig	CYLINDER NO. :	ECA-739
LAB PRES:		psig	SAMPLED BY :	MIKE KELLEY
SAMPLE TEMP. :	51	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	0.0065	0.0116	0.0010	0.0010
HELIUM	0.00	0.00	---	---
HYDROGEN	1.22	0.13	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.06	0.09	---	---
CARBON DIOXIDE	3.40	7.99	---	---
METHANE	86.7643	74.3592	---	---
ETHANE	5.8007	9.3180	1.5460	1.5545
PROPANE	1.5534	3.6593	0.4267	0.4291
I-BUTANE	0.3607	1.1200	0.1179	0.1186
N-BUTANE	0.3075	0.9548	0.0969	0.0975
I-PENTANE	0.1608	0.6192	0.0580	0.0583
N-PENTANE	0.0955	0.3681	0.0350	0.0352
HEXANES PLUS	0.2706	1.3798	0.1060	0.1062
TOTALS	100.00000	100.00000	2.3875	2.4004

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0123	0.0513
TOLUENE	0.0018	0.0089
ETHYLBENZENE	0.0001	0.0006
XYLENES	0.0002	0.0012
TOTAL BTEX	0.0144	0.0620

**(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 :	963.4 /scf	968.7 /scf
	NET WET REAL :	946.6 /scf	951.9 /scf
HHV	GROSS DRY REAL :	1066.7 /scf	1072.6 /scf
	GROSS WET REAL :	1048.1 /scf	1054.0 /scf
	NET HEATING VALUE (60 °F ideal reaction):		19561.1 Btu/lbm
	GROSS HEATING VALUE (60°F ideal reaction):		21654.6 Btu/lbm
	RELATIVE DENSITY (AIR=1):		0.6457
	DENSITY		0.04933 lbm/scf
	COMPRESSIBILITY FACTOR :		0.9975
	REGULAR WOBBE INDEX		1328.3

EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	202511015	ANALYSIS NO. :	02
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	NOVEMBER 19, 2025 08:38
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 16, 2025
PRODUCER :	QB ENERGY OPERATING LLC	CYLINDER NO. :	ECA-739
LEASE NO. :		SAMPLED BY :	MIKE KELLEY
NAME/DESCRIP :	110180266 M8 PUCKETT 41D-25D CASING		
FIELD DATA		SAMPLE TEMP. :	51
SAMPLE PRES. :	622	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm mol*		
COMMENTS :	*SPOT* *NO PROBE*		

Componet	Mole %	Wt %
Helium	0.00	0.00
Hydrogen	1.22	0.13
Carbon Dioxide	3.40	7.99
Nitrogen	0.06	0.09
Methane	86.7643	74.3592
Ethane	5.8007	9.3180
Propane	1.5534	3.6593
Isobutane	0.3607	1.1200
n-Butane	0.3075	0.9548
Isopentane	0.1561	0.6016
n-Pentane	0.0955	0.3681
Cyclopentane	0.0047	0.0176
n-Hexane	0.0434	0.1998
Cyclohexane	0.0204	0.0917
Other Hexanes	0.0977	0.4475
Heptanes	0.0541	0.2884
Methylcyclohexane	0.0176	0.0923
2,2,4 Trimethylpentane	0.0000	0.0000
Benzene	0.0123	0.0513
Toluene	0.0018	0.0089
Ethylbenzene	0.0001	0.0006
Xylenes	0.0002	0.0012
C8+ Heavies	0.0230	0.1981
Subtotal	99.99350	99.98840
Oxygen/Argon	0.00	0.00
Alcohols	0.0065	0.0116
Total	100.00000	100.00000

Calculated Values BTU @ **14.65**		**Total Sample**	**C6+ Fraction**	**C8+ Fraction**	**C10+ Fraction**	
LHV	Net Dry Real:	963.4	4834.9	8015.3	8949.5	**Btu/scf**
	Net Wet Real:	946.6	4750.4	7875.2	8793.1	**Btu/scf**
HHV	Gross Dry Real:	1066.7	5204.4	8647.3	9665.4	**Btu/scf**
	Gross Wet Real:	1048.1	5113.4	8496.1	9496.4	**Btu/scf**
Other Calculated Values						
Regualr Wobbe Index*		1328.3	2851.8	3684.7	3929.6	**Btu/scf**
Net Heating Value (60 °F ideal reaction):		19561.1	19252.7	19217.6	19499.5	**Btu/lbm**
Gross Heating Value (60°F ideal reaction):		21654.6	20724.9	20730.5	21051.8	**Btu/lbm**
Molar Mass (MW):		18.71965	95.43	160.391	176.294	**g/mol**
Relative Density (AIR=1):		0.6457	3.2948	5.5380	6.0872	**SG**
Density:		0.04933	0.25146	0.42267	0.46457	**lbm/scf**
Compressiblity Factor:		0.9975	0.9915	0.9996	0.9999	**Z**
Liquid Volume real gas @:	**14.65**	17.6994	0.1057	0.008	0.008	**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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SAMPLE TEMP. :	51 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	---	1.22	0.13	---	---
Nitrogen	---	0.06	0.09	---	---
Carbon Dioxide	---	3.40	7.99	---	---
Methane	P1	86.7643	74.3592	---	---
Ethane	P2	5.8007	9.3180	1.546	1.555
Propane	P3	1.5534	3.6593	0.427	0.429
i-Butane	I4	0.3607	1.1200	0.118	0.119
Methanol	X1	0.0062	0.0106	0.001	0.001
n-Butane	P4	0.3075	0.9548	0.097	0.098
2,2-Dimethylpropane	I5	0.0044	0.0169	0.002	0.002
i-Pentane	I5	0.1517	0.5847	0.055	0.055
Acetone	X3	0.0001	0.0003	0.000	0.000
i-Propanol	X3	0.0001	0.0003	0.000	0.000
n-Pentane	P5	0.0955	0.3681	0.035	0.035
t-Butanol	X4	0.0001	0.0004	0.000	0.000
2,2-Dimethylbutane	I6	0.0054	0.0248	0.002	0.002
Cyclopentane	N5	0.0047	0.0176	0.001	0.001
2,3-Dimethylbutane	I6	0.0101	0.0465	0.004	0.004
2-Methylpentane	I6	0.0385	0.1773	0.016	0.016
3-Methylpentane	I6	0.0218	0.1004	0.009	0.009
n-Hexane	P6	0.0434	0.1998	0.018	0.018
2,2-Dimethylpentane	I7	0.0016	0.0086	0.001	0.001
Methylcyclopentane	N6	0.0219	0.0985	0.008	0.008
2,4-Dimethylpentane	I7	0.0028	0.0150	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0007	0.0037	0.000	0.000
Benzene	A6	0.0123	0.0513	0.003	0.003
3,3-Dimethylpentane	I7	0.0008	0.0043	0.000	0.000

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Cyclohexane	N6	0.0204	0.0917	0.007	0.007
2-Methylhexane	I7	0.0109	0.0583	0.005	0.005
2,3-Dimethylpentane	I7	0.0027	0.0145	0.001	0.001
1,1-Dimethylcyclopentane	N7	0.0023	0.0121	0.001	0.001
3-Methylhexane	I7	0.0091	0.0487	0.004	0.004
1c,3-Dimethylcyclopentane	N7	0.0029	0.0152	0.001	0.001
1t,3-Dimethylcyclopentane	N7	0.0026	0.0136	0.001	0.001
3-Ethylpentane	I7	0.0004	0.0021	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0039	0.0205	0.002	0.002
n-Heptane	P7	0.0127	0.0680	0.006	0.006
1c,2-Dimethylcyclopentane	N7	0.0002	0.0011	0.000	0.000
Methylcyclohexane	N7	0.0176	0.0923	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	0.0004	0.0021	0.000	0.000
2,5-Dimethylhexane	I8	0.0004	0.0025	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0003	0.0018	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	0.0001	0.0006	0.000	0.000
Toluene	A7	0.0018	0.0089	0.001	0.001
2,3-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
2-Methylheptane	I8	0.0006	0.0037	0.000	0.000
4-Methylheptane	I8	0.0002	0.0012	0.000	0.000
3-Methylheptane	I8	0.0004	0.0025	0.000	0.000
1c,2t,3-Trimethylcyclopentane	N8	0.0004	0.0024	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0002	0.0012	0.000	0.000
1,1-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
n-Octane	P8	0.0002	0.0012	0.000	0.000
1c,4-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
Ethylbenzene	I8	0.0001	0.0006	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0001	0.0006	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0001	0.0006	0.000	0.000
i-Butylcyclopentane	N9	0.0001	0.0007	0.000	0.000
n-Nonane	P9	0.0001	0.0007	0.000	0.000
i-Propylbenzene	A9	0.0001	0.0006	0.000	0.000
3,6-Dimethyloctane	I10	0.0002	0.0015	0.000	0.000
1,3-Methylethylbenzene	A9	0.0008	0.0051	0.000	0.000
1,4-Methylethylbenzene	A9	0.0004	0.0026	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0004	0.0026	0.000	0.000
2-Methylnonane	I10	0.0003	0.0023	0.000	0.000
t-Butylbenzene	A10	0.0009	0.0065	0.000	0.000
n-Decane	P10	0.0003	0.0023	0.000	0.000
1,3-Methyl-i-propylbenzene	A10	0.0001	0.0007	0.000	0.000
1,3-Diethylbenzene	A10	0.0001	0.0007	0.000	0.000
n-Butylbenzene	A10	0.0001	0.0007	0.000	0.000
1,2-Diethylbenzene	A10	0.0001	0.0007	0.000	0.000
1,2-Methyl-n-propylbenzene	A10	0.0001	0.0007	0.000	0.000
1,3-Dimethyl-4-ethylbenzene	A10	0.0003	0.0021	0.000	0.000
1,2-Dimethyl-4-ethylbenzene	A10	0.0001	0.0007	0.000	0.000
1,3-Dimethyl-2-ethylbenzene	A10	0.0002	0.0014	0.000	0.000
1,2-Ethyl-i-propylbenzene	A10	0.0001	0.0008	0.000	0.000
1,4-Methyl-t-butylbenzene	A11	0.0001	0.0008	0.000	0.000
n-Undecane	P11	0.0020	0.0167	0.001	0.001
1,4-Ethyl-i-propylbenzene	A11	0.0001	0.0008	0.000	0.000
1,2-Methyl-n-butylbenzene	A11	0.0001	0.0008	0.000	0.000
1,2,3,5-Tetramethylbenzene	A11	0.0001	0.0007	0.000	0.000
5-Methylindan	A11	0.0001	0.0007	0.000	0.000
1,2-Ethyl-n-propylbenzene	A11	0.0001	0.0008	0.000	0.000

1,3-Di-i-propylbenzene	A11	0.0001	0.0009	0.000	0.000
sec-Pentylbenzene	A11	0.0002	0.0016	0.000	0.000
n-Pentylbenzene	A11	0.0001	0.0008	0.000	0.000
1,2-Di-n-propylbenzene	A11	0.0001	0.0009	0.000	0.000
1,4-Di-i-propylbenzene	A11	0.0003	0.0026	0.000	0.000
Tetrahydronaphthalene	A10	0.0002	0.0014	0.000	0.000
Naphthalene	A10	0.0006	0.0041	0.000	0.000
1-t-Butyl-3,5-dimethylbenzene	A12	0.0001	0.0009	0.000	0.000
1,4-Ethyl-t-butylbenzene	A11	0.0001	0.0009	0.000	0.000
1,3-Di-n-propylbenzene	A12	0.0001	0.0009	0.000	0.000
UnknownC11s	U11	0.0001	0.0009	0.000	0.000
n-Dodecane	P12	0.0011	0.0100	0.001	0.001
1,3,5-Triethylbenzene	A12	0.0002	0.0017	0.000	0.000
1,4-Methyl-n-pentylbenzene	A12	0.0001	0.0009	0.000	0.000
n-Hexylbenzene	A12	0.0001	0.0009	0.000	0.000
1,2,3,4,5-Pentamethylbenzene	A13	0.0002	0.0016	0.000	0.000
2-Methylnaphthalene	A11	0.0001	0.0008	0.000	0.000
1-Methylnaphthalene	A11	0.0001	0.0008	0.000	0.000
UnknownC12s	U12	0.0010	0.0083	0.001	0.001
n-Tridecane	P13	0.0007	0.0069	0.001	0.001
UnknownC13s	U13	0.0012	0.0118	0.001	0.001
n-Tetradecane	P14	0.0004	0.0042	0.000	0.000
UnknownC14s	U14	0.0004	0.0042	0.000	0.000
n-Pentadecane	P15	0.0002	0.0022	0.000	0.000
UnknownC15s	U15	0.0012	0.0136	0.001	0.001
n-Hexadecane	P16	0.0002	0.0024	0.000	0.000
UnknownC16s	U16	0.0004	0.0049	0.000	0.000
n-Heptadecane	P17	0.0001	0.0013	0.000	0.000
UnknownC17s	U17	0.0005	0.0064	0.000	0.000
n-Octadecane	P18	0.0001	0.0013	0.000	0.000
UnknownC18s	U18	0.0008	0.0109	0.001	0.001
UnknownC19s	U19	0.0006	0.0086	0.001	0.001
TOTAL		100.00000	100.00000	2.3875	2.4004

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0123	0.0513
TOLUENE	0.0018	0.0089
ETHYLBENZENE	0.0001	0.0006
XYLENES	0.0002	0.0012
TOTAL BTEX	0.0144	0.0620

(DETAILED HYDROCARBON ANALYSIS/NJ 1993)

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	NET WET REAL :	946.6	/scf	951.9	/scf
HHV	GROSS DRY REAL :	1066.7	/scf	1072.6	/scf
	GROSS WET REAL :	1048.1	/scf	1054.0	/scf
	NET HEATING VALUE (60 °F ideal reaction):			19561.1	Btu/lbm
	GROSS HEATING VALUE (60°F ideal reaction):			21654.6	Btu/lbm
	RELATIVE DENSITY (AIR=1):			0.6457	
	DENSITY			0.04933	lb/scf
	COMPRESSIBILITY FACTOR :			0.9975	
	REGULAR WOBBE INDEX			1328.3	

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

Net Dry Ideal BTU	4809 /scf	Relative Density - SG (Air=1)	3.2948		***C6+factors***
Gross Dry Ideal BTU	5176.5 /scf	**Z** Compressiblity Factor	0.99152		0.99063
Net Dry Ideal BTU	19252.7 /lb	Density Factor	251.464	lbm/1000 ft3	
Gross Dry Ideal BTU	20724.9 /lb	Molar Mass or MW	95.43	g/mol	
		Volume Liquid Ideal gas	0.106	scf/gal	23.5

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.*