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EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY:	**05-045-13001**	NAME/DESCRIP :	**110170179 UNOCAL 23D-4D CASING**
LEASE #:			
FIELD/AREA:			

PROJECT NO. :	**202506106**	ANALYSIS NO. :	**01**
COMPANY NAME :	**QB ENERGY OPERATING, LLC**	ANALYSIS DATE:	JUNE 25, 2025 09:13
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	JUNE 10, 2025
CUSTOMER REF:		TO:	
PRODUCER :	QB ENERGY OPERATING, LLC	EFFECTIVE DATE:	

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

SAMPLE CYCLE:			SAMPLE TYPE:	SPOT
SAMPLE PRES. :	377	psig	PROBE :	NO PROBE
FLOW PRES. :		psig	CYLINDER NO. :	ECA-737
LAB PRES:		psig	SAMPLED BY :	MIKE KELLEY
SAMPLE TEMP. :	67	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	0.0399	0.0710	0.0050	0.0050
HELIUM	0.01	0.00	---	---
HYDROGEN	0.05	0.01	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.19	0.29	---	---
CARBON DIOXIDE	0.15	0.37	---	---
METHANE	92.3154	82.0302	---	---
ETHANE	3.4699	5.7791	0.9255	0.9305
PROPANE	1.9797	4.8353	0.5437	0.5466
I-BUTANE	0.3613	1.1632	0.1179	0.1186
N-BUTANE	0.6926	2.2297	0.2179	0.2191
I-PENTANE	0.2319	0.9254	0.0840	0.0844
N-PENTANE	0.2132	0.8520	0.0770	0.0774
HEXANES PLUS	0.2961	1.4442	0.1140	0.1143
TOTALS	100.00000	100.00000	2.0850	2.0959

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0265	0.1147
TOLUENE	0.0009	0.0046
ETHYLBENZENE	0.0000	0.0000
XYLENES	0.0002	0.0012
TOTAL BTEX	0.0276	0.1205

**(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 :	1002.2 **/scf**	1007.7 **/scf**
	NET WET REAL :	984.7 **/scf**	990.2 **/scf**
HHV	GROSS DRY REAL :	1109.0 **/scf**	1115.1 **/scf**
	GROSS WET REAL :	1089.6 **/scf**	1095.7 **/scf**

NET HEATING VALUE (60 °F ideal reaction):	21089.6 **Btu/lbm**
GROSS HEATING VALUE (60°F ideal reaction):	23343.1 **Btu/lbm**
RELATIVE DENSITY (AIR=1):	0.6229
DENSITY	0.04757 **lbm/scf**
COMPRESSIBILITY FACTOR :	0.9975
REGULAR WOBBE INDEX	1406.0

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EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	202506106	ANALYSIS NO. :	01
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	JUNE 25, 2025 09:13
ACCOUNT NO. :		SAMPLE DATE :	JUNE 10, 2025
PRODUCER :	QB ENERGY OPERATING, LLC	CYLINDER NO. :	ECA-737
LEASE NO. :		SAMPLED BY :	MIKE KELLEY
NAME/DESCRIP :	110170179 UNOCAL 23D-4D CASING		
FIELD DATA		SAMPLE TEMP. :	67
SAMPLE PRES. :	377	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm mol*		
COMMENTS :	***SPOT*** ***NO PROBE***		

Componet	Mole %	Wt %
Helium	0.01	0.00
Hydrogen	0.05	0.01
Carbon Dioxide	0.15	0.37
Nitrogen	0.19	0.29
Methane	92.3154	82.0302
Ethane	3.4699	5.7791
Propane	1.9797	4.8353
Isobutane	0.3613	1.1632
n-Butane	0.6926	2.2297
Isopentane	0.2199	0.8788
n-Pentane	0.2132	0.8520
Cyclopentane	0.0120	0.0466
n-Hexane	0.0665	0.3174
Cyclohexane	0.0206	0.0960
Other Hexanes	0.1267	0.6018
Heptanes	0.0400	0.2209
Methylcyclohexane	0.0103	0.0560
2,2,4 Trimethylpentane	0.0001	0.0006
Benzene	0.0265	0.1147
Toluene	0.0009	0.0046
Ethylbenzene	0.0000	0.0000
Xylenes	0.0002	0.0012
C8+ Heavies	0.0043	0.0310
Subtotal	99.96010	99.92900
Oxygen/Argon	0.00	0.00
Alcohols	0.0399	0.0710
Total	100.00000	100.00000

Calculated Values BTU @ **14.65**		**Total Sample**	**C6+ Fraction**	**C8+ Fraction**	**C10+ Fraction**	
LHV	Net Dry Real:	1002.2	4459.5	6049.5	7840.2	**Btu/scf**
	Net Wet Real:	984.7	4381.5	5943.7	7703.1	**Btu/scf**
HHV	Gross Dry Real:	1109.0	4794.7	6482.1	8371.0	**Btu/scf**
	Gross Wet Real:	1089.6	4710.9	6368.8	8224.7	**Btu/scf**
Other Calculated Values						
Regualr Wobbe Index*		1406.0	2730.0	3071.5	3568.2	**Btu/scf**
Net Heating Value (60 °F ideal reaction):		21089.6	19163.8	18309.0	19874.3	**Btu/lbm**
Gross Heating Value (60°F ideal reaction):		23343.1	20606.1	19620.2	21228.0	**Btu/lbm**
Molar Mass (MW):		18.0537	88.074	129.411	160.295	**g/mol**
Relative Density (AIR=1):		0.6229	3.0406	4.4680	5.5347	**SG**
Density:		0.04757	0.23209	0.34101	0.42240	**lbm/scf**
Compressiblity Factor:		0.9975	0.9897	0.9985	0.9997	**Z**
Liquid Volume real gas @:	**14.65**	17.6924	0.1136	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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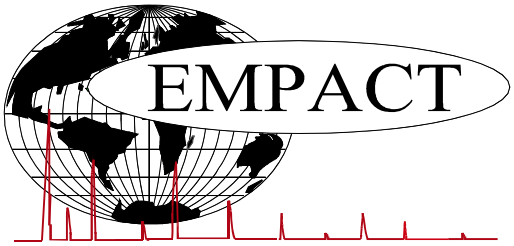

EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PRIMARY DB KEY: **05-045-13001** NAME/DESCRIP : **110170179 UNOCAL 23D-4D CASING**
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OFFICE / BRANCH: PARACHUTE, CO SAMPLE DATE : JUNE 10, 2025
CUSTOMER REF: TO:
PRODUCER : QB ENERGY OPERATING, LLC EFFECTIVE DATE:

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

SAMPLE CYCLE: SAMPLE TYPE: SPOT
SAMPLE PRES. : 377 psig PROBE : NO PROBE
FLOW PRES. : psig CYLINDER NO. : ECA-737
LAB PRES: psig SAMPLED BY : MIKE KELLEY
SAMPLE TEMP. : 67 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	---	0.01	0.00	---	---
Hydrogen	---	0.05	0.01	---	---
Nitrogen	---	0.19	0.29	---	---
Carbon Dioxide	---	0.15	0.37	---	---
Methane	P1	92.3154	82.0302	---	---
Ethane	P2	3.4699	5.7791	0.926	0.931
Propane	P3	1.9797	4.8353	0.544	0.547
i-Butane	I4	0.3613	1.1632	0.118	0.119
Methanol	X1	0.0398	0.0706	0.005	0.005
n-Butane	P4	0.6926	2.2297	0.218	0.219
2,2-Dimethylpropane	I5	0.0027	0.0108	0.001	0.001
i-Pentane	I5	0.2172	0.8680	0.079	0.079
n-Pentane	P5	0.2132	0.8520	0.077	0.077
t-Butanol	X4	0.0001	0.0004	0.000	0.000
2,2-Dimethylbutane	I6	0.0039	0.0186	0.002	0.002
Cyclopentane	N5	0.0120	0.0466	0.004	0.004
2,3-Dimethylbutane	I6	0.0090	0.0430	0.004	0.004
2-Methylpentane	I6	0.0566	0.2702	0.023	0.023
3-Methylpentane	I6	0.0299	0.1427	0.012	0.012
n-Hexane	P6	0.0665	0.3174	0.027	0.027
2,2-Dimethylpentane	I7	0.0004	0.0022	0.000	0.000
Methylcyclopentane	N6	0.0273	0.1273	0.010	0.010
2,4-Dimethylpentane	I7	0.0019	0.0105	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0004	0.0022	0.000	0.000
Benzene	A6	0.0265	0.1147	0.007	0.007
3,3-Dimethylpentane	I7	0.0006	0.0033	0.000	0.000
Cyclohexane	N6	0.0206	0.0960	0.007	0.007
2-Methylhexane	I7	0.0076	0.0422	0.004	0.004
2,3-Dimethylpentane	I7	0.0027	0.0150	0.001	0.001
1,1-Dimethylcyclopentane	N7	0.0014	0.0076	0.001	0.001

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3-Methylhexane	I7	0.0069	0.0383	0.003	0.003
1c,3-Dimethylcyclopentane	N7	0.0021	0.0114	0.001	0.001
1t,3-Dimethylcyclopentane	N7	0.0019	0.0104	0.001	0.001
3-Ethylpentane	I7	0.0002	0.0011	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0032	0.0174	0.001	0.001
2,2,4-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
n-Heptane	P7	0.0099	0.0549	0.005	0.005
1c,2-Dimethylcyclopentane	N7	0.0004	0.0022	0.000	0.000
Methylcyclohexane	N7	0.0103	0.0560	0.004	0.004
2,2-Dimethylhexane	I8	0.0003	0.0019	0.000	0.000
1,1,3-Trimethylcyclopentane	N7	0.0001	0.0006	0.000	0.000
Ethylcyclopentane	N7	0.0003	0.0016	0.000	0.000
2,5-Dimethylhexane	I8	0.0002	0.0013	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0002	0.0013	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
Toluene	A7	0.0009	0.0046	0.000	0.000
2,3-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
2-Methylheptane	I8	0.0002	0.0013	0.000	0.000
4-Methylheptane	I8	0.0001	0.0006	0.000	0.000
1c,2t,3-Trimethylcyclopentane	N8	0.0002	0.0012	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
n-Octane	P8	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-Propylbenzene	A9	0.0001	0.0007	0.000	0.000
3,6-Dimethyloctane	I10	0.0002	0.0015	0.000	0.000
1,3-Methylethylbenzene	A9	0.0006	0.0040	0.000	0.000
1,4-Methylethylbenzene	A9	0.0003	0.0020	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0002	0.0013	0.000	0.000
5-Methylnonane	I10	0.0002	0.0015	0.000	0.000
t-Butylbenzene	A10	0.0007	0.0052	0.000	0.000
1,2,3-Trimethylbenzene	A9	0.0001	0.0007	0.000	0.000
UnknownC16s	U16	0.0001	0.0013	0.000	0.000
n-Heptadecane	P17	0.0001	0.0013	0.000	0.000
n-Nonadecane	P19	0.0001	0.0015	0.000	0.000
TOTAL		100.00000	100.00000	2.0850	2.0959

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0265	0.1147
TOLUENE	0.0009	0.0046
ETHYLBENZENE	0.0000	0.0000
XYLENES	0.0002	0.0012
TOTAL BTEX	0.0276	0.1205

**(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 :	1002.2 /scf	1007.7 /scf
	NET WET REAL :	984.7 /scf	990.2 /scf
HHV	GROSS DRY REAL :	1109.0 /scf	1115.1 /scf
	GROSS WET REAL :	1089.6 /scf	1095.7 /scf
	NET HEATING VALUE (60 °F ideal reaction):		21089.6 Btu/lbm
	GROSS HEATING VALUE (60°F ideal reaction):		23343.1 Btu/lbm
	RELATIVE DENSITY (AIR=1):		0.6229
	DENSITY		0.04757 lb/scf
	COMPRESSIBILITY FACTOR :		0.9975
	REGULAR WOBBE INDEX		1406.0

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

Net Dry Ideal BTU	4427.6 /scf	Relative Density - SG (Air=1)	3.0406	***C6+factors***
Gross Dry Ideal BTU	4760.4 /scf	**Z** Compressiblity Factor	0.98974	0.98927
Net Dry Ideal BTU	19163.8 /lb	Density Factor	232.087 lbm/1000 ft3	
Gross Dry Ideal BTU	20606.1 /lb	Molar Mass or MW	88.074 g/mol	
		Volume Liquid Ideal gas	0.114 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.