EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY:	**05-045-07856**	NAME/DESCRIP :	**UNOCAL 2 LOCATION: 335687, 14-9D**
LEASE #:			**SURFACE SAMPLE AT WELLHEAD**
FIELD/AREA:			
PROJECT NO. :	**202506130**	ANALYSIS NO. :	**03**
COMPANY NAME :	**QB ENERGY OPERATING, LLC**	ANALYSIS DATE:	JUNE 28, 2025 19:48
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	JUNE 23, 2025 11:28
CUSTOMER REF:		TO:	
PRODUCER :	QB ENERGY OPERATING, LLC	EFFECTIVE DATE:	

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

SAMPLE CYCLE:		SAMPLE TYPE:	SPOT
SAMPLE PRES. :	psig	PROBE :	
FLOW PRES. :	psig	CYLINDER NO. :	1L TEDLAR
LAB PRES:	psig	SAMPLED BY :	DEREK HORN
SAMPLE TEMP. :	ºf	SAMPLING COMPANY:	QB ENERGY OPERATING, LLC
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	0.0001	0.0002	0.0000	0.0000
HELIUM	0.01	0.00	---	---
HYDROGEN	0.00	0.00	---	---
OXYGEN/ARGON	2.43	4.10	---	---
NITROGEN	7.93	11.72	---	---
CARBON DIOXIDE	0.40	0.93	---	---
METHANE	83.3553	70.5861	---	---
ETHANE	3.1360	4.9775	0.8362	0.8408
PROPANE	1.5872	3.6944	0.4356	0.4380
I-BUTANE	0.2655	0.8145	0.0869	0.0874
N-BUTANE	0.4675	1.4343	0.1469	0.1477
I-PENTANE	0.1502	0.5715	0.0539	0.0542
N-PENTANE	0.1232	0.4692	0.0450	0.0452
HEXANES PLUS	0.1458	0.7013	0.0570	0.0572
TOTALS	100.00000	100.00000	1.6615	1.6705

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0005	0.0021
TOLUENE	0.0002	0.0010
ETHYLBENZENE	0.0000	0.0000
XYLENES	0.0001	0.0006
TOTAL BTEX	0.0008	0.0037

**(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 :	883.0 **/scf**	887.9 **/scf**
	NET WET REAL :	867.6 **/scf**	872.5 **/scf**
HHV	GROSS DRY REAL :	978.0 **/scf**	983.3 **/scf**
	GROSS WET REAL :	960.9 **/scf**	966.2 **/scf**

NET HEATING VALUE (60 °F ideal reaction):	17716.3 **Btu/lbm**
GROSS HEATING VALUE (60°F ideal reaction):	19619.3 **Btu/lbm**
RELATIVE DENSITY (AIR=1):	0.6536
DENSITY	0.04992 **lbm/scf**
COMPRESSIBILITY FACTOR :	0.9978
REGULAR WOBBE INDEX	1210.8

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EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	202506130	ANALYSIS NO. :	03
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	JUNE 28, 2025 19:48
ACCOUNT NO. :		SAMPLE DATE :	JUNE 23, 2025 11:28
PRODUCER :	QB ENERGY OPERATING, LLC	CYLINDER NO. :	1L TEDLAR
LEASE NO. :		SAMPLED BY :	DEREK HORN
NAME/DESCRIP :	UNOCAL 2 LOCATION: 335687, 14-9D SURFACE SAMPLE AT WELLHEAD		

FIELD DATA		SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm mol*		
COMMENTS :	*SPOT*		

Componet	Mole %	Wt %
Helium	0.01	0.00
Hydrogen	0.00	0.00
Carbon Dioxide	0.40	0.93
Nitrogen	7.93	11.72
Methane	83.3553	70.5861
Ethane	3.1360	4.9775
Propane	1.5872	3.6944
Isobutane	0.2655	0.8145
n-Butane	0.4675	1.4343
Isopentane	0.1447	0.5511
n-Pentane	0.1232	0.4692
Cyclopentane	0.0055	0.0204
n-Hexane	0.0282	0.1283
Cyclohexane	0.0098	0.0435
Other Hexanes	0.0617	0.2792
Heptanes	0.0257	0.1357
Methylcyclohexane	0.0098	0.0508
2,2,4 Trimethylpentane	0.0001	0.0006
Benzene	0.0005	0.0021
Toluene	0.0002	0.0010
Ethylbenzene	0.0000	0.0000
Xylenes	0.0001	0.0006
C8+ Heavies	0.0097	0.0595
Subtotal	97.56990	95.89980
Oxygen/Argon	2.43	4.10
Alcohols	0.0001	0.0002
Total	100.00000	100.00000

Calculated Values BTU @ **14.65**		**Total Sample**	**C6+ Fraction**	**C8+ Fraction**	**C10+ Fraction**	
LHV	Net Dry Real:	883.0	4640.8	5777.7	#DIV/0!	**Btu/scf**
	Net Wet Real:	867.6	4559.7	5676.7	#DIV/0!	**Btu/scf**
HHV	Gross Dry Real:	978.0	5001.4	6222.7	#DIV/0!	**Btu/scf**
	Gross Wet Real:	960.9	4914.0	6113.9	#DIV/0!	**Btu/scf**
Other Calculated Values						
Regualr Wobbe Index*		1210.8	2802.5	3118.6	#DIV/0!	**Btu/scf**
Net Heating Value (60 °F ideal reaction):		17716.3	19400.2	19857.5	#DIV/0!	**Btu/lbm**
Gross Heating Value (60°F ideal reaction):		19619.3	20908.6	21388.7	#DIV/0!	**Btu/lbm**
Molar Mass (MW):		18.94628	91.025	115.38	#DIV/0!	**g/mol**
Relative Density (AIR=1):		0.6536	3.1428	3.9830	#DIV/0!	**SG**
Density:		0.04992	0.23987	0.30404	#DIV/0!	**lbm/scf**
Compressiblity Factor:		0.9978	0.9903	0.9971	#DIV/0!	**Z**
Liquid Volume real gas @:	**14.65**	16.8591	0.0568	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.

EMPACT Analytical Systems Inc. 365 S Main St Brighton, CO 80601 303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PRIMARY DB KEY: **05-045-07856** NAME/DESCRIP : **UNOCAL 2 LOCATION: 335687, 14-9D**
LEASE #: **SURFACE SAMPLE AT WELLHEAD**
FIELD/AREA:

PROJECT NO. : **202506130** ANALYSIS NO. : **03**
COMPANY NAME : **QB ENERGY OPERATING, LLC** ANALYSIS DATE: JUNE 28, 2025 19:48
OFFICE / BRANCH: PARACHUTE, CO SAMPLE DATE : JUNE 23, 2025 11:28
CUSTOMER REF: TO:
PRODUCER : QB ENERGY OPERATING, LLC EFFECTIVE DATE:
*****FIELD DATA*****
SAMPLE CYCLE: SAMPLE TYPE: SPOT
SAMPLE PRES. : psig PROBE :
FLOW PRES. : psig CYLINDER NO. : 1L TEDLAR
LAB PRES: psig SAMPLED BY : DEREK HORN
SAMPLE TEMP. : ºf SAMPLING COMPANY: QB ENERGY OPERATING, LLC
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	---	---
Oxygen/Argon	---	2.43	4.10	---	---
Nitrogen	---	7.93	11.72	---	---
Carbon Dioxide	---	0.40	0.93	---	---
Methane	P1	83.3553	70.5861	---	---
Ethane	P2	3.1360	4.9775	0.836	0.841
Propane	P3	1.5872	3.6944	0.436	0.438
i-Butane	I4	0.2655	0.8145	0.087	0.087
Methanol	X1	0.0001	0.0002	0.000	0.000
n-Butane	P4	0.4675	1.4343	0.147	0.148
2,2-Dimethylpropane	I5	0.0013	0.0050	0.000	0.000
i-Pentane	I5	0.1434	0.5461	0.052	0.052
n-Pentane	P5	0.1232	0.4692	0.045	0.045
2,2-Dimethylbutane	I6	0.0012	0.0054	0.000	0.000
Cyclopentane	N5	0.0055	0.0204	0.002	0.002
2,3-Dimethylbutane	I6	0.0046	0.0209	0.002	0.002
2-Methylpentane	I6	0.0285	0.1296	0.012	0.012
3-Methylpentane	I6	0.0147	0.0669	0.006	0.006
n-Hexane	P6	0.0282	0.1283	0.012	0.012
2,2-Dimethylpentane	I7	0.0002	0.0011	0.000	0.000
Methylcyclopentane	N6	0.0127	0.0564	0.004	0.004
2,4-Dimethylpentane	I7	0.0009	0.0048	0.000	0.000
2,2,3-Trimethylbutane	I7	0.0001	0.0005	0.000	0.000
Benzene	A6	0.0005	0.0021	0.000	0.000
3,3-Dimethylpentane	I7	0.0002	0.0011	0.000	0.000
Cyclohexane	N6	0.0098	0.0435	0.003	0.003
2-Methylhexane	I7	0.0033	0.0175	0.002	0.002
2,3-Dimethylpentane	I7	0.0029	0.0154	0.001	0.001
1,1-Dimethylcyclopentane	N7	0.0008	0.0042	0.000	0.000

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3-Methylhexane	I7	0.0043	0.0228	0.002	0.002
1c,3-Dimethylcyclopentane	N7	0.0015	0.0078	0.001	0.001
1t,3-Dimethylcyclopentane	N7	0.0014	0.0072	0.001	0.001
3-Ethylpentane	I7	0.0003	0.0016	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0024	0.0125	0.001	0.001
2,2,4-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
n-Heptane	P7	0.0067	0.0354	0.003	0.003
1c,2-Dimethylcyclopentane	N7	0.0002	0.0011	0.000	0.000
Methylcyclohexane	N7	0.0098	0.0508	0.004	0.004
2,2-Dimethylhexane	I8	0.0004	0.0024	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	0.0003	0.0018	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0003	0.0018	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0004	0.0024	0.000	0.000
3,3-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
Toluene	A7	0.0002	0.0010	0.000	0.000
2,3-Dimethylhexane	I8	0.0002	0.0012	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0001	0.0006	0.000	0.000
2-Methylheptane	I8	0.0013	0.0079	0.001	0.001
4-Methylheptane	I8	0.0003	0.0018	0.000	0.000
3-Methylheptane	I8	0.0003	0.0018	0.000	0.000
1c,2t,3-Trimethylcyclopentane	N8	0.0011	0.0065	0.001	0.001
3-Ethylhexane	I8	0.0002	0.0012	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0004	0.0024	0.000	0.000
1,1-Dimethylcyclohexane	N8	0.0001	0.0006	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	0.0004	0.0024	0.000	0.000
n-Octane	P8	0.0013	0.0078	0.001	0.001
1c,4-Dimethylcyclohexane	N8	0.0002	0.0012	0.000	0.000
i-Propylcyclopentane	I8	0.0001	0.0006	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0003	0.0020	0.000	0.000
2,2,3-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
2,4-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
Ethylcyclohexane	N8	0.0003	0.0018	0.000	0.000
n-Propylcyclopentane	N8	0.0001	0.0006	0.000	0.000
2,5-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0001	0.0006	0.000	0.000
4-Methyloctane	I9	0.0001	0.0007	0.000	0.000
2-Methyloctane	I9	0.0001	0.0007	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	0.0001	0.0007	0.000	0.000
i-Butylcyclopentane	N9	0.0001	0.0007	0.000	0.000
n-Nonane	P9	0.0002	0.0014	0.000	0.000
n-Propylbenzene	A9	0.0001	0.0006	0.000	0.000
UnknownC9s	U9	0.0001	0.0007	0.000	0.000
TOTAL		100.00000	100.00000	1.6615	1.6705

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BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0005	0.0021
TOLUENE	0.0002	0.0010
ETHYLBENZENE	0.0000	0.0000
XYLENES	0.0001	0.0006
TOTAL BTEX	0.0008	0.0037

**(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 :	883.0 /scf	887.9 /scf
	NET WET REAL :	867.6 /scf	872.5 /scf
HHV	GROSS DRY REAL :	978.0 /scf	983.3 /scf
	GROSS WET REAL :	960.9 /scf	966.2 /scf

NET HEATING VALUE (60 °F ideal reaction):	17716.3 Btu/lbm
GROSS HEATING VALUE (60°F ideal reaction):	19619.3 Btu/lbm
RELATIVE DENSITY (AIR=1):	0.6536
DENSITY	0.04992 lb/scf
COMPRESSIBILITY FACTOR :	0.9978
REGULAR WOBBE INDEX	1210.8

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

Net Dry Ideal BTU	4610.1 /scf	Relative Density - SG (Air=1)	3.1428	***C6+factors***
Gross Dry Ideal BTU	4968.3 /scf	**Z** Compressiblity Factor	0.99027	0.98972
Net Dry Ideal BTU	19400.2 /lb	Density Factor	239.867 lbm/1000 ft3	
Gross Dry Ideal BTU	20908.6 /lb	Molar Mass or MW	91.025 g/mol	
		Volume Liquid Ideal gas	0.057 scf/gal	23.7

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.*