EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY:	**05-045-13234**	NAME/DESCRIP :	**110170177 UNOCAL 23A-4D CASING**
LEASE #:			
FIELD/AREA:			

PROJECT NO. :	**202506106**	ANALYSIS NO. :	**04**
COMPANY NAME :	**QB ENERGY OPERATING, LLC**	ANALYSIS DATE:	JUNE 25, 2025 14:24
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	JUNE 10, 20255
CUSTOMER REF:		TO:	
PRODUCER :	QB ENERGY OPERATING, LLC	EFFECTIVE DATE:	

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

SAMPLE CYCLE:			SAMPLE TYPE:	SPOT
SAMPLE PRES. :	815	psig	PROBE :	NO PROBE
FLOW PRES. :		psig	CYLINDER NO. :	ECA-804
LAB PRES:		psig	SAMPLED BY :	MIKE KELLEY
SAMPLE TEMP. :	64	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	0.0033	0.0056	0.0000	0.0000
HELIUM	0.00	0.00	---	---
HYDROGEN	0.03	0.00	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.07	0.10	---	---
CARBON DIOXIDE	3.42	7.94	---	---
METHANE	87.4005	73.9987	---	---
ETHANE	6.3965	10.1507	1.7051	1.7144
PROPANE	1.4496	3.3735	0.3978	0.4000
I-BUTANE	0.4127	1.2659	0.1349	0.1357
N-BUTANE	0.2605	0.7991	0.0820	0.0824
I-PENTANE	0.1830	0.6966	0.0670	0.0673
N-PENTANE	0.0912	0.3473	0.0330	0.0332
HEXANES PLUS	0.2825	1.3219	0.1110	0.1113
TOTALS	100.00000	100.00000	2.5308	2.5443

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0137	0.0565
TOLUENE	0.0010	0.0049
ETHYLBENZENE	0.0001	0.0006
XYLENES	0.0001	0.0006
TOTAL BTEX	0.0149	0.0626

**(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 :	974.4 **/scf**	979.7 **/scf**
	NET WET REAL :	957.4 **/scf**	962.7 **/scf**
HHV	GROSS DRY REAL :	1078.2 **/scf**	1084.1 **/scf**
	GROSS WET REAL :	1059.4 **/scf**	1065.3 **/scf**

NET HEATING VALUE (60 °F ideal reaction):	19526.6 **Btu/lbm**
GROSS HEATING VALUE (60°F ideal reaction):	21610.0 **Btu/lbm**
RELATIVE DENSITY (AIR=1):	0.6541
DENSITY	0.04993 **lbm/scf**
COMPRESSIBILITY FACTOR :	0.9974
REGULAR WOBBE INDEX	1333.9

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EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	202506106	ANALYSIS NO. :	04
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	JUNE 25, 2025 14:24
ACCOUNT NO. :		SAMPLE DATE :	JUNE 10, 20255
PRODUCER :	QB ENERGY OPERATING, LLC	CYLINDER NO. :	ECA-804
LEASE NO. :		SAMPLED BY :	MIKE KELLEY
NAME/DESCRIP :	110170177 UNOCAL 23A-4D CASING		
FIELD DATA		SAMPLE TEMP. :	64
SAMPLE PRES. :	815	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm mol*		
COMMENTS :	***SPOT*** ***NO PROBE***		

Componet	Mole %	Wt %
Helium	0.00	0.00
Hydrogen	0.03	0.00
Carbon Dioxide	3.42	7.94
Nitrogen	0.07	0.10
Methane	87.4005	73.9987
Ethane	6.3965	10.1507
Propane	1.4496	3.3735
Isobutane	0.4127	1.2659
n-Butane	0.2605	0.7991
Isopentane	0.1803	0.6866
n-Pentane	0.0912	0.3473
Cyclopentane	0.0027	0.0100
n-Hexane	0.0524	0.2383
Cyclohexane	0.0149	0.0662
Other Hexanes	0.1406	0.6368
Heptanes	0.0444	0.2343
Methylcyclohexane	0.0121	0.0627
2,2,4 Trimethylpentane	0.0001	0.0006
Benzene	0.0137	0.0565
Toluene	0.0010	0.0049
Ethylbenzene	0.0001	0.0006
Xylenes	0.0001	0.0006
C8+ Heavies	0.0031	0.0204
Subtotal	99.99670	99.99440
Oxygen/Argon	0.00	0.00
Alcohols	0.0033	0.0056
Total	100.00000	100.00000

Calculated Values BTU @ **14.65**		**Total Sample**	**C6+ Fraction**	**C8+ Fraction**	**C10+ Fraction**	
LHV	Net Dry Real:	974.4	4509.4	5798.6	6583.0	**Btu/scf**
	Net Wet Real:	957.4	4430.6	5697.2	6467.9	**Btu/scf**
HHV	Gross Dry Real:	1078.2	4855.0	6203.1	6994.4	**Btu/scf**
	Gross Wet Real:	1059.4	4770.1	6094.7	6872.1	**Btu/scf**
Other Calculated Values						
Regualr Wobbe Index*		1333.9	2753.9	3018.5	3228.7	**Btu/scf**
Net Heating Value (60 °F ideal reaction):		19526.6	19220.1	17751.6	18322.8	**Btu/lbm**
Gross Heating Value (60°F ideal reaction):		21610.0	20694.0	18987.3	19464.9	**Btu/lbm**
Molar Mass (MW):		18.94974	88.636	122.748	136.64	**g/mol**
Relative Density (AIR=1):		0.6541	3.0600	4.2381	4.7178	**SG**
Density:		0.04993	0.23357	0.32346	0.36007	**lbm/scf**
Compressiblity Factor:		0.9974	0.9891	0.9986	0.9995	**Z**
Liquid Volume real gas @:	**14.65**	17.848	0.1107	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:	**05-045-13234**	NAME/DESCRIP :	**110170177 UNOCAL 23A-4D CASING**
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PRODUCER :	QB ENERGY OPERATING, LLC	EFFECTIVE DATE:	
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SAMPLE PRES. :	815 psig	PROBE :	NO PROBE
FLOW PRES. :	psig	CYLINDER NO. :	ECA-804
LAB PRES:	psig	SAMPLED BY :	MIKE KELLEY
SAMPLE TEMP. :	64 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	---	0.03	0.00	---	---
Nitrogen	---	0.07	0.10	---	---
Carbon Dioxide	---	3.42	7.94	---	---
Methane	P1	87.4005	73.9987	---	---
Ethane	P2	6.3965	10.1507	1.705	1.714
Propane	P3	1.4496	3.3735	0.398	0.400
i-Butane	I4	0.4127	1.2659	0.135	0.136
Methanol	X1	0.0033	0.0056	0.000	0.000
n-Butane	P4	0.2605	0.7991	0.082	0.082
2,2-Dimethylpropane	I5	0.0060	0.0229	0.002	0.002
i-Pentane	I5	0.1743	0.6637	0.064	0.064
n-Pentane	P5	0.0912	0.3473	0.033	0.033
2,2-Dimethylbutane	I6	0.0107	0.0487	0.004	0.004
Cyclopentane	N5	0.0027	0.0100	0.001	0.001
2,3-Dimethylbutane	I6	0.0156	0.0709	0.006	0.006
2-Methylpentane	I6	0.0572	0.2601	0.024	0.024
3-Methylpentane	I6	0.0330	0.1501	0.013	0.013
n-Hexane	P6	0.0524	0.2383	0.021	0.021
2,2-Dimethylpentane	I7	0.0014	0.0074	0.001	0.001
Methylcyclopentane	N6	0.0241	0.1070	0.009	0.009
2,4-Dimethylpentane	I7	0.0037	0.0196	0.002	0.002
2,2,3-Trimethylbutane	I7	0.0011	0.0058	0.001	0.001
Benzene	A6	0.0137	0.0565	0.004	0.004
3,3-Dimethylpentane	I7	0.0010	0.0053	0.000	0.000
Cyclohexane	N6	0.0149	0.0662	0.005	0.005
2-Methylhexane	I7	0.0087	0.0460	0.004	0.004
2,3-Dimethylpentane	I7	0.0029	0.0154	0.001	0.001
1,1-Dimethylcyclopentane	N7	0.0017	0.0088	0.001	0.001

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3-Methylhexane	I7	0.0075	0.0397	0.003	0.003
1c,3-Dimethylcyclopentane	N7	0.0019	0.0099	0.001	0.001
1t,3-Dimethylcyclopentane	N7	0.0016	0.0083	0.001	0.001
3-Ethylpentane	I7	0.0002	0.0011	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0026	0.0135	0.001	0.001
2,2,4-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
n-Heptane	P7	0.0091	0.0481	0.004	0.004
1c,2-Dimethylcyclopentane	N7	0.0004	0.0021	0.000	0.000
Methylcyclohexane	N7	0.0121	0.0627	0.005	0.005
2,2-Dimethylhexane	I8	0.0002	0.0012	0.000	0.000
1,1,3-Trimethylcyclopentane	N7	0.0002	0.0012	0.000	0.000
Ethylcyclopentane	N7	0.0004	0.0021	0.000	0.000
2,5-Dimethylhexane	I8	0.0002	0.0012	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
Toluene	A7	0.0010	0.0049	0.000	0.000
3-Methylheptane	I8	0.0001	0.0006	0.000	0.000
n-Octane	P8	0.0001	0.0006	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
Ethylbenzene	I8	0.0001	0.0006	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0001	0.0006	0.000	0.000
3,6-Dimethyloctane	I10	0.0002	0.0015	0.000	0.000
1,3-Methylethylbenzene	A9	0.0005	0.0032	0.000	0.000
1,4-Methylethylbenzene	A9	0.0002	0.0013	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0002	0.0013	0.000	0.000
1,2-Methylethylbenzene	A9	0.0002	0.0013	0.000	0.000
t-Butylbenzene	A10	0.0006	0.0043	0.000	0.000
1,2,3-Trimethylbenzene	A9	0.0001	0.0006	0.000	0.000
1,2-Dimethyl-3-ethylbenzene	A10	0.0001	0.0007	0.000	0.000
UnknownC10s	U10	0.0001	0.0007	0.000	0.000
TOTAL		100.00000	100.00000	2.5308	2.5443

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0137	0.0565
TOLUENE	0.0010	0.0049
ETHYLBENZENE	0.0001	0.0006
XYLENES	0.0001	0.0006
TOTAL BTEX	0.0149	0.0626

**(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 :	974.4 /scf	979.7 /scf
	NET WET REAL :	957.4 /scf	962.7 /scf
HHV	GROSS DRY REAL :	1078.2 /scf	1084.1 /scf
	GROSS WET REAL :	1059.4 /scf	1065.3 /scf
	NET HEATING VALUE (60 °F ideal reaction):		19526.6 Btu/lbm
	GROSS HEATING VALUE (60°F ideal reaction):		21610.0 Btu/lbm
	RELATIVE DENSITY (AIR=1):		0.6541
	DENSITY		0.04993 lb/scf
	COMPRESSIBILITY FACTOR :		0.9974
	REGULAR WOBBE INDEX		1333.9

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

Net Dry Ideal BTU	4474.3 /scf	Relative Density - SG (Air=1)	3.06	***C6+factors***
Gross Dry Ideal BTU	4817.3 /scf	**Z** Compressiblity Factor	0.98912	0.98859
Net Dry Ideal BTU	19220.1 /lb	Density Factor	233.57 lbm/1000 ft3	
Gross Dry Ideal BTU	20694 /lb	Molar Mass or MW	88.636 g/mol	
		Volume Liquid Ideal gas	0.111 scf/gal	24.8

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.*