EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY:	**05-045-13000**	NAME/DESCRIP :	**110170167 UNOCAL 13D-9D**
LEASE #:			**BRADEN HEAD**
FIELD/AREA			

PROJECT NO. :	**202507061**	ANALYSIS NO. :	**01**
COMPANY NAME :	**QB ENERGY OPERATING, LLC**	ANALYSIS DATE:	AUGUST 05, 2025 10:10
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	JUNE 25, 2025
CUSTOMER REF:		TO:	
PRODUCER :	QB ENERGY OPERATING, LLC	EFFECTIVE DATE:	

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

SAMPLE CYCLE:			SAMPLE TYPE:	SPOT
SAMPLE PRES. :	49	psig	PROBE :	NO PROBE
FLOW PRES. :		psig	CYLINDER NO. :	TBI-572
LAB PRES:		psig	SAMPLED BY :	MIKE KELLEY
SAMPLE TEMP. :	75	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	0.0029	0.0095	0.0010	0.0010
HELIUM	0.00	0.00	---	---
HYDROGEN	0.01	0.00	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.25	0.39	---	---
CARBON DIOXIDE	0.02	0.05	---	---
METHANE	91.7872	81.2582	---	---
ETHANE	4.0256	6.6797	1.0734	1.0792
PROPANE	2.2972	5.5899	0.6306	0.6341
I-BUTANE	0.3576	1.1469	0.1169	0.1176
N-BUTANE	0.6227	1.9972	0.1959	0.1970
I-PENTANE	0.1868	0.7428	0.0670	0.0673
N-PENTANE	0.1584	0.6306	0.0570	0.0573
HEXANES PLUS	0.2816	1.5053	0.1060	0.1062
TOTALS	100.00000	100.00000	2.2478	2.2597

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0008	0.0034
TOLUENE	0.0004	0.0020
ETHYLBENZENE	0.0003	0.0018
XYLENES	0.0012	0.0071
TOTAL BTEX	0.0027	0.0143

**(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 :	1007.7 **/scf**	1013.2 **/scf**
	NET WET REAL :	990.1 **/scf**	995.6 **/scf**
HHV	GROSS DRY REAL :	1114.5 **/scf**	1120.5 **/scf**
	GROSS WET REAL :	1095.0 **/scf**	1101.0 **/scf**

NET HEATING VALUE (60 °F ideal reaction):	21135.9 **Btu/lbm**
GROSS HEATING VALUE (60°F ideal reaction):	23390.5 **Btu/lbm**
RELATIVE DENSITY (AIR=1):	0.6242
DENSITY	0.04775 **lbm/scf**
COMPRESSIBILITY FACTOR :	0.9975
REGULAR WOBBE INDEX	1411.4

EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	202507061	ANALYSIS NO. :	01
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	AUGUST 05, 2025 10:10
ACCOUNT NO. :		SAMPLE DATE :	JUNE 25, 2025
PRODUCER :	QB ENERGY OPERATING, LLC	CYLINDER NO. :	TBI-572
LEASE NO. :		SAMPLED BY :	MIKE KELLEY
NAME/DESCRIP :	110170167 UNOCAL 13D-9D BRADEN HEAD		
FIELD DATA		SAMPLE TEMP. :	75
SAMPLE PRES. :	49	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm mol*		
COMMENTS :	***SPOT*** ***NO PROBE***		

Componet	Mole %	Wt %
Helium	0.00	0.00
Hydrogen	0.01	0.00
Carbon Dioxide	0.02	0.05
Nitrogen	0.25	0.39
Methane	91.7872	81.2582
Ethane	4.0256	6.6797
Propane	2.2972	5.5899
Isobutane	0.3576	1.1469
n-Butane	0.6227	1.9972
Isopentane	0.1785	0.7107
n-Pentane	0.1584	0.6306
Cyclopentane	0.0083	0.0321
n-Hexane	0.0472	0.2244
Cyclohexane	0.0162	0.0752
Other Hexanes	0.0921	0.4357
Heptanes	0.0586	0.3224
Methylcyclohexane	0.0178	0.0965
2,2,4 Trimethylpentane	0.0000	0.0000
Benzene	0.0008	0.0034
Toluene	0.0004	0.0020
Ethylbenzene	0.0003	0.0018
Xylenes	0.0012	0.0071
C8+ Heavies	0.0470	0.3368
Subtotal	99.99710	99.99050
Oxygen/Argon	0.00	0.00
Alcohols	0.0029	0.0095
Total	100.00000	100.00000

Calculated Values BTU @ **14.65**		**Total Sample**	**C6+ Fraction**	**C8+ Fraction**	**C10+ Fraction**	
LHV	Net Dry Real:	1007.7	4916.2	6415.7	8541.1	**Btu/scf**
	Net Wet Real:	990.1	4830.3	6303.5	8391.8	**Btu/scf**
HHV	Gross Dry Real:	1114.5	5295.8	6912.3	9219.3	**Btu/scf**
	Gross Wet Real:	1095.0	5203.2	6791.5	9058.1	**Btu/scf**
Other Calculated Values						
Regualr Wobbe Index*		1411.4	2881.0	3273.9	3806.6	**Btu/scf**
Net Heating Value (60 °F ideal reaction):		21135.9	19346.7	19254.1	19141.4	**Btu/lbm**
Gross Heating Value (60°F ideal reaction):		23390.5	20848.2	20744.2	20650.9	**Btu/lbm**
Molar Mass (MW):		18.12067	96.948	129.465	170.902	**g/mol**
Relative Density (AIR=1):		0.6242	3.3463	4.4709	5.9009	**SG**
Density:		0.04775	0.25543	0.34117	0.45034	**lbm/scf**
Compressiblity Factor:		0.9975	0.9921	0.9984	0.9999	**Z**
Liquid Volume real gas @:	**14.65**	17.7453	0.1057	0.013	0.002	**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

PRIMARY DB KEY:	**05-045-13000**	NAME/DESCRIP :	**110170167 UNOCAL 13D-9D**
LEASE #:			**BRADEN HEAD**
FIELD/AREA:			
PROJECT NO. :	**202507061**	ANALYSIS NO. :	**01**
COMPANY NAME :	**QB ENERGY OPERATING, LLC**	ANALYSIS DATE:	AUGUST 05, 2025 10:10
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	JUNE 25, 2025
CUSTOMER REF:		TO:	
PRODUCER :	QB ENERGY OPERATING, LLC	EFFECTIVE DATE:	
FIELD DATA			
SAMPLE CYCLE:		SAMPLE TYPE:	SPOT
SAMPLE PRES. :	49 psig	PROBE :	NO PROBE
FLOW PRES. :	psig	CYLINDER NO. :	TBI-572
LAB PRES:	psig	SAMPLED BY :	MIKE KELLEY
SAMPLE TEMP. :	75 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**
Hydrogen	---	0.01	0.00	---	---
Nitrogen	---	0.25	0.39	---	---
Carbon Dioxide	---	0.02	0.05	---	---
Methane	P1	91.7872	81.2582	---	---
Ethane	P2	4.0256	6.6797	1.073	1.079
Propane	P3	2.2972	5.5899	0.631	0.634
i-Butane	I4	0.3576	1.1469	0.117	0.118
n-Butane	P4	0.6226	1.9969	0.196	0.197
2,2-Dimethylpropane	I5	0.0012	0.0048	0.000	0.000
i-Pentane	I5	0.1773	0.7059	0.065	0.065
Acetone	X3	0.0022	0.0071	0.001	0.001
i-Propanol	X3	0.0006	0.0020	0.000	0.000
UnknownC4s	U4	0.0001	0.0003	0.000	0.000
n-Pentane	P5	0.1584	0.6306	0.057	0.057
t-Butanol	X4	0.0001	0.0004	0.000	0.000
2,2-Dimethylbutane	I6	0.0015	0.0071	0.001	0.001
Cyclopentane	N5	0.0083	0.0321	0.002	0.002
2,3-Dimethylbutane	I6	0.0065	0.0309	0.003	0.003
2-Methylpentane	I6	0.0422	0.2007	0.017	0.017
3-Methylpentane	I6	0.0220	0.1046	0.009	0.009
n-Hexane	P6	0.0472	0.2244	0.019	0.019
2,2-Dimethylpentane	I7	0.0006	0.0033	0.000	0.000
Methylcyclopentane	N6	0.0199	0.0924	0.007	0.007
2,4-Dimethylpentane	I7	0.0016	0.0088	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0002	0.0011	0.000	0.000
Benzene	A6	0.0008	0.0034	0.000	0.000
3,3-Dimethylpentane	I7	0.0003	0.0017	0.000	0.000
Cyclohexane	N6	0.0162	0.0752	0.006	0.006

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2-Methylhexane	I7	0.0097	0.0536	0.004	0.004
2,3-Dimethylpentane	I7	0.0033	0.0183	0.001	0.001
1,1-Dimethylcyclopentane	N7	0.0014	0.0076	0.001	0.001
3-Methylhexane	I7	0.0092	0.0509	0.004	0.004
1c,3-Dimethylcyclopentane	N7	0.0030	0.0163	0.001	0.001
1t,3-Dimethylcyclopentane	N7	0.0027	0.0146	0.001	0.001
3-Ethylpentane	I7	0.0006	0.0033	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0046	0.0249	0.002	0.002
n-Heptane	P7	0.0172	0.0951	0.008	0.008
1c,2-Dimethylcyclopentane	N7	0.0031	0.0168	0.001	0.001
Methylcyclohexane	N7	0.0178	0.0965	0.007	0.007
2,2-Dimethylhexane	I8	0.0010	0.0063	0.000	0.000
1,1,3-Trimethylcyclopentane	N7	0.0002	0.0012	0.000	0.000
Ethylcyclopentane	N7	0.0009	0.0049	0.000	0.000
2,5-Dimethylhexane	I8	0.0008	0.0050	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0006	0.0038	0.000	0.000
2,4-Dimethylhexane	I8	0.0002	0.0013	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0010	0.0062	0.000	0.000
3,3-Dimethylhexane	I8	0.0002	0.0013	0.000	0.000
2,3,4-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
2,3,3-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
Toluene	A7	0.0004	0.0020	0.000	0.000
2,3-Dimethylhexane	I8	0.0008	0.0050	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0003	0.0019	0.000	0.000
2-Methylheptane	I8	0.0044	0.0278	0.002	0.002
4-Methylheptane	I8	0.0010	0.0063	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0001	0.0006	0.000	0.000
3,4-Dimethylhexane	I8	0.0002	0.0013	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
3-Methylheptane	I8	0.0024	0.0151	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0021	0.0130	0.001	0.001
3-Ethylhexane	I8	0.0005	0.0031	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0011	0.0068	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0003	0.0019	0.000	0.000
2,2,5-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
3c-Ethylmethylcyclopentane	N8	0.0002	0.0012	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0002	0.0012	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0002	0.0012	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
2,2,4-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
1t,3-Dimethylcyclohexane	N8	0.0012	0.0074	0.001	0.001
n-Octane	P8	0.0039	0.0246	0.002	0.002
1c,4-Dimethylcyclohexane	N8	0.0004	0.0025	0.000	0.000
i-Propylcyclopentane	I8	0.0001	0.0006	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
2,2,3,4-Tetramethylpentane	I9	0.0001	0.0007	0.000	0.000
2,3,4-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
2,2-Dimethylheptane	I9	0.0003	0.0021	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0005	0.0035	0.000	0.000
2,2,3-Trimethylhexane	I9	0.0002	0.0014	0.000	0.000
2,4-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
4,4-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
Ethylcyclohexane	N8	0.0012	0.0074	0.001	0.001
n-Propylcyclopentane	N8	0.0004	0.0025	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0002	0.0014	0.000	0.000
2,5-Dimethylheptane	I9	0.0004	0.0028	0.000	0.000
3,3-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
3,5-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
2,6-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
Ethylbenzene	I8	0.0003	0.0018	0.000	0.000

1,3-Dimethylbenzene (m-Xylene)	A8	0.0009	0.0053	0.000	0.000
1,4-Dimethylbenzene (p-Xylene)	A8	0.0002	0.0012	0.000	0.000
4-Ethylheptane	I9	0.0001	0.0007	0.000	0.000
4-Methyloctane	I9	0.0003	0.0021	0.000	0.000
2-Methyloctane	I9	0.0004	0.0028	0.000	0.000
3-Methyloctane	I9	0.0001	0.0007	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	0.0004	0.0028	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
UnknownC8s	U8	0.0009	0.0057	0.000	0.000
n-Nonane	P9	0.0008	0.0057	0.000	0.000
1,1-Methylethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
2,4-Dimethyloctane	I10	0.0001	0.0008	0.000	0.000
n-Butylcyclopentane	N9	0.0001	0.0007	0.000	0.000
n-Propylbenzene	A9	0.0002	0.0013	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0004	0.0031	0.000	0.000
1,3-Methylethylbenzene	A9	0.0013	0.0086	0.001	0.001
1,4-Methylethylbenzene	A9	0.0006	0.0040	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0005	0.0033	0.000	0.000
5-Methylnonane	I10	0.0001	0.0008	0.000	0.000
1,2-Methylethylbenzene	A9	0.0005	0.0033	0.000	0.000
2-Methylnonane	I10	0.0001	0.0008	0.000	0.000
3-Methylnonane	I10	0.0001	0.0008	0.000	0.000
t-Butylbenzene	A10	0.0017	0.0126	0.001	0.001
i-Butylcyclohexane	N10	0.0001	0.0008	0.000	0.000
i-Butylbenzene	A10	0.0001	0.0007	0.000	0.000
sec-Butylbenzene	A10	0.0001	0.0007	0.000	0.000
UnknownC9s	U9	0.0005	0.0035	0.000	0.000
n-Decane	P10	0.0002	0.0015	0.000	0.000
1,2,3-Trimethylbenzene	A9	0.0003	0.0020	0.000	0.000
1,3-Methyl-i-propylbenzene	A10	0.0001	0.0007	0.000	0.000
1,2-Methyl-i-propylbenzene	A10	0.0001	0.0007	0.000	0.000
3-Ethylnonane	I10	0.0001	0.0009	0.000	0.000
1,4-Methyl-n-propylbenzene	A10	0.0001	0.0007	0.000	0.000
n-Butylbenzene	A10	0.0001	0.0007	0.000	0.000
1,3-Dimethyl-5-ethylbenzene	A10	0.0001	0.0007	0.000	0.000
1,2-Diethylbenzene	A10	0.0001	0.0007	0.000	0.000
t-Decahydronaphthalene	A9	0.0001	0.0008	0.000	0.000
1,2-Methyl-n-propylbenzene	A10	0.0001	0.0007	0.000	0.000
1,3-Dimethyl-4-ethylbenzene	A10	0.0001	0.0007	0.000	0.000
1,2-Dimethyl-4-ethylbenzene	A10	0.0001	0.0007	0.000	0.000
1,4-Methyl-t-butylbenzene	A11	0.0001	0.0008	0.000	0.000
UnknownC10s	U10	0.0007	0.0055	0.000	0.000
n-Undecane	P11	0.0003	0.0026	0.000	0.000
1,4-Ethyl-i-propylbenzene	A11	0.0001	0.0008	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
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
Naphthalene	A10	0.0001	0.0007	0.000	0.000
UnknownC11s	U11	0.0003	0.0026	0.000	0.000
n-Dodecane	P12	0.0004	0.0037	0.000	0.000
1,3,5-Triethylbenzene	A12	0.0001	0.0009	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	0.0017	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	0.0003	0.0026	0.000	0.000
n-Tridecane	P13	0.0004	0.0041	0.000	0.000
UnknownC13s	U13	0.0003	0.0030	0.000	0.000

n-Tetradecane	P14	0.0004	0.0044	0.000	0.000
UnknownC14s	U14	0.0006	0.0066	0.000	0.000
n-Pentadecane	P15	0.0003	0.0035	0.000	0.000
UnknownC15s	U15	0.0007	0.0082	0.001	0.001
n-Hexadecane	P16	0.0002	0.0025	0.000	0.000
UnknownC16s	U16	0.0005	0.0062	0.000	0.000
n-Heptadecane	P17	0.0001	0.0013	0.000	0.000
UnknownC17s	U17	0.0002	0.0026	0.000	0.000
UnknownC18s	U18	0.0002	0.0028	0.000	0.000
n-Nonadecane	P19	0.0002	0.0030	0.000	0.000
n-Heneicosane	P21	0.0001	0.0017	0.000	0.000
n-Docosane	P22	0.0001	0.0017	0.000	0.000
TOTAL		100.00000	100.00000	2.2478	2.2597

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0008	0.0034
TOLUENE	0.0004	0.0020
ETHYLBENZENE	0.0003	0.0018
XYLENES	0.0012	0.0071
TOTAL BTEX	0.0027	0.0143

**(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 :	1007.7 /scf	1013.2 /scf
	NET WET REAL :	990.1 /scf	995.6 /scf
HHV	GROSS DRY REAL :	1114.5 /scf	1120.5 /scf
	GROSS WET REAL :	1095.0 /scf	1101.0 /scf
	NET HEATING VALUE (60 °F ideal reaction):		21135.9 Btu/lbm
	GROSS HEATING VALUE (60°F ideal reaction):		23390.5 Btu/lbm
	RELATIVE DENSITY (AIR=1):		0.6242
	DENSITY		0.04775 lb/scf
	COMPRESSIBILITY FACTOR :		0.9975
	REGULAR WOBBE INDEX		1411.4

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

Net Dry Ideal BTU	4892.5 /scf	Relative Density - SG (Air=1)	3.3463	***C6+factors***
Gross Dry Ideal BTU	5270.2 /scf	**Z** Compressiblity Factor	0.99206	0.99095
Net Dry Ideal BTU	19346.7 /lb	Density Factor	255.434 lbm/1000 ft3	
Gross Dry Ideal BTU	20848.2 /lb	Molar Mass or MW	96.948 g/mol	
		Volume Liquid Ideal gas	0.106 scf/gal	22.2

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.