EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY: **05-045-13083** NAME/DESCRIP : **110170169 U2 UNOCAL 14B-9D**
LEASE #: **BRADEN HEAD**
FIELD/AREA: **GRAND VALLEY**

PROJECT NO. : **202511011** ANALYSIS NO. : **01**
COMPANY NAME : **QB ENERGY OPERATING, LLC** ANALYSIS DATE: NOVEMBER 13, 2025 14:59
OFFICE / BRANCH: PARACHUTE, CO SAMPLE DATE : OCTOBER 29, 2025
CUSTOMER REF: TO:
PRODUCER : QB ENERGY OPERATING LLC EFFECTIVE DATE:

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

SAMPLE CYCLE: SAMPLE TYPE: SPOT
SAMPLE PRES. : 52 psig PROBE : NO
FLOW PRES. : psig CYLINDER NO. : TBI-251
LAB PRES: psig SAMPLED BY : MIKE KELLEY
SAMPLE TEMP. : 52 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
GLYCOLS	0.0007	0.0025	0.0000	0.0000
ALCOHOLS	0.0936	0.2452	0.0170	0.0171
HELIUM	0.01	0.00	---	---
HYDROGEN	0.00	0.00	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.19	0.31	---	---
CARBON DIOXIDE	0.02	0.05	---	---
METHANE	94.7429	87.7568	---	---
ETHANE	3.0625	5.3169	0.8163	0.8208
PROPANE	0.8713	2.2183	0.2388	0.2401
I-BUTANE	0.1955	0.6561	0.0639	0.0643
N-BUTANE	0.3067	1.0292	0.0959	0.0964
I-PENTANE	0.1331	0.5539	0.0480	0.0482
N-PENTANE	0.1389	0.5786	0.0500	0.0502
HEXANES PLUS	0.2348	1.2825	0.0890	0.0892
TOTALS	100.00000	100.00000	1.4189	1.4263

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0072	0.0325
TOLUENE	0.0016	0.0085
ETHYLBENZENE	0.0003	0.0019
XYLENES	0.0012	0.0073
TOTAL BTEX	0.0103	0.0502

**(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 :	967.2 /scf	972.5 /scf
	NET WET REAL :	950.3 /scf	955.6 /scf
HHV	GROSS DRY REAL :	1071.6 /scf	1077.5 /scf
	GROSS WET REAL :	1052.9 /scf	1058.8 /scf

NET HEATING VALUE (60 °F ideal reaction):	21235.1 **Btu/lbm**
GROSS HEATING VALUE (60°F ideal reaction):	23531.8 **Btu/lbm**
RELATIVE DENSITY (AIR=1):	0.5968
DENSITY	0.04564 **lbm/scf**
COMPRESSIBILITY FACTOR :	0.9977
REGULAR WOBBE INDEX	1388.3

EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	202511011	ANALYSIS NO. :	01
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	NOVEMBER 13, 2025 14:59
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 29, 2025
PRODUCER :	QB ENERGY OPERATING LLC	CYLINDER NO. :	TBI-251
LEASE NO. :		SAMPLED BY :	MIKE KELLEY
NAME/DESCRIP :	110170169 U2 UNOCAL 14B-9D BRADEN HEAD		
FIELD DATA		SAMPLE TEMP. :	52
SAMPLE PRES. :	52	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm mol*		
COMMENTS :	***SPOT*** ***NO PROBE***		

Componet	Mole %	Wt %
Helium	0.01	0.00
Hydrogen	0.00	0.00
Carbon Dioxide	0.02	0.05
Nitrogen	0.19	0.31
Methane	94.7429	87.7568
Ethane	3.0625	5.3169
Propane	0.8713	2.2183
Isobutane	0.1955	0.6561
n-Butane	0.3067	1.0292
Isopentane	0.1282	0.5340
n-Pentane	0.1389	0.5786
Cyclopentane	0.0049	0.0199
n-Hexane	0.0381	0.1896
Cyclohexane	0.0138	0.0670
Other Hexanes	0.0767	0.3798
Heptanes	0.0420	0.2421
Methylcyclohexane	0.0191	0.1083
2,2,4 Trimethylpentane	0.0002	0.0013
Benzene	0.0072	0.0325
Toluene	0.0016	0.0085
Ethylbenzene	0.0003	0.0019
Xylenes	0.0012	0.0073
C8+ Heavies	0.0346	0.2442
Subtotal	99.90570	99.75230
Oxygen/Argon	0.00	0.00
Glycols	0.0007	0.0025
Alcohols	0.0936	0.2452
Total	100.00000	100.00000

Calculated Values BTU @ **14.65**		**Total Sample**	**C6+ Fraction**	**C8+ Fraction**	**C10+ Fraction**	
LHV	Net Dry Real:	967.2	4697.1	6060.1	7207.6	**Btu/scf**
	Net Wet Real:	950.3	4615.0	5954.2	7081.6	**Btu/scf**
HHV	Gross Dry Real:	1071.6	5058.8	6526.7	7808.9	**Btu/scf**
	Gross Wet Real:	1052.9	4970.4	6412.6	7672.4	**Btu/scf**
Other Calculated Values						
Regualr Wobbe Index*		1388.3	2814.2	3191.9	3497.1	**Btu/scf**
Net Heating Value (60 °F ideal reaction):		21235.1	19324.6	19474.6	18942.9	**Btu/lbm**
Gross Heating Value (60°F ideal reaction):		23531.8	20811.8	20976.5	20513.9	**Btu/lbm**
Molar Mass (MW):		17.31956	92.599	121.376	145.215	**g/mol**
Relative Density (AIR=1):		0.5968	3.1968	4.1907	5.0141	**SG**
Density:		0.04564	0.24400	0.31986	0.38267	**lbm/scf**
Compressiblity Factor:		0.9977	0.9915	0.9980	0.9997	**Z**
Liquid Volume real gas @:	**14.65**	17.4113	0.0967	0.009	0.001	**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:	**05-045-13083**	NAME/DESCRIP :	**110170169 U2 UNOCAL 14B-9D**
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PRODUCER :	QB ENERGY OPERATING LLC	EFFECTIVE DATE:	
FIELD DATA			
SAMPLE CYCLE:		SAMPLE TYPE:	SPOT
SAMPLE PRES. :	52 psig	PROBE :	NO
FLOW PRES. :	psig	CYLINDER NO. :	TBI-251
LAB PRES:	psig	SAMPLED BY :	MIKE KELLEY
SAMPLE TEMP. :	52 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	---	---
Nitrogen	---	0.19	0.31	---	---
Carbon Dioxide	---	0.02	0.05	---	---
Methane	P1	94.7429	87.7568	---	---
Ethane	P2	3.0625	5.3169	0.816	0.821
Propane	P3	0.8713	2.2183	0.239	0.240
i-Butane	I4	0.1955	0.6561	0.064	0.064
Methanol	X1	0.0049	0.0091	0.001	0.001
n-Butane	P4	0.3067	1.0292	0.096	0.096
2,2-Dimethylpropane	I5	0.0032	0.0133	0.001	0.001
Ethanol	X2	0.0886	0.2357	0.016	0.016
i-Pentane	I5	0.1250	0.5207	0.046	0.046
n-Pentane	P5	0.1161	0.4836	0.042	0.042
t-Butanol	X4	0.0001	0.0004	0.000	0.000
2,2-Dimethylbutane	I6	0.0029	0.0144	0.001	0.001
Cyclopentane	N5	0.0049	0.0199	0.001	0.001
2,3-Dimethylbutane	I6	0.0062	0.0308	0.003	0.003
2-Methylpentane	I6	0.0344	0.1711	0.014	0.014
3-Methylpentane	I6	0.0184	0.0916	0.007	0.007
UnknownC5s	U5	0.0228	0.0950	0.008	0.008
n-Hexane	P6	0.0381	0.1896	0.016	0.016
2,2-Dimethylpentane	I7	0.0007	0.0040	0.000	0.000
Methylcyclopentane	N6	0.0148	0.0719	0.005	0.005
2,4-Dimethylpentane	I7	0.0015	0.0087	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0003	0.0017	0.000	0.000
Benzene	A6	0.0072	0.0325	0.002	0.002
3,3-Dimethylpentane	I7	0.0004	0.0023	0.000	0.000

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Cyclohexane	N6	0.0138	0.0670	0.005	0.005
2-Methylhexane	I7	0.0072	0.0416	0.003	0.003
2,3-Dimethylpentane	I7	0.0026	0.0151	0.001	0.001
1,1-Dimethylcyclopentane	N7	0.0013	0.0074	0.001	0.001
3-Methylhexane	I7	0.0070	0.0405	0.003	0.003
1c,3-Dimethylcyclopentane	N7	0.0022	0.0125	0.001	0.001
Ethylene glycol	GL2	0.0007	0.0025	0.000	0.000
1t,3-Dimethylcyclopentane	N7	0.0019	0.0108	0.001	0.001
3-Ethylpentane	I7	0.0004	0.0023	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0030	0.0170	0.001	0.001
2,2,4-Trimethylpentane	I8	0.0002	0.0013	0.000	0.000
n-Heptane	P7	0.0122	0.0706	0.006	0.006
1c,2-Dimethylcyclopentane	N7	0.0003	0.0017	0.000	0.000
Methylcyclohexane	N7	0.0191	0.1083	0.008	0.008
2,2-Dimethylhexane	I8	0.0007	0.0046	0.000	0.000
1,1,3-Trimethylcyclopentane	N7	0.0002	0.0013	0.000	0.000
Ethylcyclopentane	N7	0.0008	0.0046	0.000	0.000
2,5-Dimethylhexane	I8	0.0006	0.0040	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0006	0.0040	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0006	0.0039	0.000	0.000
3,3-Dimethylhexane	I8	0.0002	0.0013	0.000	0.000
Toluene	A7	0.0016	0.0085	0.001	0.001
2,3-Dimethylhexane	I8	0.0005	0.0033	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0002	0.0013	0.000	0.000
2-Methylheptane	I8	0.0026	0.0172	0.001	0.001
4-Methylheptane	I8	0.0007	0.0046	0.000	0.000
3-Methyl-3-ethylpentane	I8	0.0001	0.0006	0.000	0.000
3,4-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
3-Methylheptane	I8	0.0017	0.0112	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0022	0.0143	0.001	0.001
3-Ethylhexane	I8	0.0001	0.0006	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0010	0.0065	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0004	0.0026	0.000	0.000
2,2,5-Trimethylhexane	I9	0.0001	0.0008	0.000	0.000
3c-Ethylmethylcyclopentane	N8	0.0002	0.0013	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0002	0.0013	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0002	0.0013	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
2,2,4-Trimethylhexane	I9	0.0001	0.0008	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0007	0.0046	0.000	0.000
1t,3-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
n-Octane	P8	0.0037	0.0244	0.002	0.002
1c,4-Dimethylcyclohexane	N8	0.0005	0.0032	0.000	0.000
i-Propylcyclopentane	I8	0.0001	0.0006	0.000	0.000
2,4,4-Trimethylhexane	I9	0.0001	0.0008	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0001	0.0008	0.000	0.000
2,2,3,4-Tetramethylpentane	I9	0.0001	0.0008	0.000	0.000
2,3,4-Trimethylhexane	I9	0.0001	0.0008	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0011	0.0080	0.001	0.001
2,2,3-Trimethylhexane	I9	0.0002	0.0015	0.000	0.000
2,4-Dimethylheptane	I9	0.0001	0.0008	0.000	0.000
4,4-Dimethylheptane	I9	0.0001	0.0008	0.000	0.000
Ethylcyclohexane	N8	0.0010	0.0065	0.000	0.000
n-Propylcyclopentane	N8	0.0004	0.0026	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0003	0.0022	0.000	0.000
2,5-Dimethylheptane	I9	0.0006	0.0045	0.000	0.000
3,3-Dimethylheptane	I9	0.0004	0.0029	0.000	0.000
3,5-Dimethylheptane	I9	0.0002	0.0015	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0001	0.0008	0.000	0.000

Ethylbenzene	I8	0.0003	0.0019	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0009	0.0055	0.000	0.000
1,4-Dimethylbenzene (p-Xylene)	A8	0.0002	0.0012	0.000	0.000
3,4-Dimethylheptane	I9	0.0001	0.0008	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0001	0.0008	0.000	0.000
4-Methyloctane	I9	0.0003	0.0022	0.000	0.000
2-Methyloctane	I9	0.0004	0.0029	0.000	0.000
3-Methyloctane	I9	0.0001	0.0008	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	0.0004	0.0029	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0001	0.0006	0.000	0.000
i-Butylcyclopentane	N9	0.0003	0.0022	0.000	0.000
UnknownC8s	U8	0.0002	0.0013	0.000	0.000
n-Nonane	P9	0.0018	0.0133	0.001	0.001
1,1-Methylethylcyclohexane	N9	0.0002	0.0014	0.000	0.000
i-Propylbenzene	A9	0.0001	0.0007	0.000	0.000
i-Propylcyclohexane	N9	0.0001	0.0008	0.000	0.000
2,4-Dimethyloctane	I10	0.0001	0.0008	0.000	0.000
n-Butylcyclopentane	N9	0.0002	0.0014	0.000	0.000
n-Propylbenzene	A9	0.0003	0.0021	0.000	0.000
3,6-Dimethyloctane	I10	0.0001	0.0008	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0001	0.0008	0.000	0.000
1,3-Methylethylbenzene	A9	0.0001	0.0007	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0003	0.0021	0.000	0.000
2,3-Dimethyloctane	I10	0.0001	0.0008	0.000	0.000
5-Methylnonane	I10	0.0002	0.0016	0.000	0.000
1,2-Methylethylbenzene	A9	0.0002	0.0014	0.000	0.000
3-Ethyloctane	I10	0.0001	0.0008	0.000	0.000
3-Methylnonane	I10	0.0002	0.0016	0.000	0.000
t-Butylbenzene	A10	0.0001	0.0008	0.000	0.000
i-Butylcyclohexane	N10	0.0001	0.0008	0.000	0.000
UnknownC9s	U9	0.0006	0.0045	0.000	0.000
n-Decane	P10	0.0007	0.0058	0.000	0.000
1,3-Methyl-i-propylbenzene	A10	0.0003	0.0023	0.000	0.000
3-Ethylnonane	I10	0.0001	0.0009	0.000	0.000
1,3-Diethylbenzene	A10	0.0001	0.0008	0.000	0.000
1,3-Methyl-n-propylbenzene	A10	0.0001	0.0008	0.000	0.000
n-Butylbenzene	A10	0.0001	0.0008	0.000	0.000
1,2-Dimethyl-4-ethylbenzene	A10	0.0002	0.0016	0.000	0.000
1,3-Dimethyl-2-ethylbenzene	A10	0.0001	0.0008	0.000	0.000
UnknownC10s	U10	0.0010	0.0082	0.001	0.001
n-Undecane	P11	0.0003	0.0027	0.000	0.000
1,4-Ethyl-i-propylbenzene	A11	0.0001	0.0009	0.000	0.000
1,2-Methyl-n-butylbenzene	A11	0.0003	0.0025	0.000	0.000
1,3-Di-i-propylbenzene	A11	0.0001	0.0009	0.000	0.000
sec-Pentylbenzene	A11	0.0003	0.0025	0.000	0.000
UnknownC11s	U11	0.0003	0.0027	0.000	0.000
n-Dodecane	P12	0.0003	0.0029	0.000	0.000
TOTAL		100.00000	100.00000	1.4189	1.4263

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0072	0.0325
TOLUENE	0.0016	0.0085
ETHYLBENZENE	0.0003	0.0019
XYLENES	0.0012	0.0073
TOTAL BTEX	0.0103	0.0502

(DETAILED HYDROCARBON ANALYSIS/NJ 1993)

Mod ASTM D6730,GPA 2261 & GPA 2286.

***(CALC: GPA 2172, GPA 2145 & TP-17 @14.696 & 60 F)*

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	NET WET REAL :	950.3 /scf	955.6 /scf
HHV	GROSS DRY REAL :	1071.6 /scf	1077.5 /scf
	GROSS WET REAL :	1052.9 /scf	1058.8 /scf
	NET HEATING VALUE (60 °F ideal reaction):		21235.1 Btu/lbm
	GROSS HEATING VALUE (60°F ideal reaction):		23531.8 Btu/lbm
	RELATIVE DENSITY (AIR=1):		0.5968
	DENSITY		0.04564 lb/scf
	COMPRESSIBILITY FACTOR :		0.9977
	REGULAR WOBBE INDEX		1388.3

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

Net Dry Ideal BTU	4671.8 **/scf**	Relative Density - SG (Air=1)	3.1968		***C6+factors***
Gross Dry Ideal BTU	5031.6 **/scf**	**Z** Compressiblity Factor	0.99151		0.99072
Net Dry Ideal BTU	19324.6 **/lb**	Density Factor	244.004	**lbm/1000 ft3**	
Gross Dry Ideal BTU	20811.8 **/lb**	Molar Mass or MW	92.599	**g/mol**	
		Volume Liquid Ideal gas	0.097	**scf/gal**	23.4

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.