

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY: 05-045-07868	NAME/DESCRIP : 110170166 UNOCAL 24-9DRD
LEASE #:	BRADEN HEAD
FIELD/AREA	
PROJECT NO. : 202507060	ANALYSIS NO. : 01
COMPANY NAME : QB ENERGY OPERATING, LLC	ANALYSIS DATE: AUGUST 05, 2025 06:45
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. : 29	psig	PROBE :	NO PROBE
FLOW PRES. :	psig	CYLINDER NO. :	ECA-754
LAB PRES:	psig	SAMPLED BY :	MIKE KELLEY
SAMPLE TEMP. : 78	°f	SAMPLING COMPANY:	QB ENERGY OPERATING, LLC
AMBIENT TEMP.:	°f	H2S BY STAIN TUBE:	— ppm mol
H2O BY STAIN TUBE:	- #/mmcf	CO2 BY STAIN TUBE:	- Mol %
FIELD COMMENTS:			
LAB COMMENTS:			

<u>COMPONENT</u>	<u>MOLE %</u>	<u>MASS %</u>	<u>GPM @ 14.65</u>	<u>GPM @ 14.73</u>
ALCOHOLS	0.0037	0.0067	0.0000	0.0000
HELIUM	0.01	0.00	---	---
HYDROGEN	0.02	0.00	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.26	0.41	---	---
CARBON DIOXIDE	0.07	0.17	---	---
METHANE	92.8690	83.2934	---	---
ETHANE	3.4556	5.8091	0.9214	0.9264
PROPANE	1.7967	4.4294	0.4937	0.4964
I-BUTANE	0.2976	0.9670	0.0969	0.0975
N-BUTANE	0.5453	1.7719	0.1709	0.1718
I-PENTANE	0.1862	0.7500	0.0680	0.0683
N-PENTANE	0.1598	0.6446	0.0580	0.0583
HEXANES PLUS	0.3261	1.7479	0.1280	0.1282
TOTALS	100.0000	100.0000	1.9369	1.9469

<u>BTEX COMPONENTS</u>	<u>MOLE%</u>	<u>WT%</u>
BENZENE	0.0154	0.0673
TOLUENE	0.0091	0.0469
ETHYLBENZENE	0.0023	0.0136
XYLENES	0.0097	0.0576
TOTAL BTEX	0.0365	0.1854

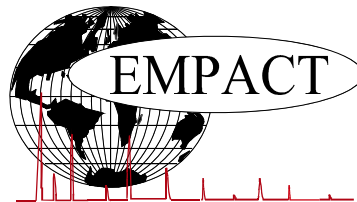
	<u>CALCULATED VALUES**</u>	
	<u>14.65</u>	<u>14.73</u>
LHV NET DRY REAL :	994.4 /scf	999.9 /scf
NET WET REAL :	977.0 /scf	982.5 /scf
HHV GROSS DRY REAL :	1101.0 /scf	1107.0 /scf
GROSS WET REAL :	1081.8 /scf	1087.8 /scf
NET HEATING VALUE (60 °F ideal reaction):		21133.1 Btu/lbm
GROSS HEATING VALUE (60°F ideal reaction):		23394.9 Btu/lbm
RELATIVE DENSITY (AIR=1):		0.6165
DENSITY		0.04713 lbm/scf
COMPRESSIBILITY FACTOR :		0.9975
REGULAR WOBBE INDEX		1403.1

**(DETAILED HYDROCARBON ANALYSIS/NJ 1993)*

Mod ASTM D6730,GPA 2261 & GPA 2286.

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

The data presented herein has been acquired by means of current analytical techniques and represents the judicious conclusion EMPACT Analytical Systems, Inc. Results of the analysis can be affected by the sampling conditions, therefore, are only warranted through proper lab protocol. EMPACT assumes no responsibility for interpretation or any consequences from application of the reported information and is the sole liability of the user. The reproduction in any media of this reported information may not be made, in portion or as a whole, without the written permission of EMPACT Analytical Systems, Inc.



**EXTENDED NATURAL GAS ANALYSIS (*DHA)
GLYCALC INFORMATION**

PROJECT NO. :	202507060	ANALYSIS NO. :	01
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	AUGUST 05, 2025 06:45
ACCOUNT NO. :		SAMPLE DATE :	JUNE 25, 2025
PRODUCER :	QB ENERGY OPERATING, LLC	CYLINDER NO. :	ECA-754
LEASE NO. :		SAMPLED BY :	MIKE KELLEY
NAME/DESCRIP :	110170166 UNOCAL 24-9DRD BRADEN HEAD		

FIELD DATA

SAMPLE PRES. :	29	SAMPLE TEMP. :	78
H2S BY STAIN TUBE:	—	AMBIENT TEMP.:	
COMMENTS :	— ppm mol NO PROBE SPOT		

Componet	Mole %	Wt %
Helium	0.01	0.00
Hydrogen	0.02	0.00
Carbon Dioxide	0.07	0.17
Nitrogen	0.26	0.41
Methane	92.8690	83.2934
Ethane	3.4556	5.8091
Propane	1.7967	4.4294
Isobutane	0.2976	0.9670
n-Butane	0.5453	1.7719
Isopentane	0.1773	0.7151
n-Pentane	0.1598	0.6446
Cyclopentane	0.0089	0.0349
n-Hexane	0.0445	0.2144
Cyclohexane	0.0197	0.0927
Other Hexanes	0.0903	0.4326
Heptanes	0.0551	0.3074
Methylcyclohexane	0.0240	0.1317
2,2,4 Trimethylpentane	0.0000	0.0000
Benzene	0.0154	0.0673
Toluene	0.0091	0.0469
Ethylbenzene	0.0023	0.0136
Xylenes	0.0097	0.0576
C8+ Heavies	0.0560	0.3837
<u>Subtotal</u>	<u>99.99630</u>	<u>99.99330</u>
Oxygen/Argon	0.00	0.00
Alcohols	0.0037	0.0067
<u>Total</u>	<u>100.00000</u>	<u>100.00000</u>

Calculated Values BTU @	Total	C6+	C8+	C10+				
					Sample	Fraction	Fraction	Fraction
LHV Net Dry Real:	14.65	994.4	4822.0	5930.8	7679.4	Btu/scf		
Net Wet Real:		977.0	4737.7	5827.1	7545.2	Btu/scf		
HHV Gross Dry Real:		1101.0	5179.8	6367.4	8285.6	Btu/scf		
Gross Wet Real:		1081.8	5089.3	6256.1	8140.8	Btu/scf		

Other Calculated Values

Regualr Wobbe Index*	1403.1	2835.8	3137.7	3610.2	Btu/scf
Net Heating Value (60 °F ideal reaction):	21133.1	19260.3	19449.7	19752.6	Btu/lbm
Gross Heating Value (60°F ideal reaction):	23394.9	20695.4	20878.5	21303.9	Btu/lbm
Molar Mass (MW):	17.88736	95.841	119.592	153.411	g/mol
Relative Density (AIR=1):	0.6165	3.3097	4.1286	5.2967	SG
Density:	0.04713	0.25258	0.31516	0.40425	lbm/scf
Compressibility Factor:	0.9975	0.9929	0.9981	0.9997	Z
Liquid Volume real gas @:	14.65	17.6306	0.1276	0.0239	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 underscore) indicates there was no tube pulled for H2S.

The data presented herein has been acquired by means of current analytical techniques and represents the judicious conclusion EMPACT Analytical Systems, Inc. Results of the analysis can be affected by the sampling conditions, therefore, are only warranted through proper lab protocol. EMPACT assumes no responsibility for interpretation or any consequences from application of the reported information and is the sole liability of the user. The reproduction in any media of this reported information may not be made, in portion or as a whole, without the written permission of EMPACT Analytical Systems, Inc.



**EXTENDED NATURAL GAS ANALYSIS (*DHA)
DHA COMPONENT LIST**

PRIMARY DB KEY: **05-045-07868** NAME/DESCRIP : **110170166 UNOCAL 24-9DRD**
 LEASE #: **BRADEN HEAD**
 FIELD/AREA:
 PROJECT NO. : **202507060** ANALYSIS NO. : **01**
 COMPANY NAME : **QB ENERGY OPERATING, LLC** ANALYSIS DATE: **AUGUST 05, 2025 06:45**
 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. : **29** psig PROBE : **NO PROBE**
 FLOW PRES. : psig CYLINDER NO. : **ECA-754**
 LAB PRES: psig SAMPLED BY : **MIKE KELLEY**
 SAMPLE TEMP. : **78** °f SAMPLING COMPANY: **QB ENERGY OPERATING, LLC**
 AMBIENT TEMP.: °f 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	---	0.02	0.00	---	---
Nitrogen	---	0.26	0.41	---	---
Carbon Dioxide	---	0.07	0.17	---	---
Methane	P1	92.8690	83.2934	---	---
Ethane	P2	3.4556	5.8091	0.921	0.926
Propane	P3	1.7967	4.4294	0.494	0.496
i-Butane	I4	0.2976	0.9670	0.097	0.098
Methanol	X1	0.0037	0.0067	0.000	0.000
n-Butane	P4	0.5453	1.7719	0.171	0.172
2,2-Dimethylpropane	I5	0.0015	0.0060	0.001	0.001
i-Pentane	I5	0.1758	0.7091	0.064	0.064
n-Pentane	P5	0.1598	0.6446	0.058	0.058
2,2-Dimethylbutane	I6	0.0015	0.0072	0.001	0.001
Cyclopentane	N5	0.0089	0.0349	0.003	0.003
2,3-Dimethylbutane	I6	0.0062	0.0299	0.003	0.003
2-Methylpentane	I6	0.0399	0.1922	0.017	0.017
3-Methylpentane	I6	0.0210	0.1012	0.009	0.009
n-Hexane	P6	0.0445	0.2144	0.018	0.018
2,2-Dimethylpentane	I7	0.0005	0.0028	0.000	0.000
Methylcyclopentane	N6	0.0217	0.1021	0.008	0.008
2,4-Dimethylpentane	I7	0.0014	0.0078	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0002	0.0011	0.000	0.000
Benzene	A6	0.0154	0.0673	0.004	0.004
3,3-Dimethylpentane	I7	0.0003	0.0017	0.000	0.000
Cyclohexane	N6	0.0197	0.0927	0.007	0.007
2-Methylhexane	I7	0.0088	0.0493	0.004	0.004
2,3-Dimethylpentane	I7	0.0030	0.0168	0.001	0.001

1,1-Dimethylcyclopentane	N7	0.0013	0.0072	0.001	0.001
3-Methylhexane	I7	0.0084	0.0471	0.004	0.004
1c,3-Dimethylcyclopentane	N7	0.0030	0.0165	0.001	0.001
1t,3-Dimethylcyclopentane	N7	0.0028	0.0154	0.001	0.001
3-Ethylpentane	I7	0.0006	0.0034	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0046	0.0253	0.002	0.002
n-Heptane	P7	0.0165	0.0924	0.008	0.008
1c,2-Dimethylcyclopentane	N7	0.0022	0.0121	0.001	0.001
Methylcyclohexane	N7	0.0240	0.1317	0.010	0.010
2,2-Dimethylhexane	I8	0.0007	0.0045	0.000	0.000
1,1,3-Trimethylcyclopentane	N7	0.0003	0.0019	0.000	0.000
Ethylcyclopentane	N7	0.0012	0.0066	0.000	0.000
2,5-Dimethylhexane	I8	0.0007	0.0045	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0005	0.0032	0.000	0.000
2,4-Dimethylhexane	I8	0.0002	0.0013	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0010	0.0063	0.000	0.000
3,3-Dimethylhexane	I8	0.0002	0.0013	0.000	0.000
Toluene	A7	0.0091	0.0469	0.003	0.003
2,3-Dimethylhexane	I8	0.0008	0.0051	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0003	0.0019	0.000	0.000
2-Methylheptane	I8	0.0044	0.0281	0.002	0.002
4-Methylheptane	I8	0.0012	0.0077	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	0.0028	0.0179	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0032	0.0201	0.002	0.002
3-Ethylhexane	I8	0.0006	0.0039	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0016	0.0101	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0005	0.0031	0.000	0.000
2,2,5-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
3c-Ethylmethylcyclopentane	N8	0.0003	0.0019	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0003	0.0019	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0003	0.0019	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,2-Dimethylcyclohexane	N8	0.0014	0.0088	0.001	0.001
1t,3-Dimethylcyclohexane	N8	0.0015	0.0094	0.001	0.001
n-Octane	P8	0.0067	0.0428	0.003	0.003
1c,4-Dimethylcyclohexane	N8	0.0008	0.0050	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
1c,2-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
2,2-Dimethylheptane	I9	0.0004	0.0029	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0015	0.0106	0.001	0.001
2,2,3-Trimethylhexane	I9	0.0005	0.0036	0.000	0.000
2,4-Dimethylheptane	I9	0.0002	0.0015	0.000	0.000
4,4-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
Ethylcyclohexane	N8	0.0015	0.0094	0.001	0.001
n-Propylcyclopentane	N8	0.0006	0.0038	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0003	0.0021	0.000	0.000
2,5-Dimethylheptane	I9	0.0008	0.0058	0.000	0.000
3,3-Dimethylheptane	I9	0.0002	0.0015	0.000	0.000
3,5-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
2,6-Dimethylheptane	I9	0.0002	0.0015	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
Ethylbenzene	I8	0.0023	0.0136	0.001	0.001
1,3-Dimethylbenzene (m-Xylene)	A8	0.0053	0.0315	0.002	0.002
1,4-Dimethylbenzene (p-Xylene)	A8	0.0021	0.0125	0.001	0.001

3,4-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0002	0.0015	0.000	0.000
4-Ethylheptane	I9	0.0002	0.0015	0.000	0.000
4-Methyloctane	I9	0.0007	0.0050	0.000	0.000
2-Methyloctane	I9	0.0011	0.0079	0.001	0.001
1c,2t,3-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
3-Ethylheptane	I9	0.0001	0.0007	0.000	0.000
3-Methyloctane	I9	0.0002	0.0015	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	0.0011	0.0078	0.001	0.001
3,3-Diethylpentane	I9	0.0001	0.0007	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0023	0.0136	0.001	0.001
i-Butylcyclopentane	N9	0.0006	0.0043	0.000	0.000
n-Nonane	P9	0.0031	0.0223	0.002	0.002
1,1-Methylethylcyclohexane	N9	0.0004	0.0028	0.000	0.000
i-Propylbenzene	A9	0.0002	0.0013	0.000	0.000
i-Propylcyclohexane	N9	0.0001	0.0007	0.000	0.000
2,2-Dimethyloctane	I10	0.0001	0.0008	0.000	0.000
2,4-Dimethyloctane	I10	0.0002	0.0016	0.000	0.000
2,6-Dimethyloctane	I10	0.0001	0.0008	0.000	0.000
2,5-Dimethyloctane	I10	0.0001	0.0008	0.000	0.000
n-Butylcyclopentane	N9	0.0003	0.0021	0.000	0.000
3,3-Dimethyloctane	I10	0.0002	0.0016	0.000	0.000
n-Propylbenzene	A9	0.0005	0.0034	0.000	0.000
3,6-Dimethyloctane	I10	0.0002	0.0016	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0002	0.0016	0.000	0.000
1,3-Methylethylbenzene	A9	0.0003	0.0020	0.000	0.000
1,4-Methylethylbenzene	A9	0.0001	0.0007	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0003	0.0020	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	0.0003	0.0020	0.000	0.000
2-Methylnonane	I10	0.0001	0.0008	0.000	0.000
3-Ethylheptane	I10	0.0001	0.0008	0.000	0.000
3-Methylnonane	I10	0.0002	0.0016	0.000	0.000
t-Butylbenzene	A10	0.0003	0.0022	0.000	0.000
i-Butylcyclohexane	N10	0.0001	0.0008	0.000	0.000
UnknownC9s	U9	0.0008	0.0058	0.000	0.000
n-Decane	P10	0.0006	0.0048	0.000	0.000
Sec-Butylcyclohexane	A10	0.0001	0.0008	0.000	0.000
1,2-Methyl-i-propylbenzene	A10	0.0001	0.0007	0.000	0.000
3-Ethylnonane	I10	0.0002	0.0017	0.000	0.000
1,3-Diethylbenzene	A10	0.0001	0.0007	0.000	0.000
1,4-Diethylbenzene	A10	0.0001	0.0007	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
1,3-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
UnknownC10s	U10	0.0019	0.0151	0.001	0.001
n-Undecane	P11	0.0002	0.0017	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	0.0002	0.0019	0.000	0.000
1,2,3,4,5-Pentamethylbenzene	A13	0.0001	0.0008	0.000	0.000
UnknownC12s	U12	0.0001	0.0009	0.000	0.000
n-Tridecane	P13	0.0001	0.0010	0.000	0.000
n-Nonadecane	P19	0.0002	0.0030	0.000	0.000
UnknownC20s	U20	0.0001	0.0016	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	1.9369	1.9469

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0154	0.0673
TOLUENE	0.0091	0.0469
ETHYLBENZENE	0.0023	0.0136
XYLENES	0.0097	0.0576
TOTAL BTEX	0.0365	0.1854

*(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 :	994.4 /scf	999.9 /scf
NET WET REAL :	977.0 /scf	982.5 /scf
HHV GROSS DRY REAL :	1101.0 /scf	1107.0 /scf
GROSS WET REAL :	1081.8 /scf	1087.8 /scf
NET HEATING VALUE (60 °F ideal reaction):		21133.1 Btu/lbm
GROSS HEATING VALUE (60°F ideal reaction):		23394.9 Btu/lbm
RELATIVE DENSITY (AIR=1):		0.6165
DENSITY		0.04713 lb/scf
COMPRESSIBILITY FACTOR :		0.9975
REGULAR WOBBE INDEX		1403.1

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

Net Dry Ideal BTU	<u>4802.7</u> /scf	Relative Density - SG (Air=1)	<u>3.3097</u>	C6+ factors
Gross Dry Ideal BTU	<u>5159.1</u> /scf	Z Compressibility Factor	<u>0.99289</u>	<u>0.99213</u>
Net Dry Ideal BTU	<u>19260.3</u> /lb	Density Factor	<u>252.578</u> lbm/1000 ft3	
Gross Dry Ideal BTU	<u>20695.4</u> /lb	Molar Mass or MW	<u>95.841</u> g/mol	
		Volume Liquid Ideal gas	<u>0.128</u> scf/gal	<u>23.4</u>

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.

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