

**EXTENDED NATURAL GAS ANALYSIS (\*DHA)**

**MAIN PAGE**

PRIMARY DB KEY: <b>05-045-07868</b>	NAME/DESCRIP : <b>110170166 UNOCAL 24-9DRD</b>
LEASE #:	<b>PRODUCTION CASING</b>
FIELD/AREA	
PROJECT NO. : <b>202507060</b>	ANALYSIS NO. : <b>02</b>
COMPANY NAME : <b>QB ENERGY OPERATING, LLC</b>	ANALYSIS DATE: <b>AUGUST 05, 2025 08:27</b>
OFFICE / BRANCH: <b>PARACHUTE, CO</b>	SAMPLE DATE : <b>JUNE 25, 2025</b>
CUSTOMER REF:	TO:
PRODUCER : <b>QB ENERGY OPERATING, LLC</b>	EFFECTIVE DATE:

**\*\*\*FIELD DATA\*\*\***

SAMPLE CYCLE:	SAMPLE TYPE: <b>SPOT</b>
SAMPLE PRES. : <b>271</b> psig	PROBE : <b>NO PROBE</b>
FLOW PRES. :              psig	CYLINDER NO. : <b>ECA-784</b>
LAB PRES:                  psig	SAMPLED BY : <b>MIKE KELLEY</b>
SAMPLE TEMP. : <b>75</b> °f	SAMPLING COMPANY: <b>QB ENERGY OPERATING, LLC</b>
AMBIENT TEMP.:            °f	H2S BY STAIN TUBE: <b>-</b> ppm mol
H2O BY STAIN TUBE: <b>-</b> #/mmcf	CO2 BY STAIN TUBE: <b>-</b> 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	0.0008	0.0014	0.0000	0.0000
HELIUM	0.01	0.00	---	---
HYDROGEN	0.01	0.00	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.12	0.18	---	---
CARBON DIOXIDE	0.59	1.39	---	---
METHANE	88.6592	75.9884	---	---
ETHANE	6.6384	10.6644	1.7702	1.7799
PROPANE	2.1797	5.1350	0.5987	0.6020
I-BUTANE	0.4582	1.4228	0.1499	0.1508
N-BUTANE	0.4939	1.5337	0.1549	0.1558
I-PENTANE	0.2250	0.8666	0.0820	0.0824
N-PENTANE	0.1607	0.6194	0.0580	0.0583
HEXANES PLUS	0.4542	2.1983	0.1840	0.1848
<b>TOTALS</b>	<b>100.0000</b>	<b>100.0000</b>	<b>2.9977</b>	<b>3.0140</b>

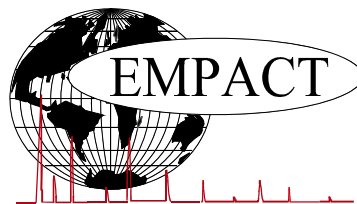
<u>BTEX COMPONENTS</u>	<u>MOLE%</u>	<u>WT%</u>	<u>CALCULATED VALUES**</u>	
			<u>BTU @ 14.65</u>	<u>14.73</u>
BENZENE	0.0174	0.0726	<b>LHV NET DRY REAL :</b>	<b>1027.4 /scf</b>
TOLUENE	0.0060	0.0295		<b>1033.1 /scf</b>
ETHYLBENZENE	0.0000	0.0000	<b>NET WET REAL :</b>	<b>1009.4 /scf</b>
XYLENES	0.0000	0.0000		<b>1015.1 /scf</b>
<b>TOTAL BTEX</b>	<b>0.0234</b>	<b>0.1021</b>	<b>HHV GROSS DRY REAL :</b>	<b>1135.8 /scf</b>
				<b>1142.0 /scf</b>
			<b>GROSS WET REAL :</b>	<b>1115.9 /scf</b>
				<b>1122.1 /scf</b>
			<b>NET HEATING VALUE (60 °F ideal reaction):</b>	<b>20840.9 Btu/lbm</b>
			<b>GROSS HEATING VALUE (60°F ideal reaction):</b>	<b>23046.4 Btu/lbm</b>
			<b>RELATIVE DENSITY (AIR=1):</b>	<b>0.6462</b>
			<b>DENSITY</b>	<b>0.04932 lbm/scf</b>
			<b>COMPRESSIBILITY FACTOR :</b>	<b>0.9973</b>
			<b>REGULAR WOBBE INDEX</b>	<b>1413.5</b>

*\*(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. :	02
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	AUGUST 05, 2025 08:27
ACCOUNT NO. :		SAMPLE DATE :	JUNE 25, 2025
PRODUCER :	QB ENERGY OPERATING, LLC	CYLINDER NO. :	ECA-784
LEASE NO. :		SAMPLED BY :	MIKE KELLEY
NAME/DESCRIP :	110170166 UNOCAL 24-9DRD PRODUCTION CASING		

\*\*\*FIELD DATA\*\*\*

SAMPLE PRES. :	271	SAMPLE TEMP. :	75
H2S BY STAIN TUBE:	—	AMBIENT TEMP.:	
COMMENTS :	—		

*ppm mol*  
*SPOT NO PROBE*

Componet	Mole %	Wt %
Helium	0.01	0.00
Hydrogen	0.01	0.00
Carbon Dioxide	0.59	1.39
Nitrogen	0.12	0.18
Methane	88.6592	75.9884
Ethane	6.6384	10.6644
Propane	2.1797	5.1350
Isobutane	0.4582	1.4228
n-Butane	0.4939	1.5337
Isopentane	0.2185	0.8422
n-Pentane	0.1607	0.6194
Cyclopentane	0.0065	0.0244
n-Hexane	0.0725	0.3338
Cyclohexane	0.0406	0.1826
Other Hexanes	0.1499	0.6855
Heptanes	0.1137	0.6054
Methylcyclohexane	0.0533	0.2796
2,2,4 Trimethylpentane	0.0000	0.0000
Benzene	0.0174	0.0726
Toluene	0.0060	0.0295
Ethylbenzene	0.0000	0.0000
Xylenes	0.0000	0.0000
C8+ Heavies	0.0008	0.0093
<b>Subtotal</b>	99.99920	99.99860
Oxygen/Argon	0.00	0.00
Alcohols	0.0008	0.0014
<b>Total</b>	100.00000	100.00000

Calculated Values BTU @	14.65	Total	C6+	C8+	C10+
		Sample	Fraction	Fraction	Fraction
LHV Net Dry Real:		1027.4	4593.4	10724.8	13686.4 Btu/scf
Net Wet Real:		1009.4	4513.1	10537.3	13447.1 Btu/scf
HHV Gross Dry Real:		1135.8	4941.5	11535.7	14712.5 Btu/scf
Gross Wet Real:		1115.9	4855.1	11334.0	14455.3 Btu/scf

**Other Calculated Values**

Regualr Wobbe Index*	1413.5	2777.9	4236.6	4797.1 Btu/scf
Net Heating Value (60 °F ideal reaction):	20840.9	19273.7	23683.5	24819.9 Btu/lbm
Gross Heating Value (60°F ideal reaction):	23046.4	20735.2	25471.4	26680.2 Btu/lbm
Molar Mass (MW):	18.71748	90.586	215.927	274.138 g/mol
Relative Density (AIR=1):	0.6462	3.1280	7.4553	9.4652 SG
Density:	0.04932	0.23872	0.56900	0.72240 lbm/scf
Compressibility Factor:	0.9973	0.9911	0.9996	1.0000 Z
Liquid Volume real gas @:	<b>14.65</b>	18.0493	0.1834	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 underscore) indicates there was no tube pulled for H2S.

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**EXTENDED NATURAL GAS ANALYSIS (\*DHA)**

**DHA COMPONENT LIST**

PRIMARY DB KEY: 05-045-07868 NAME/DESCRIP : 110170166 UNOCAL 24-9DRD  
 LEASE #: PRODUCTION CASING  
 FIELD/AREA:  
 PROJECT NO. : 202507060 ANALYSIS NO. : 02  
 COMPANY NAME : QB ENERGY OPERATING, LLC ANALYSIS DATE: AUGUST 05, 2025 08:27  
 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. : 271 psig PROBE : NO PROBE  
 FLOW PRES. : psig CYLINDER NO. : ECA-784  
 LAB PRES: psig SAMPLED BY : MIKE KELLEY  
 SAMPLE TEMP. : 75 °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	---	0.01	0.00	---	---
Nitrogen	---	0.12	0.18	---	---
Carbon Dioxide	---	0.59	1.39	---	---
Methane	P1	88.6592	75.9884	---	---
Ethane	P2	6.6384	10.6644	1.770	1.780
Propane	P3	2.1797	5.1350	0.599	0.602
i-Butane	I4	0.4582	1.4228	0.150	0.151
Methanol	X1	0.0008	0.0014	0.000	0.000
n-Butane	P4	0.4939	1.5337	0.155	0.156
2,2-Dimethylpropane	I5	0.0053	0.0204	0.002	0.002
i-Pentane	I5	0.2132	0.8218	0.078	0.078
n-Pentane	P5	0.1607	0.6194	0.058	0.058
2,2-Dimethylbutane	I6	0.0072	0.0331	0.003	0.003
Cyclopentane	N5	0.0065	0.0244	0.002	0.002
2,3-Dimethylbutane	I6	0.0140	0.0644	0.006	0.006
2-Methylpentane	I6	0.0557	0.2564	0.023	0.023
3-Methylpentane	I6	0.0313	0.1441	0.013	0.013
n-Hexane	P6	0.0725	0.3338	0.030	0.030
2,2-Dimethylpentane	I7	0.0022	0.0118	0.001	0.001
Methylcyclopentane	N6	0.0417	0.1875	0.015	0.015
2,4-Dimethylpentane	I7	0.0038	0.0204	0.002	0.002
2,2,3-Trimethylbutane	I7	0.0010	0.0053	0.000	0.000
Benzene	A6	0.0174	0.0726	0.005	0.005
3,3-Dimethylpentane	I7	0.0013	0.0070	0.001	0.001
Cyclohexane	N6	0.0406	0.1826	0.014	0.014
2-Methylhexane	I7	0.0173	0.0926	0.008	0.008
2,3-Dimethylpentane	I7	0.0045	0.0241	0.002	0.002

1,1-Dimethylcyclopentane	N7	0.0033	0.0173	0.001	0.001
3-Methylhexane	I7	0.0157	0.0840	0.007	0.007
1c,3-Dimethylcyclopentane	N7	0.0060	0.0315	0.003	0.003
1t,3-Dimethylcyclopentane	N7	0.0055	0.0289	0.003	0.003
3-Ethylpentane	I7	0.0008	0.0043	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0084	0.0441	0.004	0.004
n-Heptane	P7	0.0351	0.1879	0.016	0.016
1c,2-Dimethylcyclopentane	N7	0.0081	0.0425	0.004	0.004
Methylcyclohexane	N7	0.0533	0.2796	0.021	0.021
2,2-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
Ethylcyclopentane	N7	0.0007	0.0037	0.000	0.000
Toluene	A7	0.0060	0.0295	0.002	0.002
UnknownC8s	U8	0.0001	0.0006	0.000	0.000
UnknownC9s	U9	0.0001	0.0007	0.000	0.000
n-Hexadecane	P16	0.0001	0.0012	0.000	0.000
n-Nonadecane	P19	0.0002	0.0029	0.000	0.000
n-Heneicosane	P21	0.0001	0.0016	0.000	0.000
n-Docosane	P22	0.0001	0.0017	0.000	0.000
<b>TOTAL</b>		<b>100.0000</b>	<b>100.0000</b>	<b>2.9977</b>	<b>3.0140</b>

**CALCULATED VALUES\*\***

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.65	14.73
BENZENE	0.0174	0.0726	LHV NET DRY REAL :	1027.4 /scf	1033.1 /scf
TOLUENE	0.0060	0.0295	NET WET REAL :	1009.4 /scf	1015.1 /scf
ETHYLBENZENE	0.0000	0.0000	HHV GROSS DRY REAL :	1135.8 /scf	1142.0 /scf
XYLENES	0.0000	0.0000	GROSS WET REAL :	1115.9 /scf	1122.1 /scf
TOTAL BTEX	0.0234	0.1021	NET HEATING VALUE (60 °F ideal reaction):		20840.9 Btu/lbm
			GROSS HEATING VALUE (60°F ideal reaction):		23046.4 Btu/lbm
			RELATIVE DENSITY (AIR=1):		0.6462
			DENSITY		0.04932 lb/scf
			COMPRESSIBILITY FACTOR :		0.9973
			REGULAR WOBBE INDEX		1413.5

\*(DETAILED HYDROCARBON ANALYSIS/NJ 1993)

Mod ASTM D6730, GPA 2261 & GPA 2286.

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

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

Net Dry Ideal BTU	<u>4567</u> /scf	Relative Density - SG (Air=1)	<u>3.128</u>	<b>C6+ factors</b>
Gross Dry Ideal BTU	<u>4913</u> /scf	Z Compressibility Factor	<u>0.99113</u>	<u>0.99065</u>
Net Dry Ideal BTU	<u>19273.7</u> /lb	Density Factor	<u>238.717</u> lbm/1000 ft3	
Gross Dry Ideal BTU	<u>20735.2</u> /lb	Molar Mass or MW	<u>90.586</u> g/mol	
		Volume Liquid Ideal gas	<u>0.184</u> scf/gal	<u>25.2</u>
<b>This hexanes plus fraction may be applied in place of published C6+ factors. The Z &amp; GPM need additional calc for C6+ factors.</b>				
<b>#DIV/0 or 0 (zero) will appear in this section when there is no hexanes plus in the sample to calculate C6+ factors.</b>				

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