EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY:	**05-045-13082**	NAME/DESCRIP :	**110170168 UNOCAL 14A-9D**
LEASE #:			**PRODUCTION CASING**
FIELD/AREA			

PROJECT NO. :	**202507062**	ANALYSIS NO. :	**01**
COMPANY NAME :	**QB ENERGY OPERATING, LLC**	ANALYSIS DATE:	AUGUST 05, 2025 13:33
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. :	680	psig	PROBE :	NO PROBE
FLOW PRES. :		psig	CYLINDER NO. :	ECA-780
LAB PRES:		psig	SAMPLED BY :	MIKE KELLEY
SAMPLE TEMP. :	73	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	0.0045	0.0103	0.0010	0.0010
HELIUM	0.00	0.00	---	---
HYDROGEN	0.02	0.00	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.05	0.07	---	---
CARBON DIOXIDE	5.80	13.64	---	---
METHANE	89.4384	76.6622	---	---
ETHANE	3.4638	5.5649	0.9233	0.9283
PROPANE	0.5841	1.3762	0.1609	0.1617
I-BUTANE	0.1877	0.5829	0.0610	0.0613
N-BUTANE	0.0909	0.2823	0.0290	0.0291
I-PENTANE	0.0723	0.2785	0.0260	0.0261
N-PENTANE	0.0270	0.1041	0.0100	0.0100
HEXANES PLUS	0.2609	1.4280	0.1050	0.1050
TOTALS	100.00000	100.00000	1.3162	1.3225

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0123	0.0513
TOLUENE	0.0163	0.0803
ETHYLBENZENE	0.0014	0.0080
XYLENES	0.0187	0.1061
TOTAL BTEX	0.0487	0.2457

**(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 :	907.2 **/scf**	912.1 **/scf**
	NET WET REAL :	891.3 **/scf**	896.2 **/scf**
HHV	GROSS DRY REAL :	1004.8 **/scf**	1010.3 **/scf**
	GROSS WET REAL :	987.2 **/scf**	992.7 **/scf**

NET HEATING VALUE (60 °F ideal reaction):	18419.4 **Btu/lbm**
GROSS HEATING VALUE (60°F ideal reaction):	20414.6 **Btu/lbm**
RELATIVE DENSITY (AIR=1):	0.6455
DENSITY	0.04932 **lbm/scf**
COMPRESSIBILITY FACTOR :	0.9977
REGULAR WOBBE INDEX	1251.6

EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	202507062	ANALYSIS NO. :	01
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	AUGUST 05, 2025 13:33
ACCOUNT NO. :		SAMPLE DATE :	JUNE 25, 2025
PRODUCER :	QB ENERGY OPERATING, LLC	CYLINDER NO. :	ECA-780
LEASE NO. :		SAMPLED BY :	MIKE KELLEY
NAME/DESCRIP :	110170168 UNOCAL 14A-9D PRODUCTION CASING		
FIELD DATA		SAMPLE TEMP. :	73
SAMPLE PRES. :	680	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm mol*		
COMMENTS :	***SPOT*** ***NO PROBE***		

Componet	Mole %	Wt %
Helium	0.00	0.00
Hydrogen	0.02	0.00
Carbon Dioxide	5.80	13.64
Nitrogen	0.05	0.07
Methane	89.4384	76.6622
Ethane	3.4638	5.5649
Propane	0.5841	1.3762
Isobutane	0.1877	0.5829
n-Butane	0.0909	0.2823
Isopentane	0.0702	0.2706
n-Pentane	0.0270	0.1041
Cyclopentane	0.0021	0.0079
n-Hexane	0.0173	0.0797
Cyclohexane	0.0085	0.0382
Other Hexanes	0.0493	0.2262
Heptanes	0.0440	0.2348
Methylcyclohexane	0.0162	0.0850
2,2,4 Trimethylpentane	0.0000	0.0000
Benzene	0.0123	0.0513
Toluene	0.0163	0.0803
Ethylbenzene	0.0014	0.0080
Xylenes	0.0187	0.1061
C8+ Heavies	0.0769	0.5184
Subtotal	99.99550	99.98970
Oxygen/Argon	0.00	0.00
Alcohols	0.0045	0.0103
Total	100.00000	100.00000

Calculated Values BTU @ **14.65**		**Total Sample**	**C6+ Fraction**	**C8+ Fraction**	**C10+ Fraction**	
LHV	Net Dry Real:	907.2	5073.9	5945.7	7077.7	**Btu/scf**
	Net Wet Real:	891.3	4985.2	5841.8	6954.0	**Btu/scf**
HHV	Gross Dry Real:	1004.8	5439.2	6366.9	7574.3	**Btu/scf**
	Gross Wet Real:	987.2	5344.1	6255.6	7441.9	**Btu/scf**
Other Calculated Values						
Regualr Wobbe Index*		1251.6	2886.5	3107.4	3383.7	**Btu/scf**
Net Heating Value (60 °F ideal reaction):		18419.4	19011.5	18982.1	19196.7	**Btu/lbm**
Gross Heating Value (60°F ideal reaction):		20414.6	20381.4	20333.8	20544.9	**Btu/lbm**
Molar Mass (MW):		18.71699	102.405	121.989	145.903	**g/mol**
Relative Density (AIR=1):		0.6455	3.5369	4.2132	5.0379	**SG**
Density:		0.04932	0.26988	0.32147	0.38447	**lbm/scf**
Compressiblity Factor:		0.9977	0.9949	0.9987	0.9996	**Z**
Liquid Volume real gas @:	**14.65**	17.3804	0.1047	0.0409	0.006	**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

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PRODUCER :	QB ENERGY OPERATING, LLC	EFFECTIVE DATE:	
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LAB PRES:	psig	SAMPLED BY :	MIKE KELLEY
SAMPLE TEMP. :	73 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	---	0.02	0.00	---	---
Nitrogen	---	0.05	0.07	---	---
Carbon Dioxide	---	5.80	13.64	---	---
Methane	P1	89.43840	76.66220	---	---
Ethane	P2	3.4638	5.5649	0.923	0.928
Propane	P3	0.5841	1.3762	0.161	0.162
i-Butane	I4	0.1877	0.5829	0.061	0.061
Methanol	X1	0.0027	0.0047	0.000	0.000
n-Butane	P4	0.0909	0.2823	0.029	0.029
2,2-Dimethylpropane	I5	0.0033	0.0127	0.001	0.001
i-Pentane	I5	0.0669	0.2579	0.024	0.024
Acetone	X3	0.0018	0.0056	0.001	0.001
n-Pentane	P5	0.0270	0.1041	0.010	0.010
2,2-Dimethylbutane	I6	0.0048	0.0221	0.002	0.002
Cyclopentane	N5	0.0021	0.0079	0.001	0.001
2,3-Dimethylbutane	I6	0.0057	0.0262	0.002	0.002
2-Methylpentane	I6	0.0200	0.0921	0.008	0.008
3-Methylpentane	I6	0.0115	0.0530	0.005	0.005
n-Hexane	P6	0.0173	0.0797	0.007	0.007
2,2-Dimethylpentane	I7	0.0016	0.0086	0.001	0.001
Methylcyclopentane	N6	0.0073	0.0328	0.003	0.003
2,4-Dimethylpentane	I7	0.0020	0.0107	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0007	0.0037	0.000	0.000
Benzene	A6	0.0123	0.0513	0.003	0.003
3,3-Dimethylpentane	I7	0.0008	0.0043	0.000	0.000
Cyclohexane	N6	0.0085	0.0382	0.003	0.003
2-Methylhexane	I7	0.0085	0.0455	0.004	0.004
2,3-Dimethylpentane	I7	0.0022	0.0118	0.001	0.001

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1,1-Dimethylcyclopentane	N7	0.0013	0.0068	0.001	0.001
3-Methylhexane	I7	0.0075	0.0402	0.003	0.003
1c,3-Dimethylcyclopentane	N7	0.0015	0.0079	0.001	0.001
1t,3-Dimethylcyclopentane	N7	0.0013	0.0068	0.001	0.001
3-Ethylpentane	I7	0.0004	0.0021	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0021	0.0110	0.001	0.001
n-Heptane	P7	0.0112	0.0600	0.005	0.005
1c,2-Dimethylcyclopentane	N7	0.0021	0.0110	0.001	0.001
Methylcyclohexane	N7	0.0162	0.0850	0.006	0.006
2,2-Dimethylhexane	I8	0.0007	0.0043	0.000	0.000
1,1,3-Trimethylcyclopentane	N7	0.0002	0.0012	0.000	0.000
Ethylcyclopentane	N7	0.0006	0.0032	0.000	0.000
2,5-Dimethylhexane	I8	0.0010	0.0061	0.001	0.001
2,2,3-Trimethylpentane	I8	0.0008	0.0049	0.000	0.000
2,4-Dimethylhexane	I8	0.0003	0.0018	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0003	0.0018	0.000	0.000
3,3-Dimethylhexane	I8	0.0003	0.0018	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	0.0163	0.0803	0.005	0.005
2,3-Dimethylhexane	I8	0.0006	0.0037	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0001	0.0006	0.000	0.000
2-Methylheptane	I8	0.0032	0.0196	0.002	0.002
4-Methylheptane	I8	0.0011	0.0067	0.001	0.001
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	0.0026	0.0159	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0019	0.0114	0.001	0.001
3-Ethylhexane	I8	0.0005	0.0031	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0009	0.0054	0.000	0.000
1,1-Dimethylcyclohexane	N8	0.0004	0.0024	0.000	0.000
2,2,5-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
3c-Ethylmethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0005	0.0030	0.000	0.000
1t,3-Dimethylcyclohexane	N8	0.0008	0.0048	0.000	0.000
n-Octane	P8	0.0026	0.0159	0.001	0.001
1c,4-Dimethylcyclohexane	N8	0.0003	0.0018	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0002	0.0014	0.000	0.000
2,3,4-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
2,2-Dimethylheptane	I9	0.0003	0.0020	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0006	0.0041	0.000	0.000
2,2,3-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
2,4-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
Ethylcyclohexane	N8	0.0008	0.0048	0.000	0.000
n-Propylcyclopentane	N8	0.0003	0.0018	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0004	0.0027	0.000	0.000
2,5-Dimethylheptane	I9	0.0010	0.0068	0.001	0.001
3,3-Dimethylheptane	I9	0.0003	0.0020	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	0.0014	0.0080	0.001	0.001
2,3-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0120	0.0681	0.005	0.005
1,4-Dimethylbenzene (p-Xylene)	A8	0.0034	0.0193	0.001	0.001
3,4-Dimethylheptane	I9	0.0002	0.0014	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0001	0.0007	0.000	0.000
4-Ethylheptane	I9	0.0005	0.0034	0.000	0.000
4-Methyloctane	I9	0.0043	0.0295	0.002	0.002

2-Methyloctane	I9	0.0063	0.0432	0.004	0.004
1c,2t,3-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
3-Ethylheptane	I9	0.0003	0.0020	0.000	0.000
3-Methyloctane	I9	0.0008	0.0055	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	0.0063	0.0425	0.004	0.004
1,1,2-Trimethylcyclohexane	N9	0.0002	0.0013	0.000	0.000
3,3-Diethylpentane	I9	0.0002	0.0014	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0033	0.0187	0.001	0.001
i-Butylcyclopentane	N9	0.0018	0.0121	0.001	0.001
n-Nonane	P9	0.0043	0.0294	0.002	0.002
1,1-Methylethylcyclohexane	N9	0.0005	0.0034	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	0.0001	0.0008	0.000	0.000
2,6-Dimethyloctane	I10	0.0001	0.0008	0.000	0.000
n-Butylcyclopentane	N9	0.0002	0.0013	0.000	0.000
3,3-Dimethyloctane	I10	0.0001	0.0008	0.000	0.000
n-Propylbenzene	A9	0.0001	0.0006	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0011	0.0084	0.001	0.001
1,3-Methylethylbenzene	A9	0.0039	0.0251	0.002	0.002
1,4-Methylethylbenzene	A9	0.0018	0.0115	0.001	0.001
1,3,5-Trimethylbenzene	A9	0.0020	0.0128	0.001	0.001
5-Methylnonane	I10	0.0001	0.0008	0.000	0.000
1,2-Methylethylbenzene	A9	0.0004	0.0026	0.000	0.000
2-Methylnonane	I10	0.0011	0.0084	0.001	0.001
3-Methylnonane	I10	0.0001	0.0008	0.000	0.000
t-Butylbenzene	A10	0.0062	0.0445	0.003	0.003
i-Butylbenzene	A10	0.0001	0.0007	0.000	0.000
sec-Butylbenzene	A10	0.0001	0.0007	0.000	0.000
UnknownC9s	U9	0.0026	0.0178	0.001	0.001
n-Decane	P10	0.0002	0.0015	0.000	0.000
1,2,3-Trimethylbenzene	A9	0.0017	0.0109	0.001	0.001
1,3-Methyl-i-propylbenzene	A10	0.0003	0.0021	0.000	0.000
1,4-Methyl-n-propylbenzene	A10	0.0001	0.0007	0.000	0.000
n-Butylbenzene	A10	0.0002	0.0014	0.000	0.000
1,3-Dimethyl-5-ethylbenzene	A10	0.0001	0.0007	0.000	0.000
1,2-Diethylbenzene	A10	0.0002	0.0014	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	0.0014	0.0106	0.001	0.001
UnknownC11s	U11	0.0006	0.0050	0.000	0.000
n-Dodecane	P12	0.0001	0.0009	0.000	0.000
UnknownC12s	U12	0.0002	0.0017	0.000	0.000
n-Tridecane	P13	0.0001	0.0010	0.000	0.000
UnknownC13s	U13	0.0001	0.0010	0.000	0.000
n-Nonadecane	P19	0.0003	0.0043	0.000	0.000
n-Heneicosane	P21	0.0001	0.0016	0.000	0.000
n-Docosane	P22	0.0002	0.0033	0.000	0.000
TOTAL		100.00000	100.00000	1.3162	1.3225

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0123	0.0513
TOLUENE	0.0163	0.0803
ETHYLBENZENE	0.0014	0.0080
XYLENES	0.0187	0.1061
TOTAL BTEX	0.0487	0.2457

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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
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	NET WET REAL :	891.3 /scf	896.2 /scf
HHV	GROSS DRY REAL :	1004.8 /scf	1010.3 /scf
	GROSS WET REAL :	987.2 /scf	992.7 /scf

NET HEATING VALUE (60 °F ideal reaction):	18419.4 Btu/lbm
GROSS HEATING VALUE (60°F ideal reaction):	20414.6 Btu/lbm
RELATIVE DENSITY (AIR=1):	0.6455
DENSITY	0.04932 lb/scf
COMPRESSIBILITY FACTOR :	0.9977
REGULAR WOBBE INDEX	1251.6

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

Net Dry Ideal BTU	5064 /scf	Relative Density - SG (Air=1)	3.5369	***C6+factors***
Gross Dry Ideal BTU	5428.6 /scf	**Z** Compressiblity Factor	0.99493	0.99372
Net Dry Ideal BTU	19011.5 /lb	Density Factor	269.876 lbm/1000 ft3	
Gross Dry Ideal BTU	20381.4 /lb	Molar Mass or MW	102.405 g/mol	
		Volume Liquid Ideal gas	0.105 scf/gal	22.8

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.

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