EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY:	**05-045-07185**	NAME/DESCRIP :	**RULISON FEDERAL 01-42**
LEASE #:	**COC-46029**		**CASING**
FIELD/AREA:			

PROJECT NO. :	**202506058**	ANALYSIS NO. :	**04**
COMPANY NAME :	**QB ENERGY OPERATING, LLC**	ANALYSIS DATE:	JUNE 19, 2025 20:19
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	MAY 29, 2025
CUSTOMER REF:		TO:	
PRODUCER :	QB ENERGY OPERATING, LLC	EFFECTIVE DATE:	

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

SAMPLE CYCLE:			SAMPLE TYPE:	SPOT
SAMPLE PRES. :	336	psig	PROBE :	NO
FLOW PRES. :		psig	CYLINDER NO. :	ECA-782
LAB PRES:		psig	SAMPLED BY :	MIKE KELLEY
SAMPLE TEMP. :	57	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
ALCOHOLS	0.0012	0.0024	0.0000	0.0000
HELIUM	0.01	0.00	---	---
HYDROGEN	0.06	0.01	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.10	0.15	---	---
CARBON DIOXIDE	0.14	0.34	---	---
METHANE	90.3236	79.3880	---	---
ETHANE	5.9813	9.8536	1.5951	1.6038
PROPANE	1.8521	4.4744	0.5087	0.5115
I-BUTANE	0.4001	1.2741	0.1309	0.1316
N-BUTANE	0.4161	1.3250	0.1309	0.1316
I-PENTANE	0.1904	0.7517	0.0690	0.0693
N-PENTANE	0.1404	0.5550	0.0510	0.0513
HEXANES PLUS	0.3848	1.8758	0.1490	0.1496
TOTALS	100.00000	100.00000	2.6346	2.6487

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0183	0.0783
TOLUENE	0.0083	0.0419
ETHYLBENZENE	0.0000	0.0000
XYLENES	0.0000	0.0000
TOTAL BTEX	0.0266	0.1202

CALCULATED VALUES**

	BTU @	14.65	14.73
LHV	NET DRY REAL :	1014.7 **/scf**	1020.2 **/scf**
	NET WET REAL :	997.0 **/scf**	1002.5 **/scf**
HHV	GROSS DRY REAL :	1122.6 **/scf**	1128.7 **/scf**
	GROSS WET REAL :	1103.0 **/scf**	1109.1 **/scf**

NET HEATING VALUE (60 °F ideal reaction):	21111.6 **Btu/lbm**
GROSS HEATING VALUE (60°F ideal reaction):	23358.5 **Btu/lbm**
RELATIVE DENSITY (AIR=1):	0.6298
DENSITY	0.04809 **lbm/scf**
COMPRESSIBILITY FACTOR :	0.9974
REGULAR WOBBE INDEX	1415.3

**(DETAILED HYDROCARBON ANALYSIS/NJ 1993)*
Mod ASTM D6730,GPA 2261 & GPA 2286.

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

EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	202506058	ANALYSIS NO. :	04
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	JUNE 19, 2025 20:19
ACCOUNT NO. :		SAMPLE DATE :	MAY 29, 2025
PRODUCER :	QB ENERGY OPERATING, LLC	CYLINDER NO. :	ECA-782
LEASE NO. :	COC-46029	SAMPLED BY :	MIKE KELLEY
NAME/DESCRIP :	RULISON FEDERAL 01-42 CASING		
FIELD DATA		SAMPLE TEMP. :	57
SAMPLE PRES. :	336	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm mol*		
COMMENTS :	*SPOT NO*		

Componet	Mole %	Wt %
Helium	0.01	0.00
Hydrogen	0.06	0.01
Carbon Dioxide	0.14	0.34
Nitrogen	0.10	0.15
Methane	90.3236	79.3880
Ethane	5.9813	9.8536
Propane	1.8521	4.4744
Isobutane	0.4001	1.2741
n-Butane	0.4161	1.3250
Isopentane	0.1823	0.7206
n-Pentane	0.1404	0.5550
Cyclopentane	0.0081	0.0311
n-Hexane	0.0739	0.3489
Cyclohexane	0.0425	0.1960
Other Hexanes	0.1408	0.6605
Heptanes	0.0675	0.3686
Methylcyclohexane	0.0319	0.1716
2,2,4 Trimethylpentane	0.0001	0.0006
Benzene	0.0183	0.0783
Toluene	0.0083	0.0419
Ethylbenzene	0.0000	0.0000
Xylenes	0.0000	0.0000
C8+ Heavies	0.0015	0.0094
Subtotal	99.99880	99.99760
Oxygen/Argon	0.00	0.00
Alcohols	0.0012	0.0024
Total	100.00000	100.00000

Calculated Values BTU @ **14.65**		**Total Sample**	**C6+ Fraction**	**C8+ Fraction**	**C10+ Fraction**	
LHV	Net Dry Real:	1014.7	4505.8	5564.0	#DIV/0!	**Btu/scf**
	Net Wet Real:	997.0	4427.0	5466.7	#DIV/0!	**Btu/scf**
HHV	Gross Dry Real:	1122.6	4845.0	5998.5	#DIV/0!	**Btu/scf**
	Gross Wet Real:	1103.0	4760.3	5893.6	#DIV/0!	**Btu/scf**
Other Calculated Values						
Regualr Wobbe Index*		1415.3	2746.7	3013.7	#DIV/0!	**Btu/scf**
Net Heating Value (60 °F ideal reaction):		21111.6	19205.8	19547.3	#DIV/0!	**Btu/lbm**
Gross Heating Value (60°F ideal reaction):		23358.5	20653.9	21074.8	#DIV/0!	**Btu/lbm**
Molar Mass (MW):		18.25236	88.987	114.475	#DIV/0!	**g/mol**
Relative Density (AIR=1):		0.6298	3.0725	3.9524	#DIV/0!	**SG**
Density:		0.04809	0.23450	0.30166	#DIV/0!	**lbm/scf**
Compressiblity Factor:		0.9974	0.9906	0.9957	#DIV/0!	**Z**
Liquid Volume real gas @:	**14.65**	17.8938	0.1485	0	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 uderscore) indicates there was no tube pulled for H2S.

EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PRIMARY DB KEY:	**05-045-07185**	NAME/DESCRIP :	**RULISON FEDERAL 01-42**
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PRODUCER :	QB ENERGY OPERATING, LLC	EFFECTIVE DATE:	
FIELD DATA			
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SAMPLE PRES. :	336 psig	PROBE :	NO
FLOW PRES. :	psig	CYLINDER NO. :	ECA-782
LAB PRES:	psig	SAMPLED BY :	MIKE KELLEY
SAMPLE TEMP. :	57 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	---	---
Hydrogen	---	0.06	0.01	---	---
Nitrogen	---	0.10	0.15	---	---
Carbon Dioxide	---	0.14	0.34	---	---
Methane	P1	90.3236	79.3880	---	---
Ethane	P2	5.9813	9.8536	1.595	1.604
Propane	P3	1.8521	4.4744	0.509	0.512
i-Butane	I4	0.4001	1.2741	0.131	0.132
Methanol	X1	0.0010	0.0017	0.000	0.000
n-Butane	P4	0.4160	1.3247	0.131	0.132
2,2-Dimethylpropane	I5	0.0052	0.0205	0.002	0.002
i-Pentane	I5	0.1771	0.7001	0.065	0.065
i-Propanol	X3	0.0001	0.0003	0.000	0.000
UnknownC4s	U4	0.0001	0.0003	0.000	0.000
n-Pentane	P5	0.1403	0.5546	0.051	0.051
t-Butanol	X4	0.0001	0.0004	0.000	0.000
2,2-Dimethylbutane	I6	0.0064	0.0302	0.003	0.003
Cyclopentane	N5	0.0081	0.0311	0.002	0.002
2,3-Dimethylbutane	I6	0.0121	0.0571	0.005	0.005
2-Methylpentane	I6	0.0542	0.2559	0.022	0.022
3-Methylpentane	I6	0.0303	0.1430	0.012	0.012
UnknownC5s	U5	0.0001	0.0004	0.000	0.000
n-Hexane	P6	0.0739	0.3489	0.030	0.030
2,2-Dimethylpentane	I7	0.0008	0.0044	0.000	0.000
Methylcyclopentane	N6	0.0378	0.1743	0.013	0.013
2,4-Dimethylpentane	I7	0.0033	0.0181	0.002	0.002
2,2,3-Trimethylbutane	I7	0.0008	0.0044	0.000	0.000
Benzene	A6	0.0183	0.0783	0.005	0.005

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3,3-Dimethylpentane	I7	0.0010	0.0055	0.000	0.000
Cyclohexane	N6	0.0425	0.1960	0.014	0.014
2-Methylhexane	I7	0.0092	0.0505	0.004	0.004
2,3-Dimethylpentane	I7	0.0068	0.0373	0.003	0.003
1,1-Dimethylcyclopentane	N7	0.0029	0.0156	0.001	0.001
3-Methylhexane	I7	0.0106	0.0582	0.005	0.005
1c,3-Dimethylcyclopentane	N7	0.0043	0.0231	0.002	0.002
1t,3-Dimethylcyclopentane	N7	0.0037	0.0199	0.002	0.002
3-Ethylpentane	I7	0.0009	0.0049	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0054	0.0290	0.002	0.002
2,2,4-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
n-Heptane	P7	0.0166	0.0911	0.008	0.008
1c,2-Dimethylcyclopentane	N7	0.0002	0.0011	0.000	0.000
Methylcyclohexane	N7	0.0319	0.1716	0.013	0.013
2,2-Dimethylhexane	I8	0.0004	0.0025	0.000	0.000
1,1,3-Trimethylcyclopentane	N7	0.0002	0.0012	0.000	0.000
Ethylcyclopentane	N7	0.0008	0.0043	0.000	0.000
2,5-Dimethylhexane	I8	0.0002	0.0013	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0002	0.0013	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0002	0.0012	0.000	0.000
Toluene	A7	0.0083	0.0419	0.003	0.003
2,3-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
2-Methylheptane	I8	0.0001	0.0006	0.000	0.000
1c,2t,3-Trimethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
TOTAL		100.00000	100.00000	2.6346	2.6487

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0183	0.0783
TOLUENE	0.0083	0.0419
ETHYLBENZENE	0.0000	0.0000
XYLENES	0.0000	0.0000
TOTAL BTEX	0.0266	0.1202

**(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 :	1014.7 /scf	1020.2 /scf
	NET WET REAL :	997.0 /scf	1002.5 /scf
HHV	GROSS DRY REAL :	1122.6 /scf	1128.7 /scf
	GROSS WET REAL :	1103.0 /scf	1109.1 /scf
	NET HEATING VALUE (60 °F ideal reaction):		21111.6 Btu/lbm
	GROSS HEATING VALUE (60°F ideal reaction):		23358.5 Btu/lbm
	RELATIVE DENSITY (AIR=1):		0.6298
	DENSITY		0.04809 lb/scf
	COMPRESSIBILITY FACTOR :		0.9974
	REGULAR WOBBE INDEX		1415.3

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

Net Dry Ideal BTU	4477.5 /scf	Relative Density - SG (Air=1)	3.0725	***C6+factors***
Gross Dry Ideal BTU	4814.6 /scf	**Z** Compressiblity Factor	0.99061	0.99013
Net Dry Ideal BTU	19205.8 /lb	Density Factor	234.497 lbm/1000 ft3	
Gross Dry Ideal BTU	20653.9 /lb	Molar Mass or MW	88.987 g/mol	
		Volume Liquid Ideal gas	0.149 scf/gal	25.5

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.