EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY:	**05-045-12096**	NAME/DESCRIP :	**300115174 07D FEDERAL 7-11D**
LEASE #:	**COC-23443**		**CASING**
FIELD/AREA:			

PROJECT NO. :	**202501101**	ANALYSIS NO. :	**01**
COMPANY NAME :	**QB ENERGY OPERATING, LLC**	ANALYSIS DATE:	FEBRUARY 01, 2025 14:18
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	JANUARY 15, 2025
CUSTOMER REF:		TO:	
PRODUCER :	QB ENERGY OPERATING, LLC	EFFECTIVE DATE:	

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

SAMPLE CYCLE:			SAMPLE TYPE:	SPOT
SAMPLE PRES. :	375	psig	PROBE :	NO
FLOW PRES. :		psig	CYLINDER NO. :	ECA-733
LAB PRES:		psig	SAMPLED BY :	MIKE KELLEY
SAMPLE TEMP. :	20	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	0.0479	0.0888	0.0060	0.0060
HELIUM	0.00	0.00	---	---
HYDROGEN	0.07	0.01	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.11	0.18	---	---
CARBON DIOXIDE	0.01	0.03	---	---
METHANE	93.6564	86.8752	---	---
ETHANE	4.4543	7.7443	1.1871	1.1935
PROPANE	1.0240	2.6108	0.2808	0.2823
I-BUTANE	0.2256	0.7581	0.0739	0.0743
N-BUTANE	0.1608	0.5403	0.0510	0.0512
I-PENTANE	0.0755	0.3148	0.0270	0.0271
N-PENTANE	0.0449	0.1873	0.0160	0.0161
HEXANES PLUS	0.1206	0.6604	0.0480	0.0480
TOTALS	100.00000	100.00000	1.6898	1.6985

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0000	0.0000
TOLUENE	0.0001	0.0005
ETHYLBENZENE	0.0001	0.0006
XYLENES	0.0001	0.0006
TOTAL BTEX	0.0003	0.0017

**(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 :	968.7	/scf	974.0	/scf
	NET WET REAL :	951.8	/scf	957.1	/scf
HHV	GROSS DRY REAL :	1073.4	/scf	1079.3	/scf
	GROSS WET REAL :	1054.6	/scf	1060.5	/scf
	NET HEATING VALUE (60 °F ideal reaction):			21283.6	Btu/lbm
	GROSS HEATING VALUE (60°F ideal reaction):			23585.9	Btu/lbm
	RELATIVE DENSITY (AIR=1):			0.5964	
	DENSITY			0.04557	lbm/scf
	COMPRESSIBILITY FACTOR :			0.9977	
	REGULAR WOBBE INDEX			1391.1	

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.

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EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	202501101	ANALYSIS NO. :	01
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	FEBRUARY 01, 2025 14:18
ACCOUNT NO. :		SAMPLE DATE :	JANUARY 15, 2025
PRODUCER :	QB ENERGY OPERATING, LLC	CYLINDER NO. :	ECA-733
LEASE NO. :	COC-23443	SAMPLED BY :	MIKE KELLEY
NAME/DESCRIP :	300115174 07D FEDERAL 7-11D CASING		
FIELD DATA		SAMPLE TEMP. :	20
SAMPLE PRES. :	375	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm mol*		
COMMENTS :	*SPOT* *NO PROBE*		

Componet	Mole %	Wt %
Helium	0.00	0.00
Hydrogen	0.07	0.01
Carbon Dioxide	0.01	0.03
Nitrogen	0.11	0.18
Methane	93.6564	86.8752
Ethane	4.4543	7.7443
Propane	1.0240	2.6108
Isobutane	0.2256	0.7581
n-Butane	0.1608	0.5403
Isopentane	0.0746	0.3112
n-Pentane	0.0449	0.1873
Cyclopentane	0.0009	0.0036
n-Hexane	0.0179	0.0892
Cyclohexane	0.0053	0.0258
Other Hexanes	0.0406	0.2017
Heptanes	0.0289	0.1667
Methylcyclohexane	0.0109	0.0619
2,2,4 Trimethylpentane	0.0001	0.0006
Benzene	0.0000	0.0000
Toluene	0.0001	0.0005
Ethylbenzene	0.0001	0.0006
Xylenes	0.0001	0.0006
C8+ Heavies	0.0166	0.1128
Subtotal	99.95210	99.91120
Oxygen/Argon	0.00	0.00
Alcohols	0.0479	0.0888
Total	100.00000	100.00000

Calculated Values BTU @ **14.65**		**Total Sample**	**C6+ Fraction**	**C8+ Fraction**	**C10+ Fraction**	
LHV	Net Dry Real:	968.7	4829.0	5930.2	6661.4	**Btu/scf**
	Net Wet Real:	951.8	4744.6	5826.5	6545.0	**Btu/scf**
HHV	Gross Dry Real:	1073.4	5205.3	6388.0	7129.7	**Btu/scf**
	Gross Wet Real:	1054.6	5114.3	6276.3	7005.1	**Btu/scf**
Other Calculated Values						
Regualr Wobbe Index*		1391.1	2860.3	3164.3	3255.7	**Btu/scf**
Net Heating Value (60 °F ideal reaction):		21283.6	19396.9	19633.5	18817.9	**Btu/lbm**
Gross Heating Value (60°F ideal reaction):		23585.9	20908.0	21150.1	20151.7	**Btu/lbm**
Molar Mass (MW):		17.29349	94.867	118.19	139.596	**g/mol**
Relative Density (AIR=1):		0.5964	3.2753	4.0808	4.8199	**SG**
Density:		0.04557	0.25000	0.31144	0.36786	**lbm/scf**
Compressiblity Factor:		0.9977	0.9914	0.9975	0.9994	**Z**
Liquid Volume real gas @:	**14.65**	17.4931	0.0478	0.005	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.

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EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PRIMARY DB KEY:	**05-045-12096**	NAME/DESCRIP :	**300115174 07D FEDERAL 7-11D**
LEASE #:	**COC-23443**		**CASING**
FIELD/AREA:			
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PRODUCER :	QB ENERGY OPERATING, LLC	EFFECTIVE DATE:	
FIELD DATA			
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SAMPLE PRES. :	375 psig	PROBE :	NO
FLOW PRES. :	psig	CYLINDER NO. :	ECA-733
LAB PRES:	psig	SAMPLED BY :	MIKE KELLEY
SAMPLE TEMP. :	20 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**
Hydrogen	---	0.07	0.01	---	---
Nitrogen	---	0.11	0.18	---	---
Carbon Dioxide	---	0.01	0.03	---	---
Methane	P1	93.6564	86.8752	---	---
Ethane	P2	4.4543	7.7443	1.187	1.194
Propane	P3	1.0240	2.6108	0.281	0.282
i-Butane	I4	0.2256	0.7581	0.074	0.074
Methanol	X1	0.0479	0.0888	0.006	0.006
n-Butane	P4	0.1607	0.5400	0.051	0.051
2,2-Dimethylpropane	I5	0.0027	0.0113	0.001	0.001
i-Pentane	I5	0.0719	0.2999	0.026	0.026
UnknownC4s	U4	0.0001	0.0003	0.000	0.000
n-Pentane	P5	0.0449	0.1873	0.016	0.016
2,2-Dimethylbutane	I6	0.0036	0.0179	0.001	0.001
Cyclopentane	N5	0.0009	0.0036	0.000	0.000
2,3-Dimethylbutane	I6	0.0046	0.0229	0.002	0.002
2-Methylpentane	I6	0.0183	0.0912	0.008	0.008
3-Methylpentane	I6	0.0092	0.0459	0.004	0.004
n-Hexane	P6	0.0179	0.0892	0.007	0.007
2,2-Dimethylpentane	I7	0.0008	0.0046	0.000	0.000
Methylcyclopentane	N6	0.0049	0.0238	0.002	0.002
2,4-Dimethylpentane	I7	0.0014	0.0081	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0003	0.0017	0.000	0.000
3,3-Dimethylpentane	I7	0.0005	0.0029	0.000	0.000
Cyclohexane	N6	0.0053	0.0258	0.002	0.002
2-Methylhexane	I7	0.0060	0.0347	0.003	0.003
2,3-Dimethylpentane	I7	0.0012	0.0069	0.001	0.001
1,1-Dimethylcyclopentane	N7	0.0010	0.0057	0.000	0.000

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3-Methylhexane	I7	0.0048	0.0278	0.002	0.002
1c,3-Dimethylcyclopentane	N7	0.0011	0.0062	0.001	0.001
1t,3-Dimethylcyclopentane	N7	0.0010	0.0057	0.000	0.000
3-Ethylpentane	I7	0.0002	0.0012	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0015	0.0085	0.001	0.001
2,2,4-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
n-Heptane	P7	0.0086	0.0498	0.004	0.004
1c,2-Dimethylcyclopentane	N7	0.0001	0.0006	0.000	0.000
Methylcyclohexane	N7	0.0109	0.0619	0.004	0.004
2,2-Dimethylhexane	I8	0.0005	0.0033	0.000	0.000
1,1,3-Trimethylcyclopentane	N7	0.0001	0.0006	0.000	0.000
Ethylcyclopentane	N7	0.0003	0.0017	0.000	0.000
2,5-Dimethylhexane	I8	0.0005	0.0033	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0005	0.0033	0.000	0.000
2,4-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0003	0.0020	0.000	0.000
3,3-Dimethylhexane	I8	0.0002	0.0013	0.000	0.000
Toluene	A7	0.0001	0.0005	0.000	0.000
2,3-Dimethylhexane	I8	0.0003	0.0020	0.000	0.000
2-Methylheptane	I8	0.0016	0.0106	0.001	0.001
4-Methylheptane	I8	0.0005	0.0033	0.000	0.000
3-Methyl-3-ethylpentane	I8	0.0001	0.0006	0.000	0.000
3-Methylheptane	I8	0.0012	0.0079	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0012	0.0078	0.001	0.001
3-Ethylhexane	I8	0.0001	0.0006	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0005	0.0032	0.000	0.000
1,1-Dimethylcyclohexane	N8	0.0002	0.0013	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0003	0.0020	0.000	0.000
n-Octane	P8	0.0026	0.0172	0.001	0.001
1c,4-Dimethylcyclohexane	N8	0.0002	0.0013	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
2,2-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0002	0.0014	0.000	0.000
Ethylcyclohexane	N8	0.0003	0.0020	0.000	0.000
n-Propylcyclopentane	N8	0.0001	0.0006	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
2,5-Dimethylheptane	I9	0.0003	0.0022	0.000	0.000
3,3-Dimethylheptane	I9	0.0001	0.0007	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
Ethylbenzene	I8	0.0001	0.0006	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0001	0.0006	0.000	0.000
4-Ethylheptane	I9	0.0001	0.0007	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	0.0007	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	0.0004	0.0029	0.000	0.000
i-Butylcyclopentane	N9	0.0001	0.0007	0.000	0.000
n-Nonane	P9	0.0019	0.0141	0.001	0.001
1,1-Methylethylcyclohexane	N9	0.0001	0.0007	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
1,3,5-Trimethylbenzene	A9	0.0001	0.0007	0.000	0.000
t-Butylbenzene	A10	0.0001	0.0007	0.000	0.000
UnknownC9s	U9	0.0002	0.0015	0.000	0.000
n-Decane	P10	0.0001	0.0008	0.000	0.000
TOTAL		100.00000	100.00000	1.6898	1.6985

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0000	0.0000
TOLUENE	0.0001	0.0005
ETHYLBENZENE	0.0001	0.0006
XYLENES	0.0001	0.0006
TOTAL BTEX	0.0003	0.0017

*(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 :	968.7 /scf	974.0 /scf
	NET WET REAL :	951.8 /scf	957.1 /scf
HHV	GROSS DRY REAL :	1073.4 /scf	1079.3 /scf
	GROSS WET REAL :	1054.6 /scf	1060.5 /scf
	NET HEATING VALUE (60 °F ideal reaction):		21283.6 Btu/lbm
	GROSS HEATING VALUE (60°F ideal reaction):		23585.9 Btu/lbm
	RELATIVE DENSITY (AIR=1):		0.5964
	DENSITY		0.04557 lb/scf
	COMPRESSIBILITY FACTOR :		0.9977
	REGULAR WOBBE INDEX		1391.1

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

Net Dry Ideal BTU	4802.4 /scf	Relative Density - SG (Air=1)	3.2753	***C6+factors***
Gross Dry Ideal BTU	5176.6 /scf	**Z** Compressiblity Factor	0.99137	0.99061
Net Dry Ideal BTU	19396.9 /lb	Density Factor	249.998 lbm/1000 ft3	
Gross Dry Ideal BTU	20908 /lb	Molar Mass or MW	94.867 g/mol	
		Volume Liquid Ideal gas	0.048 scf/gal	23.1

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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