



EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY: 05-045-14060	NAME/DESCRIP: 300115119 20 PAD HYRUP 11-41A
LEASE #: _____	BRAIDEN HEAD
FIELD/AREA: _____	
PROJECT NO. : 202410132	ANALYSIS NO. : 01
COMPANY NAME : QB ENERGY OPERATING, LLC	ANALYSIS DATE: OCTOBER 31, 2024 07:37
OFFICE / BRANCH: PARACHUTE, CO	SAMPLE DATE : OCTOBER 17, 2024
CUSTOMER REF: _____	TO: _____
PRODUCER : _____	EFFECTIVE DATE: _____

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

SAMPLE CYCLE: _____	SAMPLE TYPE: SPOT
SAMPLE PRES. : 70 psig	PROBE : NO
FLOW PRES. : _____ psig	CYLINDER NO. : ECA-813
LAB PRES: _____ psig	SAMPLED BY : MIKE KELLEY
SAMPLE TEMP. : 68 °f	SAMPLING COMPANY: QB ENERGY
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	0.0006	0.0013	0.0000	0.0000
HELIUM	0.00	0.00	---	---
HYDROGEN	0.00	0.00	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.10	0.16	---	---
CARBON DIOXIDE	0.01	0.03	---	---
METHANE	94.2851	87.7244	---	---
ETHANE	3.9130	6.8239	1.0432	1.0489
PROPANE	1.0050	2.5702	0.2758	0.2773
I-BUTANE	0.2100	0.7079	0.0689	0.0693
N-BUTANE	0.2071	0.6981	0.0649	0.0653
I-PENTANE	0.0867	0.3624	0.0320	0.0321
N-PENTANE	0.0571	0.2389	0.0210	0.0211
HEXANES PLUS	0.1254	0.6829	0.0490	0.0490
<u>TOTALS</u>	<u>100.00000</u>	<u>100.00000</u>	<u>1.5548</u>	<u>1.5630</u>

<u>BTEX COMPONENTS</u>	<u>MOLE%</u>	<u>WT%</u>
BENZENE	0.0021	0.0095
TOLUENE	0.0002	0.0010
ETHYLBENZENE	0.0000	0.0000
XYLENES	0.0000	0.0000
<u>TOTAL BTEX</u>	<u>0.0023</u>	<u>0.0105</u>

	<u>CALCULATED VALUES**</u>	
	<u>14.65</u>	<u>14.73</u>
LHV NET DRY REAL :	966.6 /scf	971.9 /scf
NET WET REAL :	949.7 /scf	955.0 /scf
HHV GROSS DRY REAL :	1071.1 /scf	1077.0 /scf
GROSS WET REAL :	1052.4 /scf	1058.3 /scf
NET HEATING VALUE (60 °F ideal reaction):		21301.9 Btu/lbm
GROSS HEATING VALUE (60°F ideal reaction):		23607.3 Btu/lbm
RELATIVE DENSITY (AIR=1):		0.5949
DENSITY		0.04543 lbm/scf
COMPRESSIBILITY FACTOR :		0.9977
REGULAR WOBBE INDEX		1389.9

*(DETAILED HYDROCARBON ANALYSIS/NJ 1993)

Mod ASTM D6730, GPA 2261 & GPA 2286.

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

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

PROJECT NO. :	202410132	ANALYSIS NO. :	01
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	OCTOBER 31, 2024 07:37
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 17, 2024
PRODUCER :		CYLINDER NO. :	ECA-813
LEASE NO. :		SAMPLED BY :	MIKE KELLEY
NAME/DESCRIP :	300115119 2O PAD HYRUP 11-41A BRAIDEN HEAD		

FIELD DATA		SAMPLE TEMP. :	68
SAMPLE PRES. :	70	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	—		
COMMENTS :	<i>SPOT</i>		<i>NO PROBE</i>

<u>Componet</u>	<u>Mole %</u>	<u>Wt %</u>
Helium	0.00	0.00
Hydrogen	0.00	0.00
Carbon Dioxide	0.01	0.03
Nitrogen	0.10	0.16
Methane	94.2851	87.7244
Ethane	3.9130	6.8239
Propane	1.0050	2.5702
Isobutane	0.2100	0.7079
n-Butane	0.2071	0.6981
Isopentane	0.0842	0.3523
n-Pentane	0.0571	0.2389
Cyclopentane	0.0025	0.0101
n-Hexane	0.0219	0.1094
Cyclohexane	0.0085	0.0415
Other Hexanes	0.0454	0.2257
Heptanes	0.0247	0.1430
Methylcyclohexane	0.0107	0.0610
2,2,4 Trimethylpentane	0.0000	0.0000
Benzene	0.0021	0.0095
Toluene	0.0002	0.0010
Ethylbenzene	0.0000	0.0000
Xylenes	0.0000	0.0000
C8+ Heavies	0.0119	0.0918
<u>Subtotal</u>	<u>99.99940</u>	<u>99.99870</u>
Oxygen/Argon	0.00	0.00
Alcohols	0.0006	0.0013
<u>Total</u>	<u>100.00000</u>	<u>100.00000</u>

	<u>Total</u>	<u>C6+</u>	<u>C8+</u>	<u>C10+</u>
Calculated Values BTU @ <u>14.65</u>	Sample	Fraction	Fraction	Fraction
LHV Net Dry Real:	966.6	4783.3	6783.6	9539.1 Btu/scf
Net Wet Real:	949.7	4699.7	6665.0	9372.3 Btu/scf
HHV Gross Dry Real:	1071.1	5151.8	7302.6	10249.9 Btu/scf
Gross Wet Real:	1052.4	5061.7	7174.9	10070.7 Btu/scf
Other Calculated Values				
Regualr Wobbe Index*	1389.9	2842.8	3391.9	4027.0 Btu/scf
Net Heating Value (60 °F ideal reaction):	21301.9	19323.5	19477.4	18698.1 Btu/lbm
Gross Heating Value (60°F ideal reaction):	23607.3	20812.8	20970.7	20090.8 Btu/lbm
Molar Mass (MW):	17.24214	94.034	134.621	188.799 g/mol
Relative Density (AIR=1):	0.5949	3.2465	4.6477	6.5188 SG
Density:	0.04543	0.24781	0.35473	0.49752 lbm/scf
Compressibility Factor:	0.9977	0.9912	0.9982	1.0000 Z
Liquid Volume real gas @:	<u>14.65</u>	17.4572	0.0488	0.002 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: **05-045-14060** NAME/DESCRIP : **300115119 20 PAD HYRUP 11-41A**
 LEASE #: **BRAIDEN HEAD**
 FIELD/AREA:
 PROJECT NO. : **202410132** ANALYSIS NO. : **01**
 COMPANY NAME : **QB ENERGY OPERATING, LLC** ANALYSIS DATE: **OCTOBER 31, 2024 07:37**
 OFFICE / BRANCH: **PARACHUTE, CO** SAMPLE DATE : **OCTOBER 17, 2024**
 CUSTOMER REF: **TO:**
 PRODUCER : **EFFECTIVE DATE:**

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

SAMPLE CYCLE: SAMPLE TYPE: **SPOT**
 SAMPLE PRES. : **70** psig PROBE : **NO**
 FLOW PRES. : psig CYLINDER NO. : **ECA-813**
 LAB PRES: psig SAMPLED BY : **MIKE KELLEY**
 SAMPLE TEMP. : **68** °f SAMPLING COMPANY: **QB ENERGY**
 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
Nitrogen	---	0.10	0.16	---	---
Carbon Dioxide	---	0.01	0.03	---	---
Methane	P1	94.2851	87.7244	---	---
Ethane	P2	3.9130	6.8239	1.043	1.049
Propane	P3	1.0050	2.5702	0.276	0.277
i-Butane	I4	0.2100	0.7079	0.069	0.069
Methanol	X1	0.0005	0.0009	0.000	0.000
n-Butane	P4	0.2070	0.6978	0.065	0.065
2,2-Dimethylpropane	I5	0.0032	0.0134	0.001	0.001
i-Pentane	I5	0.0810	0.3389	0.030	0.030
UnknownC4s	U4	0.0001	0.0003	0.000	0.000
n-Pentane	P5	0.0570	0.2385	0.021	0.021
t-Butanol	X4	0.0001	0.0004	0.000	0.000
2,2-Dimethylbutane	I6	0.0028	0.0140	0.001	0.001
Cyclopentane	N5	0.0025	0.0101	0.001	0.001
2,3-Dimethylbutane	I6	0.0043	0.0215	0.002	0.002
2-Methylpentane	I6	0.0185	0.0924	0.008	0.008
3-Methylpentane	I6	0.0098	0.0490	0.004	0.004
UnknownC5s	U5	0.0001	0.0004	0.000	0.000
n-Hexane	P6	0.0219	0.1094	0.009	0.009
2,2-Dimethylpentane	I7	0.0004	0.0023	0.000	0.000
Methylcyclopentane	N6	0.0100	0.0488	0.004	0.004
2,4-Dimethylpentane	I7	0.0011	0.0064	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0003	0.0017	0.000	0.000
Benzene	A6	0.0021	0.0095	0.001	0.001
3,3-Dimethylpentane	I7	0.0003	0.0017	0.000	0.000
Cyclohexane	N6	0.0085	0.0415	0.003	0.003

2-Methylhexane	I7	0.0045	0.0262	0.002	0.002
2,3-Dimethylpentane	I7	0.0010	0.0058	0.000	0.000
1,1-Dimethylcyclopentane	N7	0.0008	0.0046	0.000	0.000
3-Methylhexane	I7	0.0039	0.0227	0.002	0.002
1c,3-Dimethylcyclopentane	N7	0.0012	0.0068	0.001	0.001
1t,3-Dimethylcyclopentane	N7	0.0010	0.0057	0.000	0.000
3-Ethylpentane	I7	0.0001	0.0006	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0017	0.0097	0.001	0.001
n-Heptane	P7	0.0080	0.0465	0.004	0.004
1c,2-Dimethylcyclopentane	N7	0.0001	0.0006	0.000	0.000
Methylcyclohexane	N7	0.0107	0.0610	0.004	0.004
2,2-Dimethylhexane	I8	0.0004	0.0027	0.000	0.000
Ethylcyclopentane	N7	0.0003	0.0017	0.000	0.000
2,5-Dimethylhexane	I8	0.0004	0.0027	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0003	0.0020	0.000	0.000
2,4-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0002	0.0013	0.000	0.000
3,3-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
Toluene	A7	0.0002	0.0010	0.000	0.000
2,3-Dimethylhexane	I8	0.0002	0.0013	0.000	0.000
2-Methylheptane	I8	0.0012	0.0079	0.001	0.001
4-Methylheptane	I8	0.0003	0.0020	0.000	0.000
3-Methyl-3-ethylpentane	I8	0.0001	0.0006	0.000	0.000
3-Methylheptane	I8	0.0007	0.0046	0.000	0.000
1c,2t,3-Trimethylcyclopentane	N8	0.0009	0.0059	0.000	0.000
3-Ethylhexane	I8	0.0001	0.0006	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0004	0.0026	0.000	0.000
1,1-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
3c-Ethylmethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0004	0.0026	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0002	0.0013	0.000	0.000
n-Octane	P8	0.0014	0.0093	0.001	0.001
1c,4-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
2,2-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
Ethylcyclohexane	N8	0.0002	0.0013	0.000	0.000
n-Propylcyclopentane	N8	0.0001	0.0006	0.000	0.000
2,5-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
4-Methyloctane	I9	0.0001	0.0007	0.000	0.000
2-Methyloctane	I9	0.0001	0.0007	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	0.0001	0.0007	0.000	0.000
n-Nonane	P9	0.0001	0.0007	0.000	0.000
3-Methylnonane	I10	0.0001	0.0008	0.000	0.000
t-Butylbenzene	A10	0.0001	0.0007	0.000	0.000
n-Decane	P10	0.0001	0.0008	0.000	0.000
1,4-Diethylbenzene	A10	0.0001	0.0007	0.000	0.000
UnknownC10s	U10	0.0001	0.0008	0.000	0.000
n-Undecane	P11	0.0001	0.0009	0.000	0.000
UnknownC11s	U11	0.0001	0.0009	0.000	0.000
n-Dodecane	P12	0.0001	0.0010	0.000	0.000
1,4-Methyl-n-pentylbenzene	A12	0.0001	0.0009	0.000	0.000
n-Hexylbenzene	A12	0.0001	0.0009	0.000	0.000
1,2,3,4,5-Pentamethylbenzene	A13	0.0001	0.0009	0.000	0.000
2-Methylnaphthalene	A11	0.0001	0.0008	0.000	0.000
UnknownC12s	U12	0.0001	0.0009	0.000	0.000
n-Tridecane	P13	0.0002	0.0021	0.000	0.000
n-Tetradecane	P14	0.0002	0.0023	0.000	0.000
UnknownC14s	U14	0.0003	0.0035	0.000	0.000
n-Pentadecane	P15	0.0001	0.0012	0.000	0.000
UnknownC15s	U15	0.0003	0.0037	0.000	0.000
n-Hexadecane	P16	0.0001	0.0013	0.000	0.000

UnknownC16s	U16	0.0003	0.0039	0.000	0.000
n-Heptadecane	P17	0.0001	0.0014	0.000	0.000
UnknownC17s	U17	0.0002	0.0028	0.000	0.000
UnknownC18s	U18	0.0001	0.0014	0.000	0.000
TOTAL		100.00000	100.00000	1.5548	1.5630

CALCULATED VALUES**

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.65	14.73
BENZENE	0.0021	0.0095	LHV NET DRY REAL :	966.6 /scf	971.9 /scf
TOLUENE	0.0002	0.0010	NET WET REAL :	949.7 /scf	955.0 /scf
ETHYLBENZENE	0.0000	0.0000	HHV GROSS DRY REAL :	1071.1 /scf	1077.0 /scf
XYLENES	0.0000	0.0000	GROSS WET REAL :	1052.4 /scf	1058.3 /scf
TOTAL BTEX	0.0023	0.0105	NET HEATING VALUE (60 °F ideal reaction):		21301.9 Btu/lbm
			GROSS HEATING VALUE (60°F ideal reaction):		23607.3 Btu/lbm
			RELATIVE DENSITY (AIR=1):		0.5949
			DENSITY		0.04543 lb/scf
			COMPRESSIBILITY FACTOR :		0.9977
			REGULAR WOBBE INDEX		1389.9

*(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>4755.9</u> /scf	Relative Density - SG (Air=1)	<u>3.2465</u>	C6+factors
Gross Dry Ideal BTU	<u>5122.2</u> /scf	Z Compressibility Factor	<u>0.99115</u>	<u>0.99046</u>
Net Dry Ideal BTU	<u>19323.5</u> /lb	Density Factor	<u>247.811</u> lbm/1000 ft3	
Gross Dry Ideal BTU	<u>20812.8</u> /lb	Molar Mass or MW	<u>94.034</u> g/mol	
		Volume Liquid Ideal gas	<u>0.049</u> scf/gal	<u>23.7</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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