

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY: **05-045-21942** NAME/DESCRIP : **300108685 HMU 6-12DD (J6SEB)**
 LEASE #: **COC-55972E** **BRADEN HEAD**
 FIELD/AREA:

PROJECT NO. : **202504078** ANALYSIS NO. : **02**
 COMPANY NAME : **QB ENERGY OPERATING, LLC** ANALYSIS DATE: **APRIL 27, 2025 08:35**
 OFFICE / BRANCH: **PARACHUTE, CO** SAMPLE DATE : **APRIL 11, 2025**
 CUSTOMER REF: TO:
 PRODUCER : **QB ENERGY OPERATING LLC** EFFECTIVE DATE:

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

SAMPLE CYCLE: SAMPLE TYPE: SPOT
 SAMPLE PRES. : 162 psig PROBE :
 FLOW PRES. : psig CYLINDER NO. : ECA-745
 LAB PRES: psig SAMPLED BY : MIKE KELLEY
 SAMPLE TEMP. : 42 °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	MOLE %	MASS %	GPM @	
			14.65	14.73
ALCOHOLS	0.0003	0.0006	0.0000	0.0000
HELIUM	0.01	0.00	---	---
HYDROGEN	0.00	0.00	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.23	0.37	---	---
CARBON DIOXIDE	0.12	0.30	---	---
METHANE	93.0598	84.7782	---	---
ETHANE	4.3965	7.5072	1.1721	1.1785
PROPANE	1.2077	3.0241	0.3318	0.3336
I-BUTANE	0.2641	0.8717	0.0859	0.0864
N-BUTANE	0.2382	0.7862	0.0749	0.0754
I-PENTANE	0.1141	0.4670	0.0410	0.0412
N-PENTANE	0.0658	0.2696	0.0240	0.0241
HEXANES PLUS	0.2935	1.6254	0.1190	0.1193
TOTALS	100.0000	100.0000	1.8487	1.8585

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0035	0.0155
TOLUENE	0.0053	0.0277
ETHYLBENZENE	0.0002	0.0012
XYLENES	0.0025	0.0150
TOTAL BTEX	0.0115	0.0594

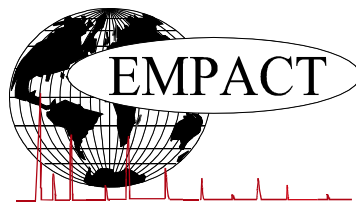
	CALCULATED VALUES**	
	14.65	14.73
BTU @		
LHV NET DRY REAL :	980.1 /scf	985.4 /scf
NET WET REAL :	963.0 /scf	968.3 /scf
HHV GROSS DRY REAL :	1085.1 /scf	1091.0 /scf
GROSS WET REAL :	1066.1 /scf	1072.0 /scf
NET HEATING VALUE (60 °F ideal reaction):		21157.1 Btu/lbm
GROSS HEATING VALUE (60°F ideal reaction):		23432.8 Btu/lbm
RELATIVE DENSITY (AIR=1):		0.6071
DENSITY		0.04640 lbm/scf
COMPRESSIBILITY FACTOR :		0.9976
REGULAR WOBBE INDEX		1393.7

*(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. :	202504078	ANALYSIS NO. :	02
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	APRIL 27, 2025 08:35
ACCOUNT NO. :		SAMPLE DATE :	APRIL 11, 2025
PRODUCER :	QB ENERGY OPERATING LLC	CYLINDER NO. :	ECA-745
LEASE NO. :	COC-55972E	SAMPLED BY :	MIKE KELLEY
NAME/DESCRIP :	300108685 HMU 6-12DD (J6SEB) BRADEN HEAD		

FIELD DATA

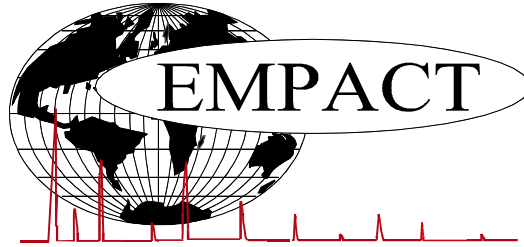
SAMPLE PRES. :	162	SAMPLE TEMP. :	42
H2S BY STAIN TUBE:	— ppm mol	AMBIENT TEMP.:	
COMMENTS :	SPOT		

Componet	Mole %	Wt %
Helium	0.01	0.00
Hydrogen	0.00	0.00
Carbon Dioxide	0.12	0.30
Nitrogen	0.23	0.37
Methane	93.0598	84.7782
Ethane	4.3965	7.5072
Propane	1.2077	3.0241
Isobutane	0.2641	0.8717
n-Butane	0.2382	0.7862
Isopentane	0.1108	0.4539
n-Pentane	0.0658	0.2696
Cyclopentane	0.0033	0.0131
n-Hexane	0.0314	0.1537
Cyclohexane	0.0181	0.0865
Other Hexanes	0.0718	0.3493
Heptanes	0.0584	0.3310
Methylcyclohexane	0.0392	0.2186
2,2,4 Trimethylpentane	0.0001	0.0006
Benzene	0.0035	0.0155
Toluene	0.0053	0.0277
Ethylbenzene	0.0002	0.0012
Xylenes	0.0025	0.0150
C8+ Heavies	0.0630	0.4263
Subtotal	99.99970	99.99940
Oxygen/Argon	0.00	0.00
Alcohols	0.0003	0.0006
Total	100.00000	100.00000

Calculated Values BTU @	Total	Sample	C6+ Fraction	C8+ Fraction	C10+ Fraction	
LHV Net Dry Real:	980.1	4925.4	5945.3	6922.7	6922.7	Btu/scf
Net Wet Real:	963.0	4839.3	5841.4	6801.7	6801.7	Btu/scf
HHV Gross Dry Real:	1085.1	5299.3	6394.6	7430.7	7430.7	Btu/scf
Gross Wet Real:	1066.1	5206.7	6282.8	7300.8	7300.8	Btu/scf
Other Calculated Values						
Regualr Wobbe Index*	1393.7	2876.6	3159.9	3379.0	3379.0	Btu/scf
Net Heating Value (60 °F ideal reaction):	21157.1	19363.0	19658.1	19116.4	19116.4	Btu/lbm
Gross Heating Value (60°F ideal reaction):	23432.8	20831.8	21147.5	20520.8	20520.8	Btu/lbm
Molar Mass (MW):	17.60945	97.591	118.84	140.784	140.784	g/mol
Relative Density (AIR=1):	0.6071	3.3691	4.1032	4.8610	4.8610	SG
Density:	0.04640	0.25716	0.31315	0.37099	0.37099	lbm/scf
Compressibility Factor:	0.9976	0.9932	0.9978	0.9994	0.9994	Z
Liquid Volume real gas @:	14.65	17.5768	0.1186	0.0269	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: **05-045-21942** NAME/DESCRIP : **300108685 HMU 6-12DD (J6SEB)**
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 FIELD/AREA:

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*****FIELD DATA*****
 SAMPLE CYCLE: SAMPLE TYPE: **SPOT**
 SAMPLE PRES. : **162** psig PROBE :
 FLOW PRES. : psig CYLINDER NO. : **ECA-745**
 LAB PRES: psig SAMPLED BY : **MIKE KELLEY**
 SAMPLE TEMP. : **42** °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
Helium	---	0.01	0.00	---	---
Nitrogen	---	0.23	0.37	---	---
Carbon Dioxide	---	0.12	0.30	---	---
Methane	P1	93.0598	84.7782	---	---
Ethane	P2	4.3965	7.5072	1.172	1.179
Propane	P3	1.2077	3.0241	0.332	0.334
i-Butane	I4	0.2641	0.8717	0.086	0.086
Methanol	X1	0.0003	0.0006	0.000	0.000
n-Butane	P4	0.2382	0.7862	0.075	0.075
2,2-Dimethylpropane	I5	0.0032	0.0131	0.001	0.001
i-Pentane	I5	0.1076	0.4408	0.039	0.039
n-Pentane	P5	0.0658	0.2696	0.024	0.024
2,2-Dimethylbutane	I6	0.0040	0.0196	0.002	0.002
Cyclopentane	N5	0.0033	0.0131	0.001	0.001
2,3-Dimethylbutane	I6	0.0071	0.0347	0.003	0.003
2-Methylpentane	I6	0.0274	0.1341	0.011	0.011
3-Methylpentane	I6	0.0156	0.0763	0.006	0.006
n-Hexane	P6	0.0314	0.1537	0.013	0.013
2,2-Dimethylpentane	I7	0.0007	0.0040	0.000	0.000
Methylcyclopentane	N6	0.0177	0.0846	0.006	0.006
2,4-Dimethylpentane	I7	0.0020	0.0114	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0005	0.0028	0.000	0.000
Benzene	A6	0.0035	0.0155	0.001	0.001
3,3-Dimethylpentane	I7	0.0007	0.0040	0.000	0.000
Cyclohexane	N6	0.0181	0.0865	0.006	0.006
2-Methylhexane	I7	0.0077	0.0438	0.004	0.004
2,3-Dimethylpentane	I7	0.0041	0.0233	0.002	0.002
1,1-Dimethylcyclopentane	N7	0.0020	0.0111	0.001	0.001
3-Methylhexane	I7	0.0087	0.0495	0.004	0.004
1c,3-Dimethylcyclopentane	N7	0.0030	0.0167	0.001	0.001

1t,3-Dimethylcyclopentane	N7	0.0028	0.0156	0.001	0.001
3-Ethylpentane	I7	0.0005	0.0028	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0043	0.0240	0.002	0.002
2,2,4-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
n-Heptane	P7	0.0189	0.1076	0.009	0.009
1c,2-Dimethylcyclopentane	N7	0.0006	0.0033	0.000	0.000
Methylcyclohexane	N7	0.0392	0.2186	0.016	0.016
2,2-Dimethylhexane	I8	0.0007	0.0045	0.000	0.000
1,1,3-Trimethylcyclopentane	N7	0.0006	0.0038	0.000	0.000
Ethylcyclopentane	N7	0.0013	0.0073	0.001	0.001
2,5-Dimethylhexane	I8	0.0011	0.0072	0.001	0.001
2,2,3-Trimethylpentane	I8	0.0010	0.0065	0.001	0.001
2,4-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0007	0.0045	0.000	0.000
3,3-Dimethylhexane	I8	0.0003	0.0019	0.000	0.000
2,3,3-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
Toluene	A7	0.0053	0.0277	0.002	0.002
2,3-Dimethylhexane	I8	0.0007	0.0045	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0002	0.0013	0.000	0.000
2-Methylheptane	I8	0.0045	0.0292	0.002	0.002
4-Methylheptane	I8	0.0013	0.0085	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0002	0.0013	0.000	0.000
3,4-Dimethylhexane	I8	0.0002	0.0013	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
3-Methylheptane	I8	0.0016	0.0104	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0066	0.0421	0.003	0.003
3-Ethylhexane	I8	0.0011	0.0072	0.001	0.001
1t,4-Dimethylcyclohexane	N8	0.0027	0.0172	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0008	0.0051	0.000	0.000
2,2,5-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
3c-Ethylmethylcyclopentane	N8	0.0002	0.0012	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0002	0.0012	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0002	0.0012	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
2,2,4-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0018	0.0115	0.001	0.001
1t,3-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
n-Octane	P8	0.0088	0.0571	0.004	0.004
1c,4-Dimethylcyclohexane	N8	0.0014	0.0089	0.001	0.001
i-Propylcyclopentane	I8	0.0001	0.0006	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
2,3,4-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
2,2-Dimethylheptane	I9	0.0002	0.0015	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0013	0.0093	0.001	0.001
2,2,3-Trimethylhexane	I9	0.0005	0.0036	0.000	0.000
2,4-Dimethylheptane	I9	0.0004	0.0029	0.000	0.000
Ethylcyclohexane	N8	0.0012	0.0077	0.001	0.001
n-Propylcyclopentane	N8	0.0005	0.0032	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0002	0.0014	0.000	0.000
2,5-Dimethylheptane	I9	0.0010	0.0073	0.001	0.001
3,3-Dimethylheptane	I9	0.0002	0.0015	0.000	0.000
2,6-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0005	0.0036	0.000	0.000
Ethylbenzene	I8	0.0002	0.0012	0.000	0.000
2,3-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0018	0.0108	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0005	0.0030	0.000	0.000
3,4-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0001	0.0007	0.000	0.000
4-Ethylheptane	I9	0.0001	0.0007	0.000	0.000
4-Methyloctane	I9	0.0008	0.0058	0.000	0.000
2-Methyloctane	I9	0.0012	0.0087	0.001	0.001
1c,2t,3-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000

3-Ethylheptane	I9	0.0001	0.0007	0.000	0.000
3-Methyloctane	I9	0.0002	0.0015	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	0.0012	0.0086	0.001	0.001
1,1,2-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
3,3-Diethylpentane	I9	0.0001	0.0007	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0002	0.0012	0.000	0.000
i-Butylcyclopentane	N9	0.0007	0.0050	0.000	0.000
n-Nonane	P9	0.0052	0.0379	0.003	0.003
1,1-Methylethylcyclohexane	N9	0.0005	0.0036	0.000	0.000
i-Propylbenzene	A9	0.0002	0.0014	0.000	0.000
i-Propylcyclohexane	N9	0.0002	0.0014	0.000	0.000
2,2-Dimethyloctane	I10	0.0001	0.0008	0.000	0.000
2,4-Dimethyloctane	I10	0.0002	0.0016	0.000	0.000
2,6-Dimethyloctane	I10	0.0001	0.0008	0.000	0.000
2,5-Dimethyloctane	I10	0.0001	0.0008	0.000	0.000
n-Butylcyclopentane	N9	0.0006	0.0043	0.000	0.000
3,3-Dimethyloctane	I10	0.0003	0.0024	0.000	0.000
n-Propylbenzene	A9	0.0008	0.0054	0.000	0.000
3,6-Dimethyloctane	I10	0.0002	0.0016	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0001	0.0008	0.000	0.000
1,3-Methylethylbenzene	A9	0.0005	0.0034	0.000	0.000
1,4-Methylethylbenzene	A9	0.0002	0.0014	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0008	0.0054	0.000	0.000
2,3-Dimethyloctane	I10	0.0001	0.0008	0.000	0.000
5-Methylnonane	I10	0.0002	0.0016	0.000	0.000
1,2-Methylethylbenzene	A9	0.0001	0.0007	0.000	0.000
2-Methylnonane	I10	0.0003	0.0024	0.000	0.000
3-Ethylheptane	I10	0.0001	0.0008	0.000	0.000
3-Methylnonane	I10	0.0002	0.0016	0.000	0.000
t-Butylbenzene	A10	0.0006	0.0046	0.000	0.000
i-Butylcyclohexane	N10	0.0001	0.0008	0.000	0.000
i-Butylbenzene	A10	0.0001	0.0007	0.000	0.000
UnknownC9s	U9	0.0016	0.0116	0.001	0.001
n-Decane	P10	0.0004	0.0032	0.000	0.000
1,2,3-Trimethylbenzene	A9	0.0001	0.0007	0.000	0.000
UnknownC10s	U10	0.0007	0.0057	0.000	0.000
TOTAL		100.00000	100.00000	1.8487	1.8585

CALCULATED VALUES**

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.65	14.73
BENZENE	0.0035	0.0155	LHV NET DRY REAL :	980.1 /scf	985.4 /scf
TOLUENE	0.0053	0.0277	NET WET REAL :	963.0 /scf	968.3 /scf
ETHYLBENZENE	0.0002	0.0012	HHV GROSS DRY REAL :	1085.1 /scf	1091.0 /scf
XYLENES	0.0025	0.0150	GROSS WET REAL :	1066.1 /scf	1072.0 /scf
TOTAL BTEX	0.0115	0.0594	NET HEATING VALUE (60 °F ideal reaction):		21157.1 Btu/lbm
			GROSS HEATING VALUE (60°F ideal reaction):		23432.8 Btu/lbm
			RELATIVE DENSITY (AIR=1):		0.6071
			DENSITY		0.04640 lb/scf
			COMPRESSIBILITY FACTOR :		0.9976
			REGULAR WOBBE INDEX		1393.7

**(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>4907.4</u> /scf	Relative Density - SG (Air=1)	<u>3.3691</u>	C6+ factors
Gross Dry Ideal BTU	<u>5280</u> /scf	Z Compressibility Factor	<u>0.99323</u>	<u>0.99236</u>
Net Dry Ideal BTU	<u>19363</u> /lb	Density Factor	<u>257.161</u> lbm/1000 ft3	
Gross Dry Ideal BTU	<u>20831.8</u> /lb	Molar Mass or MW	<u>97.591</u> g/mol	
		Volume Liquid Ideal gas	<u>0.119</u> scf/gal	<u>22.8</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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