



**EXTENDED NATURAL GAS ANALYSIS (\*DHA)**

**MAIN PAGE**

PRIMARY DB KEY: **05-103-10859**      NAME/DESCRIP :      **PICEANCE CREEK UNIT 297-11A7**  
 LEASE #:      **INTERMEDIATE CASING**  
 FIELD/AREA:

PROJECT NO. :      **202411075**      ANALYSIS NO. :      **02**  
 COMPANY NAME :      **QB ENERGY OPERATING, LLC**      ANALYSIS DATE:      **DECEMBER 07, 2024 10:45**  
 OFFICE / BRANCH:      **PARACHUTE, CO**      SAMPLE DATE :      **NOVEMBER 19, 2024 12:52**  
 CUSTOMER REF:      **TO:**  
 PRODUCER :      **QB ENERGY OPERATING, LLC**      EFFECTIVE DATE:

**\*\*\*FIELD DATA\*\*\***

SAMPLE CYCLE:      SAMPLE TYPE:      **SPOT**  
 SAMPLE PRES. :      170      psig      PROBE :  
 FLOW PRES. :      psig      CYLINDER NO. :      **ECA-814**  
 LAB PRES:      psig      SAMPLED BY :      **ANDREW TERRAZAS**  
 SAMPLE TEMP. :      29      °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 @	GPM @
			14.65	14.73
ALCOHOLS	0.0006	0.0011	0.0000	0.0000
HELIUM	0.01	0.00	---	---
HYDROGEN	0.31	0.04	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.71	1.18	---	---
CARBON DIOXIDE	0.02	0.05	---	---
METHANE	95.7108	91.1969	---	---
ETHANE	2.1686	3.8730	0.5774	0.5806
PROPANE	0.5150	1.3488	0.1419	0.1426
I-BUTANE	0.0926	0.3197	0.0300	0.0301
N-BUTANE	0.1803	0.6224	0.0569	0.0573
I-PENTANE	0.0735	0.3149	0.0270	0.0271
N-PENTANE	0.0737	0.3158	0.0270	0.0271
HEXANES PLUS	0.1349	0.7374	0.0530	0.0531
<b>TOTALS</b>	<b>100.00000</b>	<b>100.00000</b>	<b>0.9132</b>	<b>0.9179</b>

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0008	0.0037
TOLUENE	0.0001	0.0005
ETHYLBENZENE	0.0001	0.0007
XYLENES	0.0001	0.0007
<b>TOTAL BTEX</b>	<b>0.0011</b>	<b>0.0056</b>

	CALCULATED VALUES**	
	14.65	14.73
<b>BTU @</b>		
LHV NET DRY REAL :	936.8 /scf	941.9 /scf
NET WET REAL :	920.4 /scf	925.5 /scf
HHV GROSS DRY REAL :	1039.2 /scf	1044.9 /scf
GROSS WET REAL :	1021.0 /scf	1026.7 /scf
NET HEATING VALUE (60 °F ideal reaction):		21148.6 Btu/lbm
GROSS HEATING VALUE (60°F ideal reaction):		23457.6 Btu/lbm
RELATIVE DENSITY (AIR=1):		0.5808
DENSITY		0.04436 lbm/scf
COMPRESSIBILITY FACTOR :		0.9978
REGULAR WOBBE INDEX		1364.9

\*(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. :	202411075	ANALYSIS NO. :	02
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	DECEMBER 07, 2024 10:45
ACCOUNT NO. :		SAMPLE DATE :	NOVEMBER 19, 2024 12:52
PRODUCER :	QB ENERGY OPERATING, LLC	CYLINDER NO. :	ECA-814
LEASE NO. :		SAMPLED BY :	ANDREW TERRAZAS
NAME/DESCRIP :	PICEANCE CREEK UNIT 297-11A7 INTERMEDIATE CASING		

***FIELD DATA***		SAMPLE TEMP. :	29
SAMPLE PRES. :	170	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	—		
COMMENTS :	<i>SPOT ppm mol</i>		

<u>Componet</u>	<u>Mole %</u>	<u>Wt %</u>
Helium	0.01	0.00
Hydrogen	0.31	0.04
Carbon Dioxide	0.02	0.05
Nitrogen	0.71	1.18
Methane	95.7108	91.1969
Ethane	2.1686	3.8730
Propane	0.5150	1.3488
Isobutane	0.0926	0.3197
n-Butane	0.1803	0.6224
Isopentane	0.0729	0.3124
n-Pentane	0.0737	0.3158
Cyclopentane	0.0006	0.0025
n-Hexane	0.0333	0.1705
Cyclohexane	0.0053	0.0265
Other Hexanes	0.0483	0.2471
Heptanes	0.0282	0.1673
Methylcyclohexane	0.0085	0.0496
2,2,4 Trimethylpentane	0.0001	0.0007
Benzene	0.0008	0.0037
Toluene	0.0001	0.0005
Ethylbenzene	0.0001	0.0007
Xylenes	0.0001	0.0007
C8+ Heavies	0.0101	0.0701
<u>Subtotal</u>	<u>99.99940</u>	<u>99.99890</u>
Oxygen/Argon	0.00	0.00
Alcohols	0.0006	0.0011
<u>Total</u>	<u>100.00000</u>	<u>100.00000</u>

	<u>Total</u>	<u>C6+</u>	<u>C8+</u>	<u>C10+</u>	
<b>Calculated Values BTU @</b> <b>14.65</b>	<b>Sample</b>	<b>Fraction</b>	<b>Fraction</b>	<b>Fraction</b>	
LHV Net Dry Real:	936.8	4694.7	5779.8	#DIV/0!	Btu/scf
Net Wet Real:	920.4	4612.6	5678.8	#DIV/0!	Btu/scf
HHV Gross Dry Real:	1039.2	5062.6	6226.2	#DIV/0!	Btu/scf
Gross Wet Real:	1021.0	4974.1	6117.4	#DIV/0!	Btu/scf
<b>Other Calculated Values</b>					
Regualr Wobbe Index*	1364.9	2821.7	3114.4	#DIV/0!	Btu/scf
Net Heating Value (60 °F ideal reaction):	21148.6	19336.2	19624.6	#DIV/0!	Btu/lbm
Gross Heating Value (60°F ideal reaction):	23457.6	20852.1	21139.3	#DIV/0!	Btu/lbm
Molar Mass (MW):	16.83695	91.96	115.804	#DIV/0!	g/mol
Relative Density (AIR=1):	0.5808	3.1746	3.9985	#DIV/0!	SG
Density:	0.04436	0.24232	0.30516	#DIV/0!	lbm/scf
Compressibility Factor:	0.9978	0.9900	0.9971	#DIV/0!	Z
Liquid Volume real gas @:	<b>14.65</b>	17.1541	0.0528	0.002	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: **05-103-10859** NAME/DESCRIP : **PICEANCE CREEK UNIT 297-11A7**  
 LEASE #: INTERMEDIATE CASING  
 FIELD/AREA:

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 OFFICE / BRANCH: **PARACHUTE, CO** SAMPLE DATE : **NOVEMBER 19, 2024 12:52**  
 CUSTOMER REF: TO:  
 PRODUCER : **QB ENERGY OPERATING, LLC** EFFECTIVE DATE:

**\*\*\*FIELD DATA\*\*\***

SAMPLE CYCLE: SAMPLE TYPE: **SPOT**  
 SAMPLE PRES. : **170** psig PROBE :  
 FLOW PRES. : psig CYLINDER NO. : **ECA-814**  
 LAB PRES: psig SAMPLED BY : **ANDREW TERRAZAS**  
 SAMPLE TEMP. : **29** °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	---	---
Hydrogen	---	0.31	0.04	---	---
Nitrogen	---	0.71	1.18	---	---
Carbon Dioxide	---	0.02	0.05	---	---
Methane	P1	95.7108	91.1969	---	---
Ethane	P2	2.1686	3.8730	0.577	0.581
Propane	P3	0.5150	1.3488	0.142	0.143
i-Butane	I4	0.0926	0.3197	0.030	0.030
Methanol	X1	0.0006	0.0011	0.000	0.000
n-Butane	P4	0.1803	0.6224	0.057	0.057
2,2-Dimethylpropane	I5	0.0052	0.0223	0.002	0.002
i-Pentane	I5	0.0677	0.2901	0.025	0.025
n-Pentane	P5	0.0737	0.3158	0.027	0.027
2,2-Dimethylbutane	I6	0.0055	0.0282	0.002	0.002
Cyclopentane	N5	0.0006	0.0025	0.000	0.000
2,3-Dimethylbutane	I6	0.0043	0.0220	0.002	0.002
2-Methylpentane	I6	0.0237	0.1213	0.010	0.010
3-Methylpentane	I6	0.0129	0.0661	0.005	0.005
n-Hexane	P6	0.0333	0.1705	0.014	0.014
2,2-Dimethylpentane	I7	0.0010	0.0059	0.000	0.000
Methylcyclopentane	N6	0.0019	0.0095	0.001	0.001
2,4-Dimethylpentane	I7	0.0013	0.0077	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0004	0.0024	0.000	0.000
Benzene	A6	0.0008	0.0037	0.000	0.000
3,3-Dimethylpentane	I7	0.0006	0.0036	0.000	0.000
Cyclohexane	N6	0.0053	0.0265	0.002	0.002
2-Methylhexane	I7	0.0054	0.0321	0.003	0.003

2,3-Dimethylpentane	I7	0.0013	0.0077	0.001	0.001
1,1-Dimethylcyclopentane	N7	0.0010	0.0058	0.000	0.000
3-Methylhexane	I7	0.0050	0.0298	0.002	0.002
1c,3-Dimethylcyclopentane	N7	0.0003	0.0017	0.000	0.000
1t,3-Dimethylcyclopentane	N7	0.0003	0.0017	0.000	0.000
3-Ethylpentane	I7	0.0003	0.0018	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0009	0.0052	0.000	0.000
2,2,4-Trimethylpentane	I8	0.0001	0.0007	0.000	0.000
n-Heptane	P7	0.0099	0.0589	0.005	0.005
1c,2-Dimethylcyclopentane	N7	0.0001	0.0006	0.000	0.000
Methylcyclohexane	N7	0.0085	0.0496	0.003	0.003
2,2-Dimethylhexane	I8	0.0004	0.0027	0.000	0.000
Ethylcyclopentane	N7	0.0002	0.0012	0.000	0.000
2,5-Dimethylhexane	I8	0.0003	0.0020	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0003	0.0020	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0001	0.0007	0.000	0.000
3,3-Dimethylhexane	I8	0.0002	0.0014	0.000	0.000
Toluene	A7	0.0001	0.0005	0.000	0.000
2,3-Dimethylhexane	I8	0.0002	0.0014	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0001	0.0007	0.000	0.000
2-Methylheptane	I8	0.0013	0.0089	0.001	0.001
4-Methylheptane	I8	0.0004	0.0027	0.000	0.000
3-Methylheptane	I8	0.0008	0.0054	0.000	0.000
1c,2t,3-Trimethylcyclopentane	N8	0.0009	0.0060	0.000	0.000
3-Ethylhexane	I8	0.0001	0.0007	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0004	0.0027	0.000	0.000
1,1-Dimethylcyclohexane	N8	0.0002	0.0013	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0002	0.0013	0.000	0.000
UnknownC7s	U7	0.0002	0.0012	0.000	0.000
n-Octane	P8	0.0018	0.0122	0.001	0.001
1c,4-Dimethylcyclohexane	N8	0.0001	0.0007	0.000	0.000
2,2-Dimethylheptane	I9	0.0001	0.0008	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0003	0.0023	0.000	0.000
2,2,3-Trimethylhexane	I9	0.0001	0.0008	0.000	0.000
4,4-Dimethylheptane	I9	0.0001	0.0008	0.000	0.000
Ethylcyclohexane	N8	0.0003	0.0020	0.000	0.000
n-Propylcyclopentane	N8	0.0002	0.0013	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0001	0.0008	0.000	0.000
2,5-Dimethylheptane	I9	0.0002	0.0015	0.000	0.000
3,3-Dimethylheptane	I9	0.0001	0.0008	0.000	0.000
3,5-Dimethylheptane	I9	0.0001	0.0008	0.000	0.000
2,6-Dimethylheptane	I9	0.0001	0.0008	0.000	0.000
Ethylbenzene	I8	0.0001	0.0007	0.000	0.000
1,4-Dimethylbenzene (p-Xylene)	A8	0.0001	0.0007	0.000	0.000
4-Methyloctane	I9	0.0001	0.0008	0.000	0.000
2-Methyloctane	I9	0.0001	0.0008	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	0.0001	0.0008	0.000	0.000
UnknownC8s	U8	0.0001	0.0007	0.000	0.000
n-Nonane	P9	0.0002	0.0015	0.000	0.000
<b>TOTAL</b>		<b>100.00000</b>	<b>100.00000</b>	<b>0.9132</b>	<b>0.9179</b>

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0008	0.0037
TOLUENE	0.0001	0.0005
ETHYLBENZENE	0.0001	0.0007
XYLENES	0.0001	0.0007
TOTAL BTEX	0.0011	0.0056

\*(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 :	936.8 /scf	941.9 /scf
NET WET REAL :	920.4 /scf	925.5 /scf
HHV GROSS DRY REAL :	1039.2 /scf	1044.9 /scf
GROSS WET REAL :	1021.0 /scf	1026.7 /scf
NET HEATING VALUE (60 °F ideal reaction):		21148.6 Btu/lbm
GROSS HEATING VALUE (60°F ideal reaction):		23457.6 Btu/lbm
RELATIVE DENSITY (AIR=1):		0.5808
DENSITY		0.04436 lb/scf
COMPRESSIBILITY FACTOR :		0.9978
REGULAR WOBBE INDEX		1364.9

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

Net Dry Ideal BTU	<u>4662.1</u> /scf	Relative Density - SG (Air=1)	<u>3.1746</u>	<b>C6+ factors</b>
Gross Dry Ideal BTU	<u>5027.5</u> /scf	Z Compressibility Factor	<u>0.98995</u>	<u>0.98939</u>
Net Dry Ideal BTU	<u>19336.2</u> /lb	Density Factor	<u>242.323</u> lbm/1000 ft3	
Gross Dry Ideal BTU	<u>20852.1</u> /lb	Molar Mass or MW	<u>91.96</u> g/mol	
		Volume Liquid Ideal gas	<u>0.053</u> scf/gal	<u>23.1</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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