

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

**MAIN PAGE**

PRIMARY DB KEY: <b>05-103-10649</b>	NAME/DESCRIP :	<b>PICEANCE CREEK UNIT T35X-2G6</b>
LEASE #:		<b>INTERMEDIATE CASING</b>
FIELD/AREA:		
PROJECT NO. : <b>202412022</b>	ANALYSIS NO. :	<b>02</b>
COMPANY NAME : <b>QB ENERGY OPERATING, LLC</b>	ANALYSIS DATE:	DECEMBER 09, 2024 18:27
OFFICE / BRANCH: <b>PARACHUTE, CO</b>	SAMPLE DATE :	DECEMBER 3, 2024
CUSTOMER REF:	TO:	
PRODUCER : <b>QB ENERGY OPERATING, LLC</b>	EFFECTIVE DATE:	

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

SAMPLE CYCLE:		SAMPLE TYPE:	SPOT
SAMPLE PRES. : 200 psig		PROBE :	
FLOW PRES. : psig		CYLINDER NO. :	ECA-737
LAB PRES: psig		SAMPLED BY :	SHANE COLLETT
SAMPLE TEMP. : °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>
HELIUM	0.03	0.01	---	---
HYDROGEN	0.04	0.00	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	1.34	2.25	---	---
CARBON DIOXIDE	0.01	0.03	---	---
METHANE	96.6669	93.0737	---	---
ETHANE	1.2845	2.3181	0.3426	0.3445
PROPANE	0.2837	0.7508	0.0779	0.0783
I-BUTANE	0.0557	0.1943	0.0180	0.0181
N-BUTANE	0.0939	0.3276	0.0300	0.0301
I-PENTANE	0.0407	0.1761	0.0150	0.0151
N-PENTANE	0.0340	0.1472	0.0120	0.0121
HEXANES PLUS	0.1206	0.7222	0.0470	0.0470
<u>TOTALS</u>	<u>100.0000</u>	<u>100.0000</u>	<u>0.5425</u>	<u>0.5452</u>

<u>BTEX COMPONENTS</u>	<u>MOLE%</u>	<u>WT%</u>
BENZENE	0.0005	0.0023
TOLUENE	0.0017	0.0094
ETHYLBENZENE	0.0004	0.0025
XYLENES	0.0014	0.0090
<u>TOTAL BTEX</u>	<u>0.0040</u>	<u>0.0232</u>

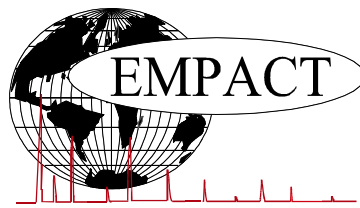
	<u>CALCULATED VALUES**</u>	
	<u>14.65</u>	<u>14.73</u>
<b>BTU @</b>		
<b>LHV NET DRY REAL :</b>	918.1 /scf	923.1 /scf
<b>NET WET REAL :</b>	902.1 /scf	907.1 /scf
<b>HHV GROSS DRY REAL :</b>	1018.3 /scf	1023.9 /scf
<b>GROSS WET REAL :</b>	1000.5 /scf	1006.1 /scf
<b>NET HEATING VALUE (60 °F ideal reaction):</b>		20950.3 Btu/lbm
<b>GROSS HEATING VALUE (60°F ideal reaction):</b>		23247.6 Btu/lbm
<b>RELATIVE DENSITY (AIR=1):</b>		0.5742
<b>DENSITY</b>		0.04390 lbm/scf
<b>COMPRESSIBILITY FACTOR :</b>		0.9979
<b>REGULAR WOBBE INDEX</b>		1345.3

\*(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. :	202412022	ANALYSIS NO. :	02
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE :	DECEMBER 09, 2024 18:27
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 3, 2024
PRODUCER :	QB ENERGY OPERATING, LLC	CYLINDER NO. :	ECA-737
LEASE NO. :		SAMPLED BY :	SHANE COLLETT
NAME/DESCRIP :	PICEANCE CREEK UNIT T35X-2G6 INTERMEDIATE CASING		

***FIELD DATA***		SAMPLE TEMP. :	
SAMPLE PRES. :	200	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	—		
COMMENTS :	<i>SPOT</i>		

<u>Componet</u>	<u>Mole %</u>	<u>Wt %</u>
Helium	0.03	0.01
Hydrogen	0.04	0.00
Carbon Dioxide	0.01	0.03
Nitrogen	1.34	2.25
Methane	96.6669	93.0737
Ethane	1.2845	2.3181
Propane	0.2837	0.7508
Isobutane	0.0557	0.1943
n-Butane	0.0939	0.3276
Isopentane	0.0400	0.1732
n-Pentane	0.0340	0.1472
Cyclopentane	0.0007	0.0029
n-Hexane	0.0151	0.0781
Cyclohexane	0.0045	0.0228
Other Hexanes	0.0275	0.1419
Heptanes	0.0218	0.1307
Methylcyclohexane	0.0122	0.0719
2,2,4 Trimethylpentane	0.0000	0.0000
Benzene	0.0005	0.0023
Toluene	0.0017	0.0094
Ethylbenzene	0.0004	0.0025
Xylenes	0.0014	0.0090
C8+ Heavies	0.0355	0.2536
<u>Subtotal</u>	<u>100.00000</u>	<u>100.00000</u>
<u>Oxygen/Argon</u>	<u>0.00</u>	<u>0.00</u>
<b>Total</b>	<b>100.00000</b>	<b>100.00000</b>

	<b>Total</b>	<b>C6+</b>	<b>C8+</b>	<b>C10+</b>
<b>Calculated Values BTU @</b>	<b>Sample</b>	<b>Fraction</b>	<b>Fraction</b>	<b>Fraction</b>
<b>14.65</b>				
LHV Net Dry Real:	918.1	5040.4	5914.4	7135.2 Btu/scf
Net Wet Real:	902.1	4952.3	5811.0	7010.5 Btu/scf
HHV Gross Dry Real:	1018.3	5427.0	6364.7	7679.1 Btu/scf
Gross Wet Real:	1000.5	5332.1	6253.4	7544.9 Btu/scf
<b>Other Calculated Values</b>				
Regualr Wobbe Index*	1345.3	2913.6	3150.3	3461.2 Btu/scf
Net Heating Value (60 °F ideal reaction):	20950.3	19368.7	19575.2	19204.4 Btu/lbm
Gross Heating Value (60°F ideal reaction):	23247.6	20853.5	21062.9	20667.5 Btu/lbm
Molar Mass (MW):	16.66206	99.78	118.406	143.318 g/mol
Relative Density (AIR=1):	0.5742	3.4451	4.0888	4.9485 SG
Density:	0.04390	0.26295	0.31202	0.37767 lbm/scf
Compressibility Factor:	0.9979	0.9934	0.9977	0.9995 Z
Liquid Volume real gas @:	<b>14.65</b>	16.9916	0.0469	0.013
				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: **05-103-10649** NAME/DESCRIP : **PICEANCE CREEK UNIT T35X-2G6**  
 LEASE #: INTERMEDIATE CASING  
 FIELD/AREA:  
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 COMPANY NAME : **QB ENERGY OPERATING, LLC** ANALYSIS DATE: **DECEMBER 09, 2024 18:27**  
 OFFICE / BRANCH: **PARACHUTE, CO** SAMPLE DATE : **DECEMBER 3, 2024**  
 CUSTOMER REF: TO:  
 PRODUCER : **QB ENERGY OPERATING, LLC** EFFECTIVE DATE:

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

SAMPLE CYCLE: SAMPLE TYPE: SPOT  
 SAMPLE PRES. : 200 psig PROBE :  
 FLOW PRES. : psig CYLINDER NO. : ECA-737  
 LAB PRES: psig SAMPLED BY : SHANE COLLETT  
 SAMPLE TEMP. : °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	---	0.03	0.01	---	---
Hydrogen	---	0.04	0.00	---	---
Nitrogen	---	1.34	2.25	---	---
Carbon Dioxide	---	0.01	0.03	---	---
Methane	P1	96.6669	93.0737	---	---
Ethane	P2	1.2845	2.3181	0.343	0.345
Propane	P3	0.2837	0.7508	0.078	0.078
i-Butane	I4	0.0557	0.1943	0.018	0.018
n-Butane	P4	0.0939	0.3276	0.030	0.030
2,2-Dimethylpropane	I5	0.0018	0.0078	0.001	0.001
i-Pentane	I5	0.0382	0.1654	0.014	0.014
n-Pentane	P5	0.0340	0.1472	0.012	0.012
2,2-Dimethylbutane	I6	0.0022	0.0114	0.001	0.001
Cyclopentane	N5	0.0007	0.0029	0.000	0.000
2,3-Dimethylbutane	I6	0.0023	0.0119	0.001	0.001
2-Methylpentane	I6	0.0133	0.0688	0.006	0.006
3-Methylpentane	I6	0.0072	0.0372	0.003	0.003
n-Hexane	P6	0.0151	0.0781	0.006	0.006
2,2-Dimethylpentane	I7	0.0005	0.0030	0.000	0.000
Methylcyclopentane	N6	0.0025	0.0126	0.001	0.001
2,4-Dimethylpentane	I7	0.0009	0.0054	0.000	0.000
2,2,3-Trimethylbutane	I7	0.0003	0.0018	0.000	0.000
Benzene	A6	0.0005	0.0023	0.000	0.000
3,3-Dimethylpentane	I7	0.0004	0.0024	0.000	0.000
Cyclohexane	N6	0.0045	0.0228	0.002	0.002
2,3-Dimethylpentane	I7	0.0044	0.0265	0.002	0.002
1,1-Dimethylcyclopentane	N7	0.0008	0.0047	0.000	0.000
3-Methylhexane	I7	0.0043	0.0259	0.002	0.002

1c,3-Dimethylcyclopentane	N7	0.0005	0.0029	0.000	0.000
1t,3-Dimethylcyclopentane	N7	0.0005	0.0029	0.000	0.000
3-Ethylpentane	I7	0.0003	0.0018	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0010	0.0059	0.000	0.000
n-Heptane	P7	0.0060	0.0361	0.003	0.003
1c,2-Dimethylcyclopentane	N7	0.0001	0.0006	0.000	0.000
Methylcyclohexane	N7	0.0122	0.0719	0.005	0.005
2,2-Dimethylhexane	I8	0.0005	0.0034	0.000	0.000
1,1,3-Trimethylcyclopentane	N7	0.0001	0.0007	0.000	0.000
Ethylcyclopentane	N7	0.0004	0.0023	0.000	0.000
2,5-Dimethylhexane	I8	0.0006	0.0041	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0005	0.0034	0.000	0.000
2,4-Dimethylhexane	I8	0.0001	0.0007	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0003	0.0020	0.000	0.000
3,3-Dimethylhexane	I8	0.0002	0.0014	0.000	0.000
2,3,3-Trimethylpentane	I8	0.0001	0.0007	0.000	0.000
Toluene	A7	0.0017	0.0094	0.001	0.001
2,3-Dimethylhexane	I8	0.0005	0.0034	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0001	0.0007	0.000	0.000
2-Methylheptane	I8	0.0033	0.0226	0.002	0.002
4-Methylheptane	I8	0.0010	0.0068	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0001	0.0007	0.000	0.000
3,4-Dimethylhexane	I8	0.0001	0.0007	0.000	0.000
3-Methylheptane	I8	0.0022	0.0151	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0030	0.0202	0.002	0.002
3-Ethylhexane	I8	0.0002	0.0014	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0013	0.0088	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0006	0.0040	0.000	0.000
2,2,5-Trimethylhexane	I9	0.0001	0.0008	0.000	0.000
3c-Ethylmethylcyclopentane	N8	0.0001	0.0007	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0001	0.0007	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0002	0.0013	0.000	0.000
2,2,4-Trimethylhexane	I9	0.0001	0.0008	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0010	0.0067	0.001	0.001
1t,3-Dimethylcyclohexane	N8	0.0001	0.0007	0.000	0.000
UnknownC7s	U7	0.0013	0.0078	0.001	0.001
n-Octane	P8	0.0053	0.0363	0.003	0.003
1c,4-Dimethylcyclohexane	N8	0.0006	0.0040	0.000	0.000
i-Propylcyclopentane	I8	0.0001	0.0007	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0001	0.0008	0.000	0.000
2,2,3,4-Tetramethylpentane	I9	0.0001	0.0008	0.000	0.000
2,3,4-Trimethylhexane	I9	0.0001	0.0008	0.000	0.000
2,2-Dimethylheptane	I9	0.0003	0.0023	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0009	0.0068	0.000	0.000
2,2,3-Trimethylhexane	I9	0.0002	0.0016	0.000	0.000
2,4-Dimethylheptane	I9	0.0001	0.0008	0.000	0.000
4,4-Dimethylheptane	I9	0.0001	0.0008	0.000	0.000
Ethylcyclohexane	N8	0.0013	0.0088	0.001	0.001
n-Propylcyclopentane	N8	0.0004	0.0027	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0002	0.0015	0.000	0.000
2,5-Dimethylheptane	I9	0.0007	0.0054	0.000	0.000
3,3-Dimethylheptane	I9	0.0002	0.0016	0.000	0.000
3,5-Dimethylheptane	I9	0.0001	0.0008	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0001	0.0008	0.000	0.000
Ethylbenzene	I8	0.0004	0.0025	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0010	0.0064	0.000	0.000
1,4-Dimethylbenzene (p-Xylene)	A8	0.0003	0.0019	0.000	0.000
4-Methyloctane	I9	0.0004	0.0031	0.000	0.000
2-Methyloctane	I9	0.0006	0.0046	0.000	0.000
3-Methyloctane	I9	0.0001	0.0008	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	0.0006	0.0046	0.000	0.000

3,3-Diethylpentane	I9	0.0001	0.0008	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0001	0.0007	0.000	0.000
i-Butylcyclopentane	N9	0.0003	0.0023	0.000	0.000
n-Nonane	P9	0.0021	0.0161	0.001	0.001
1,1-Methylethylcyclohexane	N9	0.0002	0.0015	0.000	0.000
i-Propylbenzene	A9	0.0001	0.0007	0.000	0.000
i-Propylcyclohexane	N9	0.0001	0.0008	0.000	0.000
2,2-Dimethyloctane	I10	0.0001	0.0008	0.000	0.000
2,4-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	0.0002	0.0015	0.000	0.000
3,3-Dimethyloctane	I10	0.0001	0.0008	0.000	0.000
n-Propylbenzene	A9	0.0003	0.0022	0.000	0.000
3,6-Dimethyloctane	I10	0.0001	0.0008	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0001	0.0008	0.000	0.000
1,3-Methylethylbenzene	A9	0.0001	0.0007	0.000	0.000
1,4-Methylethylbenzene	A9	0.0001	0.0007	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0001	0.0007	0.000	0.000
5-Methylnonane	I10	0.0001	0.0008	0.000	0.000
1,2-Methylethylbenzene	A9	0.0001	0.0007	0.000	0.000
3-Methylnonane	I10	0.0001	0.0008	0.000	0.000
t-Butylbenzene	A10	0.0001	0.0008	0.000	0.000
UnknownC9s	U9	0.0002	0.0016	0.000	0.000
n-Decane	P10	0.0005	0.0043	0.000	0.000
1,2-Methyl-i-propylbenzene	A10	0.0001	0.0008	0.000	0.000
UnknownC10s	U10	0.0008	0.0068	0.000	0.000
n-Undecane	P11	0.0001	0.0010	0.000	0.000
n-Dodecane	P12	0.0001	0.0010	0.000	0.000
<b>TOTAL</b>		<b>100.00000</b>	<b>100.00000</b>	<b>0.5425</b>	<b>0.5452</b>

**CALCULATED VALUES\*\***

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.65	14.73
BENZENE	0.0005	0.0023	LHV NET DRY REAL :	918.1 /scf	923.1 /scf
TOLUENE	0.0017	0.0094	NET WET REAL :	902.1 /scf	907.1 /scf
ETHYLBENZENE	0.0004	0.0025	HHV GROSS DRY REAL :	1018.3 /scf	1023.9 /scf
XYLENES	0.0014	0.0090	GROSS WET REAL :	1000.5 /scf	1006.1 /scf
TOTAL BTEX	0.0040	0.0232	NET HEATING VALUE (60 °F ideal reaction):		20950.3 Btu/lbm
			GROSS HEATING VALUE (60°F ideal reaction):		23247.6 Btu/lbm
			RELATIVE DENSITY (AIR=1):		0.5742
			DENSITY		0.04390 lb/scf
			COMPRESSIBILITY FACTOR :		0.9979
			REGULAR WOBBE INDEX		1345.3

\*(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	5022.7 /scf	Relative Density - SG (Air=1)	3.4451	<b>C6+ factors</b>
Gross Dry Ideal BTU	5407.9 /scf	Z Compressibility Factor	0.99336	0.99241
Net Dry Ideal BTU	19368.7 /lb	Density Factor	262.946 lbm/1000 ft3	
Gross Dry Ideal BTU	20853.5 /lb	Molar Mass or MW	99.78 g/mol	
		Volume Liquid Ideal gas	0.047 scf/gal	22.5
<b>This hexanes plus fraction may be applied in place of published C6+ factors. The Z &amp; GPM need additional calc for C6+ factors.</b>				
<b>#DIV/0 or 0 (zero) will appear in this section when there is no hexanes plus in the sample to calculate C6+ factors.</b>				

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