EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY: **05-103-10863** NAME/DESCRIP : **PICEANCE CREEK UNIT 297-11A1 PRODUCTION CASING**
LEASE #:
FIELD/AREA:

PROJECT NO. : **202411074** ANALYSIS NO. : **01**
COMPANY NAME : **QB ENERGY OPERATING, LLC** ANALYSIS DATE: DECEMBER 06, 2024 11:24
OFFICE / BRANCH: PARACHUTE, CO SAMPLE DATE : NOVEMBER 19, 2024 12:29
CUSTOMER REF: TO:
PRODUCER : QB ENERGY OPERATING, LLC EFFECTIVE DATE:

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

SAMPLE CYCLE: SAMPLE TYPE: SPOT
SAMPLE PRES. : 717 psig PROBE :
FLOW PRES. : psig CYLINDER NO. : ECA-806
LAB PRES: psig SAMPLED BY : ANDREW TERRAZAS
SAMPLE TEMP. : 29 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	0.1738	0.2891	0.0220	0.0221
HELIUM	0.00	0.00	---	---
HYDROGEN	1.23	0.13	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.06	0.09	---	---
CARBON DIOXIDE	3.94	8.96	---	---
METHANE	84.8768	70.3519	---	---
ETHANE	5.9578	9.2560	1.5882	1.5969
PROPANE	1.9822	4.5161	0.5447	0.5477
I-BUTANE	0.4848	1.4559	0.1579	0.1588
N-BUTANE	0.4417	1.3265	0.1389	0.1397
I-PENTANE	0.2232	0.8313	0.0810	0.0814
N-PENTANE	0.1509	0.5625	0.0540	0.0543
HEXANES PLUS	0.4788	2.2307	0.1900	0.1908
TOTALS	100.00000	100.00000	2.7767	2.7917

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0269	0.1086
TOLUENE	0.0222	0.1057
ETHYLBENZENE	0.0000	0.0000
XYLENES	0.0001	0.0006
TOTAL BTEX	0.0492	0.2149

**(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 :	981.5 /scf	986.9 /scf
	NET WET REAL :	964.3 /scf	969.7 /scf
HHV	GROSS DRY REAL :	1085.8 /scf	1091.7 /scf
	GROSS WET REAL :	1066.8 /scf	1072.7 /scf

NET HEATING VALUE (60 °F ideal reaction):	19262.3 Btu/lbm
GROSS HEATING VALUE (60°F ideal reaction):	21306.4 Btu/lbm
RELATIVE DENSITY (AIR=1):	0.6681
DENSITY	0.05100 lbm/scf
COMPRESSIBILITY FACTOR :	0.9974
REGULAR WOBBE INDEX	1329.0

EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	202411074	ANALYSIS NO. :	01
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	DECEMBER 06, 2024 11:24
ACCOUNT NO. :		SAMPLE DATE :	NOVEMBER 19, 2024 12:29
PRODUCER :	QB ENERGY OPERATING, LLC	CYLINDER NO. :	ECA-806
LEASE NO. :		SAMPLED BY :	ANDREW TERRAZAS
NAME/DESCRIP :	PICEANCE CREEK UNIT 297-11A1 PRODUCTION CASING		
FIELD DATA		SAMPLE TEMP. :	29
SAMPLE PRES. :	717	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm mol*		
COMMENTS :	*SPOT*		

Componet	Mole %	Wt %
Helium	0.00	0.00
Hydrogen	1.23	0.13
Carbon Dioxide	3.94	8.96
Nitrogen	0.06	0.09
Methane	84.8768	70.3519
Ethane	5.9578	9.2560
Propane	1.9822	4.5161
Isobutane	0.4848	1.4559
n-Butane	0.4417	1.3265
Isopentane	0.2156	0.8038
n-Pentane	0.1509	0.5625
Cyclopentane	0.0076	0.0275
n-Hexane	0.0769	0.3424
Cyclohexane	0.0415	0.1805
Other Hexanes	0.1518	0.6723
Heptanes	0.0955	0.4919
Methylcyclohexane	0.0586	0.2973
2,2,4 Trimethylpentane	0.0001	0.0006
Benzene	0.0269	0.1086
Toluene	0.0222	0.1057
Ethylbenzene	0.0000	0.0000
Xylenes	0.0001	0.0006
C8+ Heavies	0.0052	0.0308
Subtotal	99.82620	99.71090
Oxygen/Argon	0.00	0.00
Alcohols	0.1738	0.2891
Total	100.00000	100.00000

Calculated Values BTU @ **14.65**		**Total Sample**	**C6+ Fraction**	**C8+ Fraction**	**C10+ Fraction**	
LHV	Net Dry Real:	981.5	4545.1	5580.4	6335.0	**Btu/scf**
	Net Wet Real:	964.3	4465.6	5482.8	6224.3	**Btu/scf**
HHV	Gross Dry Real:	1085.8	4883.4	6012.1	6686.2	**Btu/scf**
	Gross Wet Real:	1066.8	4798.0	5907.0	6569.3	**Btu/scf**
Other Calculated Values						
Regualr Wobbe Index*		1329.0	2752.7	3030.3	3114.1	**Btu/scf**
Net Heating Value (60 °F ideal reaction):		19262.3	19160.2	19739.3	17958.2	**Btu/lbm**
Gross Heating Value (60°F ideal reaction):		21306.4	20585.7	21267.6	18953.7	**Btu/lbm**
Molar Mass (MW):		19.35333	90.151	113.815	134.221	**g/mol**
Relative Density (AIR=1):		0.6681	3.1122	3.9295	4.6343	**SG**
Density:		0.05100	0.23756	0.29993	0.35369	**lbm/scf**
Compressiblity Factor:		0.9974	0.9913	0.9960	0.9995	**Z**
Liquid Volume real gas @:	**14.65**	17.8619	0.1894	0	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.

EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PRIMARY DB KEY:	**05-103-10863**	NAME/DESCRIP :	**PICEANCE CREEK UNIT 297-11A1**
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PRODUCER :	QB ENERGY OPERATING, LLC	EFFECTIVE DATE:	
FIELD DATA			
SAMPLE CYCLE:		SAMPLE TYPE:	SPOT
SAMPLE PRES. :	717 psig	PROBE :	
FLOW PRES. :	psig	CYLINDER NO. :	ECA-806
LAB PRES:	psig	SAMPLED BY :	ANDREW TERRAZAS
SAMPLE TEMP. :	29 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	---	1.23	0.13	---	---
Nitrogen	---	0.06	0.09	---	---
Carbon Dioxide	---	3.94	8.96	---	---
Methane	P1	84.8768	70.3519	---	---
Ethane	P2	5.9578	9.2560	1.588	1.597
Propane	P3	1.9822	4.5161	0.545	0.548
i-Butane	I4	0.4848	1.4559	0.158	0.159
Methanol	X1	0.1732	0.2868	0.022	0.022
n-Butane	P4	0.4417	1.3265	0.139	0.140
2,2-Dimethylpropane	I5	0.0045	0.0168	0.002	0.002
i-Pentane	I5	0.2111	0.7870	0.077	0.077
n-Pentane	P5	0.1507	0.5618	0.054	0.054
t-Butanol	X4	0.0006	0.0023	0.000	0.000
2,2-Dimethylbutane	I6	0.0072	0.0320	0.003	0.003
Cyclopentane	N5	0.0076	0.0275	0.002	0.002
2,3-Dimethylbutane	I6	0.0146	0.0650	0.006	0.006
2-Methylpentane	I6	0.0602	0.2681	0.025	0.025
3-Methylpentane	I6	0.0341	0.1519	0.014	0.014
UnknownC5s	U5	0.0002	0.0007	0.000	0.000
n-Hexane	P6	0.0769	0.3424	0.032	0.032
2,2-Dimethylpentane	I7	0.0020	0.0103	0.001	0.001
Methylcyclopentane	N6	0.0356	0.1548	0.013	0.013
2,4-Dimethylpentane	I7	0.0039	0.0202	0.002	0.002
2,2,3-Trimethylbutane	I7	0.0008	0.0041	0.000	0.000
Benzene	A6	0.0269	0.1086	0.008	0.008
3,3-Dimethylpentane	I7	0.0012	0.0062	0.001	0.001
Cyclohexane	N6	0.0415	0.1805	0.014	0.014
2-Methylhexane	I7	0.0163	0.0844	0.008	0.008

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2,3-Dimethylpentane	I7	0.0038	0.0197	0.002	0.002
1,1-Dimethylcyclopentane	N7	0.0040	0.0203	0.002	0.002
3-Methylhexane	I7	0.0141	0.0730	0.006	0.006
1c,3-Dimethylcyclopentane	N7	0.0056	0.0284	0.003	0.003
1t,3-Dimethylcyclopentane	N7	0.0050	0.0254	0.002	0.002
3-Ethylpentane	I7	0.0005	0.0026	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0079	0.0401	0.004	0.004
2,2,4-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
UnknownC6s	U6	0.0001	0.0005	0.000	0.000
n-Heptane	P7	0.0283	0.1465	0.013	0.013
1c,2-Dimethylcyclopentane	N7	0.0004	0.0020	0.000	0.000
Methylcyclohexane	N7	0.0586	0.2973	0.023	0.023
2,2-Dimethylhexane	I8	0.0010	0.0059	0.000	0.000
1,1,3-Trimethylcyclopentane	N7	0.0002	0.0011	0.000	0.000
Ethylcyclopentane	N7	0.0015	0.0076	0.001	0.001
2,5-Dimethylhexane	I8	0.0006	0.0036	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0005	0.0029	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0005	0.0029	0.000	0.000
3,3-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
Toluene	A7	0.0222	0.1057	0.007	0.007
2,3-Dimethylhexane	I8	0.0002	0.0012	0.000	0.000
2-Methylheptane	I8	0.0005	0.0029	0.000	0.000
4-Methylheptane	I8	0.0001	0.0006	0.000	0.000
3-Methylheptane	I8	0.0002	0.0012	0.000	0.000
1c,2t,3-Trimethylcyclopentane	N8	0.0006	0.0035	0.000	0.000
3-Ethylhexane	I8	0.0001	0.0006	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0003	0.0018	0.000	0.000
1,1-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
n-Octane	P8	0.0001	0.0006	0.000	0.000
1c,4-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0001	0.0006	0.000	0.000
t-Butylbenzene	A10	0.0001	0.0007	0.000	0.000
TOTAL		100.00000	100.00000	2.7767	2.7917

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0269	0.1086
TOLUENE	0.0222	0.1057
ETHYLBENZENE	0.0000	0.0000
XYLENES	0.0001	0.0006
TOTAL BTEX	0.0492	0.2149

(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
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NET WET REAL :	964.3 /scf	969.7 /scf
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NET HEATING VALUE (60 °F ideal reaction):	19262.3 Btu/lbm
GROSS HEATING VALUE (60°F ideal reaction):	21306.4 Btu/lbm
RELATIVE DENSITY (AIR=1):	0.6681
DENSITY	0.05100 lb/scf
COMPRESSIBILITY FACTOR :	0.9974
REGULAR WOBBE INDEX	1329.0

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

Net Dry Ideal BTU	4519.7 /scf	Relative Density - SG (Air=1)	3.1122	***C6+factors***
Gross Dry Ideal BTU	4856.1 /scf	**Z** Compressiblity Factor	0.99129	0.99079
Net Dry Ideal BTU	19160.2 /lb	Density Factor	237.563 lbm/1000 ft3	
Gross Dry Ideal BTU	20585.7 /lb	Molar Mass or MW	90.151 g/mol	
		Volume Liquid Ideal gas	0.19 scf/gal	25.3

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.