EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY:	**05-103-10589**	NAME/DESCRIP :	**PCU 297 T62-X11G2**
LEASE #:	**035705**		**INTERMEDIATE CASING**
FIELD/AREA:	**PICEANCE CREEK - #68800**		
PROJECT NO. :	**202408105**	ANALYSIS NO. :	**02**
COMPANY NAME :	**QB ENERGY OPERATING, LLC**	ANALYSIS DATE:	SEPTEMBER 03, 2024 13:14
OFFICE / BRANCH:	PARACHUTE	SAMPLE DATE :	AUGUST 21, 2024 12:15
CUSTOMER REF:		TO:	
PRODUCER :	QB ENERGY OPERATING, LLC	EFFECTIVE DATE:	
*****FIELD DATA*****			
SAMPLE CYCLE:		SAMPLE TYPE:	SPOT
SAMPLE PRES. :	930 psig	PROBE :	NO
FLOW PRES. :	psig	CYLINDER NO. :	TBI-579
LAB PRES:	psig	SAMPLED BY :	RYAN POZORSKI
SAMPLE TEMP. :	84 ºf	SAMPLING COMPANY:	QB ENERGY OPERATING, LLC
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	0.0012	0.0027	0.0000	0.0000
HELIUM	0.01	0.00	---	---
HYDROGEN	0.01	0.00	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.21	0.32	---	---
CARBON DIOXIDE	2.52	6.04	---	---
METHANE	89.6412	78.3039	---	---
ETHANE	5.3347	8.7343	1.4221	1.4298
PROPANE	1.4621	3.5106	0.4017	0.4039
I-BUTANE	0.2443	0.7731	0.0799	0.0804
N-BUTANE	0.2313	0.7320	0.0730	0.0734
I-PENTANE	0.0644	0.2529	0.0240	0.0241
N-PENTANE	0.0551	0.2164	0.0200	0.0201
HEXANES PLUS	0.2157	1.1141	0.0840	0.0841
TOTALS	100.00000	100.00000	2.1047	2.1158

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0087	0.0370
TOLUENE	0.0076	0.0381
ETHYLBENZENE	0.0003	0.0017
XYLENES	0.0018	0.0103
TOTAL BTEX	0.0184	0.0871

**(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 :	963.1 /scf	968.3 /scf
	NET WET REAL :	946.3 /scf	951.5 /scf
HHV	GROSS DRY REAL :	1066.2 /scf	1072.0 /scf
	GROSS WET REAL :	1047.6 /scf	1053.4 /scf
	NET HEATING VALUE (60 °F ideal reaction):		19928.9 Btu/lbm
	GROSS HEATING VALUE (60°F ideal reaction):		22067.9 Btu/lbm
	RELATIVE DENSITY (AIR=1):		0.6333
	DENSITY		0.04839 lbm/scf
	COMPRESSIBILITY FACTOR :		0.9975
	REGULAR WOBBE INDEX		1340.7

EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	202408105	ANALYSIS NO. :	02
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	SEPTEMBER 03, 2024 13:14
ACCOUNT NO. :		SAMPLE DATE :	AUGUST 21, 2024 12:15
PRODUCER :	QB ENERGY OPERATING, LLC	CYLINDER NO. :	TBI-579
LEASE NO. :	035705	SAMPLED BY :	RYAN POZORSKI
NAME/DESCRIP :	PCU 297 T62-X11G2 INTERMEDIATE CASING		
FIELD DATA		SAMPLE TEMP. :	84
SAMPLE PRES. :	930	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm mol*		
COMMENTS :	*SPOT* *NO PROBE*		

Componet	Mole %	Wt %
Helium	0.01	0.00
Hydrogen	0.01	0.00
Carbon Dioxide	2.52	6.04
Nitrogen	0.21	0.32
Methane	89.6412	78.3039
Ethane	5.3347	8.7343
Propane	1.4621	3.5106
Isobutane	0.2443	0.7731
n-Butane	0.2313	0.7320
Isopentane	0.0627	0.2464
n-Pentane	0.0551	0.2164
Cyclopentane	0.0017	0.0065
n-Hexane	0.0321	0.1506
Cyclohexane	0.0137	0.0628
Other Hexanes	0.0514	0.2401
Heptanes	0.0480	0.2610
Methylcyclohexane	0.0221	0.1182
2,2,4 Trimethylpentane	0.0000	0.0000
Benzene	0.0087	0.0370
Toluene	0.0076	0.0381
Ethylbenzene	0.0003	0.0017
Xylenes	0.0018	0.0103
C8+ Heavies	0.0300	0.1943
Subtotal	99.99880	99.99730
Oxygen/Argon	0.00	0.00
Alcohols	0.0012	0.0027
Total	100.00000	100.00000

Calculated Values BTU @ **14.65**		**Total Sample**	**C6+ Fraction**	**C8+ Fraction**	**C10+ Fraction**	
LHV	Net Dry Real:	963.1	4783.2	5890.3	8787.1	**Btu/scf**
	Net Wet Real:	946.3	4699.6	5787.3	8633.5	**Btu/scf**
HHV	Gross Dry Real:	1066.2	5143.4	6339.3	9518.1	**Btu/scf**
	Gross Wet Real:	1047.6	5053.5	6228.5	9351.7	**Btu/scf**
Other Calculated Values						
Regualr Wobbe Index*		1340.7	2830.0	3146.2	3885.7	**Btu/scf**
Net Heating Value (60 °F ideal reaction):		19928.9	19253.6	19627.6	19555.0	**Btu/lbm**
Gross Heating Value (60°F ideal reaction):		22067.9	20703.6	21125.5	21170.3	**Btu/lbm**
Molar Mass (MW):		18.36555	94.829	117.735	174.837	**g/mol**
Relative Density (AIR=1):		0.6333	3.2743	4.0650	6.0366	**SG**
Density:		0.04839	0.24987	0.31024	0.46072	**lbm/scf**
Compressiblity Factor:		0.9975	0.9925	0.9975	0.9999	**Z**
Liquid Volume real gas @:	**14.65**	17.6625	0.0837	0.009	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:	**05-103-10589**	NAME/DESCRIP :	**PCU 297 T62-X11G2**
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PRODUCER :	QB ENERGY OPERATING, LLC	EFFECTIVE DATE:	
FIELD DATA			
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SAMPLE PRES. :	930 psig	PROBE :	NO
FLOW PRES. :	psig	CYLINDER NO. :	TBI-579
LAB PRES:	psig	SAMPLED BY :	RYAN POZORSKI
SAMPLE TEMP. :	84 ºf	SAMPLING COMPANY:	QB ENERGY OPERATING, LLC
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**
Helium	---	0.01	0.00	---	---
Hydrogen	---	0.01	0.00	---	---
Oxygen/Argon	---	0.00	0.00	---	---
Nitrogen	---	0.21	0.32	---	---
Carbon Dioxide	---	2.52	6.04	---	---
Methane	P1	89.6412	78.3039	---	---
Ethane	P2	5.3347	8.7343	1.422	1.430
Propane	P3	1.4621	3.5106	0.402	0.404
i-Butane	I4	0.2443	0.7731	0.080	0.080
Methanol	X1	0.0008	0.0014	0.000	0.000
n-Butane	P4	0.2313	0.7320	0.073	0.073
2,2-Dimethylpropane	I5	0.0036	0.0142	0.001	0.001
i-Pentane	I5	0.0591	0.2322	0.022	0.022
Acetone	X3	0.0004	0.0013	0.000	0.000
n-Pentane	P5	0.0551	0.2164	0.020	0.020
2,2-Dimethylbutane	I6	0.0041	0.0192	0.002	0.002
Cyclopentane	N5	0.0017	0.0065	0.001	0.001
2,3-Dimethylbutane	I6	0.0044	0.0206	0.002	0.002
2-Methylpentane	I6	0.0211	0.0990	0.009	0.009
3-Methylpentane	I6	0.0122	0.0572	0.005	0.005
n-Hexane	P6	0.0321	0.1506	0.013	0.013
2,2-Dimethylpentane	I7	0.0013	0.0071	0.001	0.001
Methylcyclopentane	N6	0.0095	0.0436	0.003	0.003
2,4-Dimethylpentane	I7	0.0018	0.0098	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0004	0.0022	0.000	0.000
Benzene	A6	0.0087	0.0370	0.002	0.002
3,3-Dimethylpentane	I7	0.0007	0.0038	0.000	0.000
Cyclohexane	N6	0.0137	0.0628	0.005	0.005
2-Methylhexane	I7	0.0078	0.0426	0.004	0.004
2,3-Dimethylpentane	I7	0.0020	0.0109	0.001	0.001

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1,1-Dimethylcyclopentane	N7	0.0016	0.0086	0.001	0.001
3-Methylhexane	I7	0.0071	0.0387	0.003	0.003
1c,3-Dimethylcyclopentane	N7	0.0017	0.0091	0.001	0.001
1t,3-Dimethylcyclopentane	N7	0.0015	0.0080	0.001	0.001
3-Ethylpentane	I7	0.0004	0.0022	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0027	0.0144	0.001	0.001
UnknownC6s	U6	0.0001	0.0005	0.000	0.000
n-Heptane	P7	0.0180	0.0982	0.008	0.008
1c,2-Dimethylcyclopentane	N7	0.0003	0.0016	0.000	0.000
Methylcyclohexane	N7	0.0221	0.1182	0.009	0.009
2,2-Dimethylhexane	I8	0.0008	0.0050	0.000	0.000
1,1,3-Trimethylcyclopentane	N7	0.0001	0.0006	0.000	0.000
Ethylcyclopentane	N7	0.0006	0.0032	0.000	0.000
2,5-Dimethylhexane	I8	0.0008	0.0050	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0007	0.0044	0.000	0.000
2,4-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0004	0.0025	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	0.0076	0.0381	0.003	0.003
2,3-Dimethylhexane	I8	0.0006	0.0038	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0001	0.0006	0.000	0.000
2-Methylheptane	I8	0.0031	0.0193	0.002	0.002
4-Methylheptane	I8	0.0009	0.0056	0.000	0.000
3-Methyl-3-ethylpentane	I8	0.0001	0.0006	0.000	0.000
3,4-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
3-Methylheptane	I8	0.0021	0.0131	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0029	0.0177	0.001	0.001
3-Ethylhexane	I8	0.0001	0.0006	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0012	0.0074	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0006	0.0037	0.000	0.000
3c-Ethylmethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0002	0.0012	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0009	0.0055	0.000	0.000
n-Octane	P8	0.0054	0.0336	0.003	0.003
1c,4-Dimethylcyclohexane	N8	0.0004	0.0025	0.000	0.000
i-Propylcyclopentane	I8	0.0001	0.0006	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
2,2-Dimethylheptane	I9	0.0003	0.0021	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0006	0.0041	0.000	0.000
2,2,3-Trimethylhexane	I9	0.0002	0.0014	0.000	0.000
2,4-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
4,4-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
Ethylcyclohexane	N8	0.0006	0.0037	0.000	0.000
n-Propylcyclopentane	N8	0.0004	0.0025	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
2,5-Dimethylheptane	I9	0.0004	0.0028	0.000	0.000
3,3-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
3,5-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
2,6-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
Ethylbenzene	I8	0.0003	0.0017	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0012	0.0069	0.000	0.000
1,4-Dimethylbenzene (p-Xylene)	A8	0.0004	0.0023	0.000	0.000
4-Methyloctane	I9	0.0002	0.0014	0.000	0.000
2-Methyloctane	I9	0.0003	0.0021	0.000	0.000
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	0.0001	0.0007	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	0.0003	0.0021	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0002	0.0011	0.000	0.000
i-Butylcyclopentane	N9	0.0001	0.0007	0.000	0.000
n-Nonane	P9	0.0012	0.0084	0.001	0.001

1,1-Methylethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
i-Propylbenzene	A9	0.0001	0.0007	0.000	0.000
n-Butylcyclopentane	N9	0.0001	0.0007	0.000	0.000
n-Propylbenzene	A9	0.0001	0.0007	0.000	0.000
1,3-Methylethylbenzene	A9	0.0001	0.0007	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0001	0.0007	0.000	0.000
UnknownC9s	U9	0.0004	0.0028	0.000	0.000
n-Decane	P10	0.0003	0.0023	0.000	0.000
UnknownC10s	U10	0.0002	0.0015	0.000	0.000
1,3-Methyl-n-butylbenzene	A11	0.0001	0.0008	0.000	0.000
1,3-Di-n-propylbenzene	A12	0.0001	0.0009	0.000	0.000
n-Tetradecane	P14	0.0001	0.0011	0.000	0.000
UnknownC14s	U14	0.0001	0.0011	0.000	0.000
UnknownC15s	U15	0.0001	0.0011	0.000	0.000
n-Hexadecane	P16	0.0001	0.0013	0.000	0.000
UnknownC17s	U17	0.0001	0.0013	0.000	0.000
TOTAL		100.00000	100.00000	2.1047	2.1158

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0087	0.0370
TOLUENE	0.0076	0.0381
ETHYLBENZENE	0.0003	0.0017
XYLENES	0.0018	0.0103
TOTAL BTEX	0.0184	0.0871

**(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 :	963.1 /scf	968.3	/scf
	NET WET REAL :	946.3 /scf	951.5	/scf
HHV	GROSS DRY REAL :	1066.2 /scf	1072.0	/scf
	GROSS WET REAL :	1047.6 /scf	1053.4	/scf
	NET HEATING VALUE (60 °F ideal reaction):		19928.9	Btu/lbm
	GROSS HEATING VALUE (60°F ideal reaction):		22067.9	Btu/lbm
	RELATIVE DENSITY (AIR=1):		0.6333	
	DENSITY		0.04839	lb/scf
	COMPRESSIBILITY FACTOR :		0.9975	
	REGULAR WOBBE INDEX		1340.7	

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

Net Dry Ideal BTU	4762.2 /scf	Relative Density - SG (Air=1)	3.2743		***C6+factors***
Gross Dry Ideal BTU	5120.9 /scf	**Z** Compressiblity Factor	0.9925		0.99171
Net Dry Ideal BTU	19253.6 /lb	Density Factor	249.871	lbm/1000 ft3	
Gross Dry Ideal BTU	20703.6 /lb	Molar Mass or MW	94.829	g/mol	
		Volume Liquid Ideal gas	0.084	scf/gal	24

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.