EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY:	**05-103-11165**	NAME/DESCRIP :	**PICEANCE CREEK UNIT 297-12A8**
LEASE #:	**COC - 47666A, 125190177**		**INTERMEDIATE CASING**
FIELD/AREA:			
PROJECT NO. :	**202409060**	ANALYSIS NO. :	**02**
COMPANY NAME :	**QB ENERGY OPERATING, LLC**	ANALYSIS DATE:	SEPTEMBER 23, 2024 08:16
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	SEPTEMBER 11, 2024 12:45
CUSTOMER REF:		TO:	
PRODUCER :	QB ENERGY OPERATING, LLC	EFFECTIVE DATE:	
FIELD DATA			
SAMPLE CYCLE:		SAMPLE TYPE:	SPOT
SAMPLE PRES. :	2 psig	PROBE :	
FLOW PRES. :	psig	CYLINDER NO. :	ECA-741
LAB PRES:	psig	SAMPLED BY :	ANDREW T.
SAMPLE TEMP. :	70 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	0.0619	0.1015	0.0080	0.0080
HELIUM	0.00	0.00	---	---
HYDROGEN	0.01	0.00	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.07	0.10	---	---
CARBON DIOXIDE	6.67	15.02	---	---
METHANE	86.0877	70.6737	---	---
ETHANE	4.9156	7.5638	1.3102	1.3173
PROPANE	1.1222	2.5323	0.3078	0.3095
I-BUTANE	0.2938	0.8738	0.0959	0.0965
N-BUTANE	0.2208	0.6567	0.0690	0.0693
I-PENTANE	0.1177	0.4342	0.0420	0.0422
N-PENTANE	0.0739	0.2729	0.0270	0.0271
HEXANES PLUS	0.3564	1.7711	0.1430	0.1433
TOTALS	100.00000	100.00000	2.0029	2.0132

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0120	0.0480
TOLUENE	0.0276	0.1301
ETHYLBENZENE	0.0010	0.0054
XYLENES	0.0075	0.0407
TOTAL BTEX	0.0481	0.2242

*(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 :	926.8	/scf	931.9	/scf
	NET WET REAL :	910.6	/scf	915.7	/scf
HHV	GROSS DRY REAL :	1026.4	/scf	1032.0	/scf
	GROSS WET REAL :	1008.5	/scf	1014.1	/scf
	NET HEATING VALUE (60 °F ideal reaction):			18038.6	Btu/lbm
	GROSS HEATING VALUE (60°F ideal reaction):			19971.4	Btu/lbm
	RELATIVE DENSITY (AIR=1):			0.6744	
	DENSITY			0.05149	lbm/scf
	COMPRESSIBILITY FACTOR :			0.9975	
	REGULAR WOBBE INDEX			1250.6	

EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	202409060	ANALYSIS NO. :	02
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	SEPTEMBER 23, 2024 08:16
ACCOUNT NO. :		SAMPLE DATE :	SEPTEMBER 11, 2024 12:45
PRODUCER :	QB ENERGY OPERATING, LLC	CYLINDER NO. :	ECA-741
LEASE NO. :	COC - 47666A, 125190177	SAMPLED BY :	ANDREW T.
NAME/DESCRIP :	PICEANCE CREEK UNIT 297-12A8 INTERMEDIATE CASING		
FIELD DATA		SAMPLE TEMP. :	70
SAMPLE PRES. :	2	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm mol*		
COMMENTS :	*SPOT*		

Componet	Mole %	Wt %
Helium	0.00	0.00
Hydrogen	0.01	0.00
Carbon Dioxide	6.67	15.02
Nitrogen	0.07	0.10
Methane	86.0877	70.6737
Ethane	4.9156	7.5638
Propane	1.1222	2.5323
Isobutane	0.2938	0.8738
n-Butane	0.2208	0.6567
Isopentane	0.1144	0.4224
n-Pentane	0.0739	0.2729
Cyclopentane	0.0033	0.0118
n-Hexane	0.0394	0.1737
Cyclohexane	0.0168	0.0724
Other Hexanes	0.0749	0.3291
Heptanes	0.0638	0.3260
Methylcyclohexane	0.0373	0.1874
2,2,4 Trimethylpentane	0.0001	0.0006
Benzene	0.0120	0.0480
Toluene	0.0276	0.1301
Ethylbenzene	0.0010	0.0054
Xylenes	0.0075	0.0407
C8+ Heavies	0.0760	0.4577
Subtotal	99.93810	99.89850
Oxygen/Argon	0.00	0.00
Alcohols	0.0619	0.1015
Total	100.00000	100.00000

Calculated Values BTU @ **14.65**		**Total Sample**	**C6+ Fraction**	**C8+ Fraction**	**C10+ Fraction**	
LHV	Net Dry Real:	926.8	4866.6	5802.9	7726.2	**Btu/scf**
	Net Wet Real:	910.6	4781.5	5701.5	7591.1	**Btu/scf**
HHV	Gross Dry Real:	1026.4	5226.7	6237.8	8292.7	**Btu/scf**
	Gross Wet Real:	1008.5	5135.3	6128.8	8147.7	**Btu/scf**
Other Calculated Values						
Regualr Wobbe Index*		1250.6	2844.9	3113.1	3584.7	**Btu/scf**
Net Heating Value (60 °F ideal reaction):		18038.6	19201.4	19578.3	18538.6	**Btu/lbm**
Gross Heating Value (60°F ideal reaction):		19971.4	20618.5	21047.5	19896.8	**Btu/lbm**
Molar Mass (MW):		19.54201	97.09	116.43	155.875	**g/mol**
Relative Density (AIR=1):		0.6744	3.3522	4.0197	5.3822	**SG**
Density:		0.05149	0.25585	0.30681	0.41076	**lbm/scf**
Compressiblity Factor:		0.9975	0.9935	0.9975	0.9997	**Z**
Liquid Volume real gas @:	**14.65**	17.6496	0.1426	0.0359	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.

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EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PRIMARY DB KEY:	**05-103-11165**	NAME/DESCRIP :	**PICEANCE CREEK UNIT 297-12A8**
LEASE #:	**COC - 47666A, 125190177**		**INTERMEDIATE CASING**
FIELD/AREA:			
PROJECT NO. :	**202409060**	ANALYSIS NO. :	**02**
COMPANY NAME :	**QB ENERGY OPERATING, LLC**	ANALYSIS DATE:	SEPTEMBER 23, 2024 08:16
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	SEPTEMBER 11, 2024 12:45
CUSTOMER REF:		TO:	
PRODUCER :	QB ENERGY OPERATING, LLC	EFFECTIVE DATE:	
FIELD DATA			
SAMPLE CYCLE:		SAMPLE TYPE:	SPOT
SAMPLE PRES. :	2 psig	PROBE :	
FLOW PRES. :	psig	CYLINDER NO. :	ECA-741
LAB PRES:	psig	SAMPLED BY :	ANDREW T.
SAMPLE TEMP. :	70 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**
Hydrogen	---	0.01	0.00	---	---
Oxygen/Argon	---	0.00	0.00	---	---
Nitrogen	---	0.07	0.10	---	---
Carbon Dioxide	---	6.67	15.02	---	---
Methane	P1	86.0877	70.6737	---	---
Ethane	P2	4.9156	7.5638	1.310	1.317
Propane	P3	1.1222	2.5323	0.308	0.310
i-Butane	I4	0.2938	0.8738	0.096	0.097
Methanol	X1	0.0619	0.1015	0.008	0.008
n-Butane	P4	0.2208	0.6567	0.069	0.069
2,2-Dimethylpropane	I5	0.0035	0.0130	0.001	0.001
i-Pentane	I5	0.1109	0.4094	0.040	0.040
n-Pentane	P5	0.0739	0.2729	0.027	0.027
2,2-Dimethylbutane	I6	0.0051	0.0225	0.002	0.002
Cyclopentane	N5	0.0033	0.0118	0.001	0.001
2,3-Dimethylbutane	I6	0.0074	0.0327	0.003	0.003
2-Methylpentane	I6	0.0320	0.1411	0.013	0.013
3-Methylpentane	I6	0.0180	0.0794	0.007	0.007
n-Hexane	P6	0.0394	0.1737	0.016	0.016
2,2-Dimethylpentane	I7	0.0014	0.0072	0.001	0.001
Methylcyclopentane	N6	0.0124	0.0534	0.004	0.004
2,4-Dimethylpentane	I7	0.0021	0.0108	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0006	0.0031	0.000	0.000
Benzene	A6	0.0120	0.0480	0.003	0.003
3,3-Dimethylpentane	I7	0.0010	0.0051	0.000	0.000
Cyclohexane	N6	0.0168	0.0724	0.006	0.006
2-Methylhexane	I7	0.0100	0.0513	0.005	0.005

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2,3-Dimethylpentane	I7	0.0026	0.0134	0.001	0.001
1,1-Dimethylcyclopentane	N7	0.0020	0.0100	0.001	0.001
3-Methylhexane	I7	0.0093	0.0477	0.004	0.004
1c,3-Dimethylcyclopentane	N7	0.0020	0.0100	0.001	0.001
1t,3-Dimethylcyclopentane	N7	0.0019	0.0096	0.001	0.001
3-Ethylpentane	I7	0.0005	0.0026	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0035	0.0176	0.002	0.002
2,2,4-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
n-Heptane	P7	0.0227	0.1164	0.010	0.010
1c,2-Dimethylcyclopentane	N7	0.0025	0.0125	0.001	0.001
Methylcyclohexane	N7	0.0373	0.1874	0.015	0.015
2,2-Dimethylhexane	I8	0.0015	0.0088	0.001	0.001
1,1,3-Trimethylcyclopentane	N7	0.0003	0.0017	0.000	0.000
Ethylcyclopentane	N7	0.0014	0.0070	0.001	0.001
2,5-Dimethylhexane	I8	0.0017	0.0099	0.001	0.001
2,2,3-Trimethylpentane	I8	0.0015	0.0088	0.001	0.001
2,4-Dimethylhexane	I8	0.0003	0.0017	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0012	0.0069	0.001	0.001
3,3-Dimethylhexane	I8	0.0006	0.0035	0.000	0.000
2,3,4-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
2,3,3-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
Toluene	A7	0.0276	0.1301	0.009	0.009
2,3-Dimethylhexane	I8	0.0015	0.0088	0.001	0.001
2-Methyl-3-ethylpentane	I8	0.0002	0.0012	0.000	0.000
2-Methylheptane	I8	0.0077	0.0450	0.004	0.004
4-Methylheptane	I8	0.0023	0.0135	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0002	0.0012	0.000	0.000
3,4-Dimethylhexane	I8	0.0002	0.0012	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
3-Methylheptane	I8	0.0053	0.0310	0.003	0.003
1c,2t,3-Trimethylcyclopentane	N8	0.0091	0.0523	0.005	0.005
3-Ethylhexane	I8	0.0004	0.0024	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0041	0.0235	0.002	0.002
1,1-Dimethylcyclohexane	N8	0.0017	0.0098	0.001	0.001
2,2,5-Trimethylhexane	I9	0.0002	0.0013	0.000	0.000
3c-Ethylmethylcyclopentane	N8	0.0003	0.0017	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0003	0.0017	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0004	0.0023	0.000	0.000
2,2,4-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0028	0.0161	0.001	0.001
1t,3-Dimethylcyclohexane	N8	0.0002	0.0011	0.000	0.000
n-Octane	P8	0.0128	0.0748	0.007	0.007
1c,4-Dimethylcyclohexane	N8	0.0015	0.0086	0.001	0.001
i-Propylcyclopentane	I8	0.0001	0.0006	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0002	0.0013	0.000	0.000
2,2,3,4-Tetramethylpentane	I9	0.0001	0.0007	0.000	0.000
2,3,4-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
2,2-Dimethylheptane	I9	0.0006	0.0039	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0020	0.0129	0.001	0.001
2,2,3-Trimethylhexane	I9	0.0004	0.0026	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	0.0013	0.0075	0.001	0.001
n-Propylcyclopentane	N8	0.0007	0.0040	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0008	0.0052	0.000	0.000
2,5-Dimethylheptane	I9	0.0003	0.0019	0.000	0.000
3,3-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
3,5-Dimethylheptane	I9	0.0002	0.0013	0.000	0.000

2,6-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
Ethylbenzene	I8	0.0010	0.0054	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0049	0.0266	0.002	0.002
1,4-Dimethylbenzene (p-Xylene)	A8	0.0019	0.0103	0.001	0.001
3,4-Dimethylheptane (2)	I9	0.0001	0.0007	0.000	0.000
4-Methyloctane	I9	0.0004	0.0026	0.000	0.000
2-Methyloctane	I9	0.0006	0.0039	0.000	0.000
1c,2t,3-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
3-Methyloctane	I9	0.0001	0.0007	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	0.0006	0.0039	0.000	0.000
3,3-Diethylpentane	I9	0.0001	0.0007	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0007	0.0038	0.000	0.000
i-Butylcyclopentane	N9	0.0003	0.0019	0.000	0.000
UnknownC8s	U8	0.0001	0.0006	0.000	0.000
n-Nonane	P9	0.0018	0.0118	0.001	0.001
1,1-Methylethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
i-Propylbenzene	A9	0.0001	0.0006	0.000	0.000
i-Propylcyclohexane	N9	0.0001	0.0007	0.000	0.000
2,4-Dimethyloctane	I10	0.0001	0.0007	0.000	0.000
2,6-Dimethyloctane	I10	0.0001	0.0007	0.000	0.000
2,5-Dimethyloctane	I10	0.0001	0.0007	0.000	0.000
n-Butylcyclopentane	N9	0.0002	0.0013	0.000	0.000
3,3-Dimethyloctane	I10	0.0001	0.0007	0.000	0.000
n-Propylbenzene	A9	0.0002	0.0012	0.000	0.000
3,6-Dimethyloctane	I10	0.0001	0.0007	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0001	0.0007	0.000	0.000
1,3-Methylethylbenzene	A9	0.0004	0.0025	0.000	0.000
1,4-Methylethylbenzene	A9	0.0002	0.0012	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0003	0.0018	0.000	0.000
2,3-Dimethyloctane	I10	0.0001	0.0007	0.000	0.000
5-Methylnonane	I10	0.0001	0.0007	0.000	0.000
1,2-Methylethylbenzene	A9	0.0001	0.0006	0.000	0.000
2-Methylnonane	I10	0.0001	0.0007	0.000	0.000
3-Methylnonane	I10	0.0001	0.0007	0.000	0.000
t-Butylbenzene	A10	0.0005	0.0034	0.000	0.000
UnknownC9s	U9	0.0004	0.0026	0.000	0.000
n-Decane	P10	0.0003	0.0022	0.000	0.000
1,2-Methyl-i-propylbenzene	A10	0.0001	0.0007	0.000	0.000
1,4-Diethylbenzene	A10	0.0001	0.0007	0.000	0.000
UnknownC10s	U10	0.0003	0.0022	0.000	0.000
n-Undecane	P11	0.0002	0.0016	0.000	0.000
UnknownC11s	U11	0.0001	0.0008	0.000	0.000
n-Dodecane	P12	0.0003	0.0026	0.000	0.000
1,3,5-Triethylbenzene	A12	0.0001	0.0008	0.000	0.000
1,2,3,4,5-Pentamethylbenzene	A13	0.0001	0.0008	0.000	0.000
n-Tridecane	P13	0.0002	0.0019	0.000	0.000
n-Tetradecane	P14	0.0001	0.0010	0.000	0.000
UnknownC14s	U14	0.0001	0.0010	0.000	0.000
n-Pentadecane	P15	0.0001	0.0011	0.000	0.000
UnknownC15s	U15	0.0001	0.0011	0.000	0.000
n-Hexadecane	P16	0.0001	0.0012	0.000	0.000
TOTAL		100.00000	100.00000	2.0029	2.0132

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0120	0.0480
TOLUENE	0.0276	0.1301
ETHYLBENZENE	0.0010	0.0054
XYLENES	0.0075	0.0407
TOTAL BTEX	0.0481	0.2242

**(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**

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	NET WET REAL :	910.6 /scf	915.7 /scf
HHV	GROSS DRY REAL :	1026.4 /scf	1032.0 /scf
	GROSS WET REAL :	1008.5 /scf	1014.1 /scf
	NET HEATING VALUE (60 °F ideal reaction):		18038.6 Btu/lbm
	GROSS HEATING VALUE (60°F ideal reaction):		19971.4 Btu/lbm
	RELATIVE DENSITY (AIR=1):		0.6744
	DENSITY		0.05149 lb/scf
	COMPRESSIBILITY FACTOR :		0.9975
	REGULAR WOBBE INDEX		1250.6

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

					C6+factors
Net Dry Ideal BTU	4849.9 /scf	Relative Density - SG (Air=1)	3.3522		0.99262
Gross Dry Ideal BTU	5208.8 /scf	Z Compressiblity Factor	0.99345		
Net Dry Ideal BTU	19201.4 /lb	Density Factor	255.849	lbm/1000 ft3	
Gross Dry Ideal BTU	20618.5 /lb	Molar Mass or MW	97.09	g/mol	
		Volume Liquid Ideal gas	0.143	scf/gal	23.4

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.

EMPACT Analytical Systems, Inc 365 S. Main Street, Brighton, CO 80601 303-637-0150