EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY:	**05-103-11165**	NAME/DESCRIP :	**PICEANCE CREEK UNIT 297-12A8**
LEASE #:	**COC - 47666A, 125190177**		**SURFACE CASING #2**
FIELD/AREA:			
PROJECT NO. :	**202409060**	ANALYSIS NO. :	**03**
COMPANY NAME :	**QB ENERGY OPERATING, LLC**	ANALYSIS DATE:	SEPTEMBER 23, 2024 10:06
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	SEPTEMBER 11, 2024 12:48
CUSTOMER REF:		TO:	
PRODUCER :	QB ENERGY OPERATING, LLC	EFFECTIVE DATE:	
FIELD DATA			
SAMPLE CYCLE:		SAMPLE TYPE:	SPOT
SAMPLE PRES. :	1141 psig	PROBE :	
FLOW PRES. :	psig	CYLINDER NO. :	ECA-747
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
HELIUM	0.02	0.00	---	---
HYDROGEN	0.02	0.00	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.70	1.14	---	---
CARBON DIOXIDE	0.17	0.44	---	---
METHANE	95.5042	89.4212	---	---
ETHANE	2.1379	3.7520	0.5695	0.5726
PROPANE	0.6237	1.6051	0.1708	0.1718
I-BUTANE	0.1294	0.4390	0.0420	0.0422
N-BUTANE	0.2186	0.7416	0.0689	0.0693
I-PENTANE	0.0915	0.3851	0.0340	0.0341
N-PENTANE	0.0882	0.3714	0.0320	0.0321
HEXANES PLUS	0.2965	1.7046	0.1230	0.1232
TOTALS	100.00000	100.00000	1.0402	1.0453

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0049	0.0224
TOLUENE	0.0025	0.0134
ETHYLBENZENE	0.0008	0.0050
XYLENES	0.0019	0.0118
TOTAL BTEX	0.0101	0.0526

*(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 :	948.0	/scf	953.2	/scf
	NET WET REAL :	931.4	/scf	936.6	/scf
HHV	GROSS DRY REAL :	1050.9	/scf	1056.7	/scf
	GROSS WET REAL :	1032.5	/scf	1038.3	/scf
	NET HEATING VALUE (60 °F ideal reaction):			21031.0	Btu/lbm
	GROSS HEATING VALUE (60°F ideal reaction):			23315.7	Btu/lbm
	RELATIVE DENSITY (AIR=1):			0.5909	
	DENSITY			0.04515	lbm/scf
	COMPRESSIBILITY FACTOR :			0.9978	
	REGULAR WOBBE INDEX			1368.4	

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EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	202409060	ANALYSIS NO. :	03
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	SEPTEMBER 23, 2024 10:06
ACCOUNT NO. :		SAMPLE DATE :	SEPTEMBER 11, 2024 12:48
PRODUCER :	QB ENERGY OPERATING, LLC	CYLINDER NO. :	ECA-747
LEASE NO. :	COC - 47666A, 125190177	SAMPLED BY :	ANDREW T.
NAME/DESCRIP :	PICEANCE CREEK UNIT 297-12A8 SURFACE CASING #2		
FIELD DATA		SAMPLE TEMP. :	70
SAMPLE PRES. :	1141	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm mol*		
COMMENTS :	*SPOT*		

Componet	Mole %	Wt %
Helium	0.02	0.00
Hydrogen	0.02	0.00
Carbon Dioxide	0.17	0.44
Nitrogen	0.70	1.14
Methane	95.5042	89.4212
Ethane	2.1379	3.7520
Propane	0.6237	1.6051
Isobutane	0.1294	0.4390
n-Butane	0.2186	0.7416
Isopentane	0.0894	0.3765
n-Pentane	0.0882	0.3714
Cyclopentane	0.0021	0.0086
n-Hexane	0.0453	0.2279
Cyclohexane	0.0131	0.0644
Other Hexanes	0.0650	0.3262
Heptanes	0.0642	0.3745
Methylcyclohexane	0.0270	0.1547
2,2,4 Trimethylpentane	0.0000	0.0000
Benzene	0.0049	0.0224
Toluene	0.0025	0.0134
Ethylbenzene	0.0008	0.0050
Xylenes	0.0019	0.0118
C8+ Heavies	0.0718	0.5043
Subtotal	100.00000	100.00000
Oxygen/Argon	0.00	0.00
Total	100.00000	100.00000

Calculated Values BTU @ **14.65**		**Total Sample**	**C6+ Fraction**	**C8+ Fraction**	**C10+ Fraction**	
LHV	Net Dry Real:	948.0	4982.2	5991.9	7107.0	**Btu/scf**
	Net Wet Real:	931.4	4895.1	5887.2	6982.8	**Btu/scf**
HHV	Gross Dry Real:	1050.9	5364.5	6448.4	7645.3	**Btu/scf**
	Gross Wet Real:	1032.5	5270.7	6335.7	7511.7	**Btu/scf**
Other Calculated Values						
Regualr Wobbe Index*		1368.4	2898.2	3174.5	3447.7	**Btu/scf**
Net Heating Value (60 °F ideal reaction):		21031.0	19332.8	19516.5	19221.7	**Btu/lbm**
Gross Heating Value (60°F ideal reaction):		23315.7	20816.6	21002.4	20679.2	**Btu/lbm**
Molar Mass (MW):		17.13512	98.476	119.775	143.177	**g/mol**
Relative Density (AIR=1):		0.5909	3.4002	4.1350	4.9436	**SG**
Density:		0.04515	0.25950	0.31562	0.37730	**lbm/scf**
Compressiblity Factor:		0.9978	0.9931	0.9979	0.9995	**Z**
Liquid Volume real gas @:	**14.65**	17.2458	0.1226	0.0319	0.002	**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**
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OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	SEPTEMBER 11, 2024 12:48
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PRODUCER :	QB ENERGY OPERATING, LLC	EFFECTIVE DATE:	
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SAMPLE PRES. :	1141 psig	PROBE :	
FLOW PRES. :	psig	CYLINDER NO. :	ECA-747
LAB PRES:	psig	SAMPLED BY :	ANDREW T.
SAMPLE TEMP. :	70 °f	SAMPLING COMPANY:	QB ENERGY OPERATING, LLC
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	---	0.02	0.00	---	---
Hydrogen	---	0.02	0.00	---	---
Oxygen/Argon	---	0.00	0.00	---	---
Nitrogen	---	0.70	1.14	---	---
Carbon Dioxide	---	0.17	0.44	---	---
Methane	P1	95.5042	89.4212	---	---
Ethane	P2	2.1379	3.7520	0.570	0.573
Propane	P3	0.6237	1.6051	0.171	0.172
i-Butane	I4	0.1294	0.4390	0.042	0.042
n-Butane	P4	0.2186	0.7416	0.069	0.069
2,2-Dimethylpropane	I5	0.0042	0.0177	0.002	0.002
i-Pentane	I5	0.0852	0.3588	0.031	0.031
n-Pentane	P5	0.0882	0.3714	0.032	0.032
2,2-Dimethylbutane	I6	0.0050	0.0252	0.002	0.002
Cyclopentane	N5	0.0021	0.0086	0.001	0.001
2,3-Dimethylbutane	I6	0.0053	0.0267	0.002	0.002
2-Methylpentane	I6	0.0306	0.1539	0.013	0.013
3-Methylpentane	I6	0.0172	0.0865	0.007	0.007
n-Hexane	P6	0.0453	0.2279	0.019	0.019
2,2-Dimethylpentane	I7	0.0014	0.0082	0.001	0.001
Methylcyclopentane	N6	0.0069	0.0339	0.002	0.002
2,4-Dimethylpentane	I7	0.0020	0.0117	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0006	0.0035	0.000	0.000
Benzene	A6	0.0049	0.0224	0.001	0.001
3,3-Dimethylpentane	I7	0.0010	0.0058	0.000	0.000
Cyclohexane	N6	0.0131	0.0644	0.004	0.004
2-Methylhexane	I7	0.0106	0.0620	0.005	0.005
2,3-Dimethylpentane	I7	0.0031	0.0182	0.001	0.001
1,1-Dimethylcyclopentane	N7	0.0020	0.0114	0.001	0.001
3-Methylhexane	I7	0.0104	0.0608	0.005	0.005
1c,3-Dimethylcyclopentane	N7	0.0013	0.0075	0.001	0.001
1t,3-Dimethylcyclopentane	N7	0.0012	0.0069	0.001	0.001
3-Ethylpentane	I7	0.0006	0.0035	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0029	0.0166	0.001	0.001
n-Heptane	P7	0.0249	0.1456	0.011	0.011
1c,2-Dimethylcyclopentane	N7	0.0012	0.0069	0.001	0.001

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Methylcyclohexane	N7	0.0270	0.1547	0.011	0.011
2,2-Dimethylhexane	I8	0.0012	0.0080	0.001	0.001
1,1,3-Trimethylcyclopentane	N7	0.0002	0.0013	0.000	0.000
Ethylcyclopentane	N7	0.0008	0.0046	0.000	0.000
2,5-Dimethylhexane	I8	0.0011	0.0074	0.001	0.001
2,2,3-Trimethylpentane	I8	0.0011	0.0074	0.001	0.001
2,4-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0006	0.0039	0.000	0.000
3,3-Dimethylhexane	I8	0.0005	0.0033	0.000	0.000
2,3,3-Trimethylpentane	I8	0.0002	0.0013	0.000	0.000
Toluene	A7	0.0025	0.0134	0.001	0.001
2,3-Dimethylhexane	I8	0.0003	0.0020	0.000	0.000
2-Methylheptane	I8	0.0061	0.0407	0.003	0.003
4-Methylheptane	I8	0.0017	0.0113	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0002	0.0013	0.000	0.000
3,4-Dimethylhexane	I8	0.0002	0.0013	0.000	0.000
3-Methylheptane	I8	0.0039	0.0260	0.002	0.002
1c,2t,3-Trimethylcyclopentane	N8	0.0047	0.0308	0.002	0.002
3-Ethylhexane	I8	0.0002	0.0013	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0019	0.0124	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0010	0.0065	0.000	0.000
2,2,5-Trimethylhexane	I9	0.0001	0.0008	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	0.0003	0.0020	0.000	0.000
2,2,4-Trimethylhexane	I9	0.0001	0.0008	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0018	0.0118	0.001	0.001
1t,3-Dimethylcyclohexane	N8	0.0002	0.0013	0.000	0.000
n-Octane	P8	0.0121	0.0807	0.006	0.006
1c,4-Dimethylcyclohexane	N8	0.0008	0.0053	0.000	0.000
i-Propylcyclopentane	I8	0.0001	0.0006	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0002	0.0015	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	0.0006	0.0045	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0022	0.0162	0.001	0.001
2,2,3-Trimethylhexane	I9	0.0002	0.0015	0.000	0.000
2,4-Dimethylheptane	I9	0.0001	0.0008	0.000	0.000
Ethylcyclohexane	N8	0.0020	0.0131	0.001	0.001
n-Propylcyclopentane	N8	0.0008	0.0053	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0003	0.0022	0.000	0.000
2,5-Dimethylheptane	I9	0.0010	0.0075	0.001	0.001
3,3-Dimethylheptane	I9	0.0003	0.0022	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
1,1,3-Trimethylcyclohexane	N9	0.0002	0.0015	0.000	0.000
Ethylbenzene	I8	0.0008	0.0050	0.000	0.000
2,3-Dimethylheptane	I9	0.0001	0.0008	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0014	0.0087	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0002	0.0012	0.000	0.000
3,4-Dimethylheptane	I9	0.0001	0.0008	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0001	0.0008	0.000	0.000
4-Ethylheptane	I9	0.0002	0.0015	0.000	0.000
4-Methyloctane	I9	0.0008	0.0060	0.000	0.000
2-Methyloctane	I9	0.0013	0.0098	0.001	0.001
3-Ethylheptane	I9	0.0001	0.0008	0.000	0.000
3-Methyloctane	I9	0.0002	0.0015	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	0.0013	0.0096	0.001	0.001
3,3-Diethylpentane	I9	0.0001	0.0008	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0003	0.0019	0.000	0.000

i-Butylcyclopentane	N9	0.0007	0.0051	0.000	0.000
UnknownC8s	U8	0.0010	0.0067	0.001	0.001
n-Nonane	P9	0.0057	0.0427	0.003	0.003
1,1-Methylethylcyclohexane	N9	0.0005	0.0037	0.000	0.000
i-Propylbenzene	A9	0.0002	0.0014	0.000	0.000
i-Propylcyclohexane	N9	0.0002	0.0015	0.000	0.000
2,2-Dimethyloctane	I10	0.0001	0.0008	0.000	0.000
2,4-Dimethyloctane	I10	0.0003	0.0025	0.000	0.000
2,6-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	0.0006	0.0044	0.000	0.000
3,3-Dimethyloctane	I10	0.0002	0.0016	0.000	0.000
n-Propylbenzene	A9	0.0008	0.0056	0.000	0.000
3,6-Dimethyloctane	I10	0.0002	0.0016	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0003	0.0025	0.000	0.000
1,3-Methylethylbenzene	A9	0.0002	0.0014	0.000	0.000
1,4-Methylethylbenzene	A9	0.0001	0.0007	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0002	0.0014	0.000	0.000
2,3-Dimethyloctane	I10	0.0001	0.0008	0.000	0.000
5-Methylnonane	I10	0.0003	0.0025	0.000	0.000
1,2-Methylethylbenzene	A9	0.0001	0.0007	0.000	0.000
2-Methylnonane	I10	0.0004	0.0033	0.000	0.000
3-Ethyloctane	I10	0.0001	0.0008	0.000	0.000
3-Methylnonane	I10	0.0003	0.0025	0.000	0.000
t-Butylbenzene	A10	0.0003	0.0023	0.000	0.000
i-Butylcyclohexane	N10	0.0001	0.0008	0.000	0.000
UnknownC9s	U9	0.0013	0.0098	0.001	0.001
n-Decane	P10	0.0014	0.0116	0.001	0.001
1,2-Methyl-i-propylbenzene	A10	0.0002	0.0016	0.000	0.000
3-Ethylnonane	I10	0.0001	0.0009	0.000	0.000
1,4-Diethylbenzene	A10	0.0001	0.0008	0.000	0.000
UnknownC10s	U10	0.0019	0.0158	0.001	0.001
n-Undecane	P11	0.0001	0.0009	0.000	0.000
UnknownC11s	U11	0.0001	0.0009	0.000	0.000
n-Pentadecane	P15	0.0001	0.0012	0.000	0.000
TOTAL		100.00000	100.00000	1.0402	1.0453

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0049	0.0224
TOLUENE	0.0025	0.0134
ETHYLBENZENE	0.0008	0.0050
XYLENES	0.0019	0.0118
TOTAL BTEX	0.0101	0.0526

**(DETAILED HYDROCARBON ANALYSIS/NJ 1993)*
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	NET WET REAL :	931.4 /scf	936.6 /scf
HHV	GROSS DRY REAL :	1050.9 /scf	1056.7 /scf
	GROSS WET REAL :	1032.5 /scf	1038.3 /scf
	NET HEATING VALUE (60 °F ideal reaction):		21031.0 Btu/lbm
	GROSS HEATING VALUE (60°F ideal reaction):		23315.7 Btu/lbm
	RELATIVE DENSITY (AIR=1):		0.5909
	DENSITY		0.04515 lb/scf
	COMPRESSIBILITY FACTOR :		0.9978
	REGULAR WOBBE INDEX		1368.4

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

Net Dry Ideal BTU	4963.2 /scf	Relative Density - SG (Air=1)	3.4002	***C6+factors***
Gross Dry Ideal BTU	5344.1 /scf	**Z** Compressiblity Factor	0.99307	0.9922
Net Dry Ideal BTU	19332.8 /lb	Density Factor	259.496 lbm/1000 ft3	
Gross Dry Ideal BTU	20816.6 /lb	Molar Mass or MW	98.476 g/mol	
		Volume Liquid Ideal gas	0.123 scf/gal	22.6

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