EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

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

PROJECT NO. : **202411074** ANALYSIS NO. : **02**
COMPANY NAME : **QB ENERGY OPERATING, LLC** ANALYSIS DATE: DECEMBER 06, 2024 13:24
OFFICE / BRANCH: PARACHUTE, CO SAMPLE DATE : NOVEMBER 19, 2024 12:25
CUSTOMER REF: TO:
PRODUCER : QB ENERGY OPERATING, LLC EFFECTIVE DATE:

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

SAMPLE CYCLE: SAMPLE TYPE: SPOT
SAMPLE PRES. : 210 psig PROBE :
FLOW PRES. : psig CYLINDER NO. : ECA-726
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	0.0002	0.0003	0.0000	0.0000
HELIUM	0.02	0.00	---	---
HYDROGEN	0.01	0.00	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.50	0.80	---	---
CARBON DIOXIDE	0.19	0.48	---	---
METHANE	93.9243	86.3164	---	---
ETHANE	3.1818	5.4808	0.8483	0.8530
PROPANE	1.1853	2.9941	0.3257	0.3275
I-BUTANE	0.2048	0.6819	0.0669	0.0673
N-BUTANE	0.3522	1.1727	0.1109	0.1115
I-PENTANE	0.1127	0.4652	0.0400	0.0402
N-PENTANE	0.1019	0.4212	0.0370	0.0372
HEXANES PLUS	0.2168	1.1874	0.0820	0.0822
TOTALS	100.00000	100.00000	1.5108	1.5189

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0062	0.0277
TOLUENE	0.0011	0.0058
ETHYLBENZENE	0.0002	0.0012
XYLENES	0.0007	0.0042
TOTAL BTEX	0.0082	0.0389

**(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 :	966.6 /scf	971.9 /scf
	NET WET REAL :	949.7 /scf	955.0 /scf
HHV	GROSS DRY REAL :	1070.9 /scf	1076.8 /scf
	GROSS WET REAL :	1052.2 /scf	1058.1 /scf

NET HEATING VALUE (60 °F ideal reaction):	21049.6	Btu/lbm
GROSS HEATING VALUE (60°F ideal reaction):	23323.1	Btu/lbm
RELATIVE DENSITY (AIR=1):	0.6013	
DENSITY	0.04600	lbm/scf
COMPRESSIBILITY FACTOR :	0.9977	
REGULAR WOBBE INDEX	1382.2	

EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	202411074	ANALYSIS NO. :	02
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	DECEMBER 06, 2024 13:24
ACCOUNT NO. :		SAMPLE DATE :	NOVEMBER 19, 2024 12:25
PRODUCER :	QB ENERGY OPERATING, LLC	CYLINDER NO. :	ECA-726
LEASE NO. :		SAMPLED BY :	ANDREW TERRAZAS
NAME/DESCRIP :	PICEANCE CREEK UNIT 297-11A1 INTERMEDIATE CASING		
FIELD DATA		SAMPLE TEMP. :	29
SAMPLE PRES. :	210	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm mol*		
COMMENTS :	*SPOT*		

Componet	Mole %	Wt %
Helium	0.02	0.00
Hydrogen	0.01	0.00
Carbon Dioxide	0.19	0.48
Nitrogen	0.50	0.80
Methane	93.9243	86.3164
Ethane	3.1818	5.4808
Propane	1.1853	2.9941
Isobutane	0.2048	0.6819
n-Butane	0.3522	1.1727
Isopentane	0.1082	0.4471
n-Pentane	0.1019	0.4212
Cyclopentane	0.0045	0.0181
n-Hexane	0.0374	0.1846
Cyclohexane	0.0117	0.0564
Other Hexanes	0.0602	0.2961
Heptanes	0.0444	0.2542
Methylcyclohexane	0.0166	0.0934
2,2,4 Trimethylpentane	0.0001	0.0006
Benzene	0.0062	0.0277
Toluene	0.0011	0.0058
Ethylbenzene	0.0002	0.0012
Xylenes	0.0007	0.0042
C8+ Heavies	0.0382	0.2632
Subtotal	99.99980	99.99970
Oxygen/Argon	0.00	0.00
Alcohols	0.0002	0.0003
Total	100.00000	100.00000

Calculated Values BTU @ **14.65**		**Total Sample**	**C6+ Fraction**	**C8+ Fraction**	**C10+ Fraction**	
LHV	Net Dry Real:	966.6	4851.2	6031.7	7714.1	**Btu/scf**
	Net Wet Real:	949.7	4766.4	5926.3	7579.2	**Btu/scf**
HHV	Gross Dry Real:	1070.9	5223.4	6496.5	8334.0	**Btu/scf**
	Gross Wet Real:	1052.2	5132.1	6382.9	8188.3	**Btu/scf**
Other Calculated Values						
Regualr Wobbe Index*		1382.2	2860.0	3190.1	3644.3	**Btu/scf**
Net Heating Value (60 °F ideal reaction):		21049.6	19291.2	19443.7	18774.0	**Btu/lbm**
Gross Heating Value (60°F ideal reaction):		23323.1	20775.0	20943.8	20271.8	**Btu/lbm**
Molar Mass (MW):		17.45791	95.714	120.336	152.34	**g/mol**
Relative Density (AIR=1):		0.6013	3.3042	4.1552	5.2597	**SG**
Density:		0.04600	0.25220	0.31712	0.40144	**lbm/scf**
Compressiblity Factor:		0.9977	0.9922	0.9978	0.9997	**Z**
Liquid Volume real gas @:	**14.65**	17.4293	0.0817	0.012	0.001	**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

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SAMPLE PRES. :	210 psig	PROBE :	
FLOW PRES. :	psig	CYLINDER NO. :	ECA-726
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**
Helium	---	0.02	0.00	---	---
Hydrogen	---	0.01	0.00	---	---
Nitrogen	---	0.50	0.80	---	---
Carbon Dioxide	---	0.19	0.48	---	---
Methane	P1	93.9243	86.3164	---	---
Ethane	P2	3.1818	5.4808	0.848	0.853
Propane	P3	1.1853	2.9941	0.326	0.328
i-Butane	I4	0.2048	0.6819	0.067	0.067
Methanol	X1	0.0002	0.0003	0.000	0.000
n-Butane	P4	0.3522	1.1727	0.111	0.112
2,2-Dimethylpropane	I5	0.0033	0.0136	0.001	0.001
i-Pentane	I5	0.1049	0.4335	0.038	0.038
n-Pentane	P5	0.1019	0.4212	0.037	0.037
2,2-Dimethylbutane	I6	0.0035	0.0173	0.001	0.001
Cyclopentane	N5	0.0045	0.0181	0.001	0.001
2,3-Dimethylbutane	I6	0.0048	0.0237	0.002	0.002
2-Methylpentane	I6	0.0277	0.1367	0.011	0.011
3-Methylpentane	I6	0.0148	0.0730	0.006	0.006
n-Hexane	P6	0.0374	0.1846	0.015	0.015
2,2-Dimethylpentane	I7	0.0008	0.0046	0.000	0.000
Methylcyclopentane	N6	0.0093	0.0449	0.003	0.003
2,4-Dimethylpentane	I7	0.0014	0.0080	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0004	0.0023	0.000	0.000
Benzene	A6	0.0062	0.0277	0.002	0.002
3,3-Dimethylpentane	I7	0.0006	0.0034	0.000	0.000
Cyclohexane	N6	0.0117	0.0564	0.004	0.004
2-Methylhexane	I7	0.0074	0.0425	0.003	0.003
2,3-Dimethylpentane	I7	0.0021	0.0120	0.001	0.001

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1,1-Dimethylcyclopentane	N7	0.0013	0.0073	0.001	0.001
3-Methylhexane	I7	0.0070	0.0402	0.003	0.003
1c,3-Dimethylcyclopentane	N7	0.0011	0.0062	0.001	0.001
1t,3-Dimethylcyclopentane	N7	0.0010	0.0056	0.000	0.000
3-Ethylpentane	I7	0.0004	0.0023	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0021	0.0118	0.001	0.001
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	0.0181	0.1039	0.008	0.008
1c,2-Dimethylcyclopentane	N7	0.0001	0.0006	0.000	0.000
Methylcyclohexane	N7	0.0166	0.0934	0.007	0.007
2,2-Dimethylhexane	I8	0.0007	0.0046	0.000	0.000
1,1,3-Trimethylcyclopentane	N7	0.0002	0.0013	0.000	0.000
Ethylcyclopentane	N7	0.0004	0.0022	0.000	0.000
2,5-Dimethylhexane	I8	0.0007	0.0046	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0007	0.0046	0.000	0.000
2,4-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0003	0.0020	0.000	0.000
3,3-Dimethylhexane	I8	0.0003	0.0020	0.000	0.000
2,3,3-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
Toluene	A7	0.0011	0.0058	0.000	0.000
2,3-Dimethylhexane	I8	0.0006	0.0040	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0001	0.0006	0.000	0.000
2-Methylheptane	I8	0.0037	0.0242	0.002	0.002
4-Methylheptane	I8	0.0010	0.0065	0.001	0.001
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	0.0023	0.0151	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0025	0.0161	0.001	0.001
3-Ethylhexane	I8	0.0001	0.0006	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0010	0.0064	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0006	0.0038	0.000	0.000
2,2,5-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0009	0.0058	0.000	0.000
1t,3-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
n-Octane	P8	0.0078	0.0510	0.004	0.004
1c,4-Dimethylcyclohexane	N8	0.0004	0.0026	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
2,2-Dimethylheptane	I9	0.0002	0.0015	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0009	0.0065	0.000	0.000
2,2,3-Trimethylhexane	I9	0.0002	0.0015	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	0.0010	0.0064	0.000	0.000
n-Propylcyclopentane	N8	0.0005	0.0032	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0002	0.0014	0.000	0.000
2,5-Dimethylheptane	I9	0.0005	0.0037	0.000	0.000
3,3-Dimethylheptane	I9	0.0002	0.0015	0.000	0.000
Ethylbenzene	I8	0.0002	0.0012	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0005	0.0030	0.000	0.000
1,4-Dimethylbenzene (p-Xylene)	A8	0.0001	0.0006	0.000	0.000
3,4-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0001	0.0007	0.000	0.000
4-Ethylheptane	I9	0.0001	0.0007	0.000	0.000
4-Methyloctane	I9	0.0004	0.0029	0.000	0.000
2-Methyloctane	I9	0.0005	0.0037	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	0.0005	0.0036	0.000	0.000

1,1,2-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
3,3-Diethylpentane	I9	0.0001	0.0007	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0001	0.0006	0.000	0.000
i-Butylcyclopentane	N9	0.0002	0.0014	0.000	0.000
UnknownC8s	U8	0.0001	0.0006	0.000	0.000
n-Nonane	P9	0.0016	0.0117	0.001	0.001
1,1-Methylethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
2,4-Dimethyloctane	I10	0.0001	0.0008	0.000	0.000
n-Butylcyclopentane	N9	0.0002	0.0014	0.000	0.000
3,3-Dimethyloctane	I10	0.0001	0.0008	0.000	0.000
n-Propylbenzene	A9	0.0002	0.0014	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	0.0002	0.0014	0.000	0.000
2,3-Dimethyloctane	I10	0.0001	0.0008	0.000	0.000
5-Methylnonane	I10	0.0001	0.0008	0.000	0.000
2-Methylnonane	I10	0.0001	0.0008	0.000	0.000
3-Methylnonane	I10	0.0001	0.0008	0.000	0.000
t-Butylbenzene	A10	0.0002	0.0016	0.000	0.000
i-Butylcyclohexane	N10	0.0001	0.0008	0.000	0.000
UnknownC9s	U9	0.0007	0.0052	0.000	0.000
n-Decane	P10	0.0004	0.0033	0.000	0.000
1,2-Methyl-i-propylbenzene	A10	0.0001	0.0007	0.000	0.000
1,2-Methyl-n-propylbenzene	A10	0.0001	0.0007	0.000	0.000
1,3-Dimethyl-4-ethylbenzene	A10	0.0001	0.0007	0.000	0.000
UnknownC10s	U10	0.0009	0.0073	0.001	0.001
n-Undecane	P11	0.0004	0.0036	0.000	0.000
n-Dodecane	P12	0.0003	0.0029	0.000	0.000
1,2,3,4,5-Pentamethylbenzene	A13	0.0001	0.0009	0.000	0.000
2-Methylnaphthalene	A11	0.0001	0.0008	0.000	0.000
n-Tridecane	P13	0.0002	0.0021	0.000	0.000
n-Tetradecane	P14	0.0001	0.0012	0.000	0.000
n-Hexadecane	P16	0.0001	0.0013	0.000	0.000
UnknownC16s	U16	0.0001	0.0013	0.000	0.000
TOTAL		100.00000	100.00000	1.5108	1.5189

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0062	0.0277
TOLUENE	0.0011	0.0058
ETHYLBENZENE	0.0002	0.0012
XYLENES	0.0007	0.0042
TOTAL BTEX	0.0082	0.0389

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HHV	GROSS DRY REAL :	1070.9 /scf	1076.8 /scf
	GROSS WET REAL :	1052.2 /scf	1058.1 /scf
	NET HEATING VALUE (60 °F ideal reaction):		21049.6 Btu/lbm
	GROSS HEATING VALUE (60°F ideal reaction):		23323.1 Btu/lbm
	RELATIVE DENSITY (AIR=1):		0.6013
	DENSITY		0.04600 lb/scf
	COMPRESSIBILITY FACTOR :		0.9977
	REGULAR WOBBE INDEX		1382.2

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

Net Dry Ideal BTU	4828.2 /scf	Relative Density - SG (Air=1)	3.3042	***C6+factors***
Gross Dry Ideal BTU	5198.7 /scf	**Z** Compressiblity Factor	0.99215	0.99127
Net Dry Ideal BTU	19291.2 /lb	Density Factor	252.202 lbm/1000 ft3	
Gross Dry Ideal BTU	20775 /lb	Molar Mass or MW	95.714 g/mol	
		Volume Liquid Ideal gas	0.082 scf/gal	22.9

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