EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY:	**05-045-10733**	NAME/DESCRIP :	**300105029 PF31 FEDERAL 31-7**
LEASE #:	**C007090886C125**		**CASING**
FIELD/AREA:			

PROJECT NO. :	**202501048**	ANALYSIS NO. :	**02**
COMPANY NAME :	**QB ENERGY OPERATING, LLC**	ANALYSIS DATE:	JANUARY 27, 2025 13:36
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	JANUARY 6, 2025
CUSTOMER REF:		TO:	
PRODUCER :	QB ENERGY OPERATING, LLC	EFFECTIVE DATE:	

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

SAMPLE CYCLE:			SAMPLE TYPE:	SPOT
SAMPLE PRES. :	880	psig	PROBE :	NO
FLOW PRES. :		psig	CYLINDER NO. :	ECA-803
LAB PRES:		psig	SAMPLED BY :	MIKE KELLEY
SAMPLE TEMP. :	39	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	0.0416	0.0742	0.0050	0.0050
HELIUM	0.00	0.00	---	---
HYDROGEN	0.01	0.00	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.07	0.11	---	---
CARBON DIOXIDE	3.32	7.92	---	---
METHANE	89.6389	77.9315	---	---
ETHANE	4.9651	8.0909	1.3231	1.3303
PROPANE	1.1414	2.7276	0.3138	0.3155
I-BUTANE	0.2567	0.8086	0.0839	0.0844
N-BUTANE	0.1922	0.6054	0.0600	0.0603
I-PENTANE	0.0881	0.3442	0.0320	0.0321
N-PENTANE	0.0503	0.1967	0.0180	0.0181
HEXANES PLUS	0.2257	1.1909	0.0900	0.0901
TOTALS	100.00000	100.00000	1.9258	1.9358

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0069	0.0292
TOLUENE	0.0137	0.0684
ETHYLBENZENE	0.0006	0.0035
XYLENES	0.0057	0.0328
TOTAL BTEX	0.0269	0.1339

**(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 :	951.0	**/scf**	956.2	**/scf**
	NET WET REAL :	934.4	**/scf**	939.6	**/scf**
HHV	GROSS DRY REAL :	1053.0	**/scf**	1058.7	**/scf**
	GROSS WET REAL :	1034.6	**/scf**	1040.3	**/scf**

NET HEATING VALUE (60 °F ideal reaction):	19577.8	**Btu/lbm**
GROSS HEATING VALUE (60°F ideal reaction):	21684.7	**Btu/lbm**
RELATIVE DENSITY (AIR=1):	0.6362	
DENSITY	0.04862	**lbm/scf**
COMPRESSIBILITY FACTOR :	0.9976	
REGULAR WOBBE INDEX	1321.1	

EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	202501048	ANALYSIS NO. :	02
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	JANUARY 27, 2025 13:36
ACCOUNT NO. :		SAMPLE DATE :	JANUARY 6, 2025
PRODUCER :	QB ENERGY OPERATING, LLC	CYLINDER NO. :	ECA-803
LEASE NO. :	C007090886C125	SAMPLED BY :	MIKE KELLEY
NAME/DESCRIP :	300105029 PF31 FEDERAL 31-7 CASING		
FIELD DATA		SAMPLE TEMP. :	39
SAMPLE PRES. :	880	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm mol*		
COMMENTS :	*SPOT* *NO PROBE*		

Componet	Mole %	Wt %
Helium	0.00	0.00
Hydrogen	0.01	0.00
Carbon Dioxide	3.32	7.92
Nitrogen	0.07	0.11
Methane	89.6389	77.9315
Ethane	4.9651	8.0909
Propane	1.1414	2.7276
Isobutane	0.2567	0.8086
n-Butane	0.1922	0.6054
Isopentane	0.0864	0.3378
n-Pentane	0.0503	0.1967
Cyclopentane	0.0017	0.0064
n-Hexane	0.0245	0.1144
Cyclohexane	0.0136	0.0620
Other Hexanes	0.0507	0.2358
Heptanes	0.0428	0.2315
Methylcyclohexane	0.0265	0.1410
2,2,4 Trimethylpentane	0.0000	0.0000
Benzene	0.0069	0.0292
Toluene	0.0137	0.0684
Ethylbenzene	0.0006	0.0035
Xylenes	0.0057	0.0328
C8+ Heavies	0.0407	0.2723
Subtotal	99.95840	99.92580
Oxygen/Argon	0.00	0.00
Alcohols	0.0416	0.0742
Total	100.00000	100.00000

Calculated Values BTU @ **14.65**		**Total Sample**	**C6+ Fraction**	**C8+ Fraction**	**C10+ Fraction**	
LHV	Net Dry Real:	951.0	4893.1	6046.3	9485.3	**Btu/scf**
	Net Wet Real:	934.4	4807.6	5940.6	9319.5	**Btu/scf**
HHV	Gross Dry Real:	1053.0	5254.7	6495.9	10197.1	**Btu/scf**
	Gross Wet Real:	1034.6	5162.8	6382.3	10018.8	**Btu/scf**
Other Calculated Values						
Regualr Wobbe Index*		1321.1	2855.5	3179.9	4031.3	**Btu/scf**
Net Heating Value (60 °F ideal reaction):		19577.8	19137.1	19232.5	17599.7	**Btu/lbm**
Gross Heating Value (60°F ideal reaction):		21684.7	20555.5	20661.9	18918.3	**Btu/lbm**
Molar Mass (MW):		18.45178	97.384	121.143	186.466	**g/mol**
Relative Density (AIR=1):		0.6362	3.3624	4.1819	6.4381	**SG**
Density:		0.04862	0.25662	0.31923	0.49137	**lbm/scf**
Compressiblity Factor:		0.9976	0.9934	0.9979	1.0000	**Z**
Liquid Volume real gas @:	**14.65**	17.6037	0.0897	0.0159	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

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SAMPLE TEMP. :	39 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	---	0.01	0.00	---	---
Nitrogen	---	0.07	0.11	---	---
Carbon Dioxide	---	3.32	7.92	---	---
Methane	P1	89.6389	77.9315	---	---
Ethane	P2	4.9651	8.0909	1.323	1.330
Propane	P3	1.1414	2.7276	0.314	0.316
i-Butane	I4	0.2567	0.8086	0.084	0.084
Methanol	X1	0.0403	0.0700	0.005	0.005
n-Butane	P4	0.1922	0.6054	0.060	0.060
2,2-Dimethylpropane	I5	0.0029	0.0113	0.001	0.001
i-Pentane	I5	0.0835	0.3265	0.030	0.030
i-Propanol	X3	0.0013	0.0042	0.000	0.000
n-Pentane	P5	0.0503	0.1967	0.018	0.018
2,2-Dimethylbutane	I6	0.0040	0.0187	0.002	0.002
Cyclopentane	N5	0.0017	0.0064	0.001	0.001
2,3-Dimethylbutane	I6	0.0051	0.0238	0.002	0.002
2-Methylpentane	I6	0.0217	0.1013	0.009	0.009
3-Methylpentane	I6	0.0112	0.0523	0.005	0.005
n-Hexane	P6	0.0245	0.1144	0.010	0.010
2,2-Dimethylpentane	I7	0.0009	0.0049	0.000	0.000
Methylcyclopentane	N6	0.0087	0.0397	0.003	0.003
2,4-Dimethylpentane	I7	0.0016	0.0087	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0004	0.0022	0.000	0.000
Benzene	A6	0.0069	0.0292	0.002	0.002
3,3-Dimethylpentane	I7	0.0006	0.0032	0.000	0.000
Cyclohexane	N6	0.0136	0.0620	0.005	0.005
2-Methylhexane	I7	0.0076	0.0413	0.004	0.004
2,3-Dimethylpentane	I7	0.0017	0.0092	0.001	0.001

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1,1-Dimethylcyclopentane	N7	0.0014	0.0074	0.001	0.001
3-Methylhexane	I7	0.0064	0.0347	0.003	0.003
1c,3-Dimethylcyclopentane	N7	0.0017	0.0090	0.001	0.001
1t,3-Dimethylcyclopentane	N7	0.0015	0.0080	0.001	0.001
3-Ethylpentane	I7	0.0003	0.0016	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0024	0.0128	0.001	0.001
n-Heptane	P7	0.0150	0.0815	0.007	0.007
1c,2-Dimethylcyclopentane	N7	0.0003	0.0016	0.000	0.000
Methylcyclohexane	N7	0.0265	0.1410	0.011	0.011
2,2-Dimethylhexane	I8	0.0008	0.0049	0.000	0.000
1,1,3-Trimethylcyclopentane	N7	0.0002	0.0012	0.000	0.000
Ethylcyclopentane	N7	0.0007	0.0037	0.000	0.000
2,5-Dimethylhexane	I8	0.0010	0.0062	0.001	0.001
2,2,3-Trimethylpentane	I8	0.0009	0.0056	0.000	0.000
2,4-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0005	0.0030	0.000	0.000
3,3-Dimethylhexane	I8	0.0003	0.0018	0.000	0.000
Toluene	A7	0.0137	0.0684	0.005	0.005
2,3-Dimethylhexane	I8	0.0006	0.0037	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0001	0.0006	0.000	0.000
2-Methylheptane	I8	0.0037	0.0229	0.002	0.002
4-Methylheptane	I8	0.0011	0.0068	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	0.0027	0.0167	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0034	0.0207	0.002	0.002
3-Ethylhexane	I8	0.0001	0.0006	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0014	0.0085	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0006	0.0036	0.000	0.000
2,2,5-Trimethylhexane	I9	0.0001	0.0007	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	0.0001	0.0006	0.000	0.000
2,2,4-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0010	0.0061	0.001	0.001
1t,3-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
UnknownC7s	U7	0.0001	0.0005	0.000	0.000
n-Octane	P8	0.0066	0.0409	0.003	0.003
1c,4-Dimethylcyclohexane	N8	0.0007	0.0043	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0002	0.0014	0.000	0.000
2,3,4-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
2,2-Dimethylheptane	I9	0.0004	0.0028	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0009	0.0062	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
Ethylcyclohexane	N8	0.0010	0.0061	0.000	0.000
n-Propylcyclopentane	N8	0.0003	0.0018	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0002	0.0013	0.000	0.000
2,5-Dimethylheptane	I9	0.0008	0.0056	0.000	0.000
3,3-Dimethylheptane	I9	0.0002	0.0014	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	0.0006	0.0035	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0040	0.0230	0.002	0.002
1,4-Dimethylbenzene (p-Xylene)	A8	0.0012	0.0069	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	0.0006	0.0042	0.000	0.000
2-Methyloctane	I9	0.0008	0.0056	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
3,3-Diethylpentane	I9	0.0001	0.0007	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0005	0.0029	0.000	0.000
i-Butylcyclopentane	N9	0.0003	0.0021	0.000	0.000
n-Nonane	P9	0.0018	0.0125	0.001	0.001
1,1-Methylethylcyclohexane	N9	0.0002	0.0013	0.000	0.000
i-Propylbenzene	A9	0.0001	0.0006	0.000	0.000
n-Butylcyclopentane	N9	0.0001	0.0007	0.000	0.000
1,3-Methylethylbenzene	A9	0.0001	0.0006	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0001	0.0006	0.000	0.000
UnknownC9s	U9	0.0012	0.0083	0.001	0.001
UnknownC10s	U10	0.0002	0.0015	0.000	0.000
n-Undecane	P11	0.0001	0.0009	0.000	0.000
n-Dodecane	P12	0.0003	0.0028	0.000	0.000
1,3,5-Triethylbenzene	A12	0.0001	0.0009	0.000	0.000
1,4-Methyl-n-pentylbenzene	A12	0.0001	0.0009	0.000	0.000
n-Hexylbenzene	A12	0.0001	0.0009	0.000	0.000
1,2,3,4,5-Pentamethylbenzene	A13	0.0003	0.0024	0.000	0.000
2-Methylnaphthalene	A11	0.0001	0.0008	0.000	0.000
n-Tridecane	P13	0.0006	0.0060	0.000	0.000
UnknownC13s	U13	0.0001	0.0010	0.000	0.000
n-Tetradecane	P14	0.0005	0.0054	0.000	0.000
UnknownC14s	U14	0.0002	0.0022	0.000	0.000
n-Pentadecane	P15	0.0002	0.0023	0.000	0.000
UnknownC15s	U15	0.0003	0.0035	0.000	0.000
n-Hexadecane	P16	0.0001	0.0012	0.000	0.000
UnknownC16s	U16	0.0004	0.0049	0.000	0.000
TOTAL		100.00000	100.00000	1.9258	1.9358

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0069	0.0292
TOLUENE	0.0137	0.0684
ETHYLBENZENE	0.0006	0.0035
XYLENES	0.0057	0.0328
TOTAL BTEX	0.0269	0.1339

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	NET WET REAL :	934.4 /scf	939.6 /scf
HHV	GROSS DRY REAL :	1053.0 /scf	1058.7 /scf
	GROSS WET REAL :	1034.6 /scf	1040.3 /scf
	NET HEATING VALUE (60 °F ideal reaction):		19577.8 Btu/lbm
	GROSS HEATING VALUE (60°F ideal reaction):		21684.7 Btu/lbm
	RELATIVE DENSITY (AIR=1):		0.6362
	DENSITY		0.04862 lb/scf
	COMPRESSIBILITY FACTOR :		0.9976
	REGULAR WOBBE INDEX		1321.1

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

Net Dry Ideal BTU	4875.8 /scf	Relative Density - SG (Air=1)	3.3624	***C6+factors***
Gross Dry Ideal BTU	5236.1 /scf	**Z** Compressiblity Factor	0.99335	0.99241
Net Dry Ideal BTU	19137.1 /lb	Density Factor	256.622 lbm/1000 ft3	
Gross Dry Ideal BTU	20555.5 /lb	Molar Mass or MW	97.384 g/mol	
		Volume Liquid Ideal gas	0.09 scf/gal	23.6

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.