EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY:	**05-103-10501**	NAME/DESCRIP :	**PIEANCE CREEK UNIT T87X-3G2 PRODUCTION CASING**
LEASE #:			
FIELD/AREA:			
PROJECT NO. :	**202507033**	ANALYSIS NO. :	**01**
COMPANY NAME :	**QB ENERGY OPERATING, LLC**	ANALYSIS DATE:	JULY 20, 2025 17:10
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	JUNE 30, 2025
CUSTOMER REF:		TO:	
PRODUCER :	QB ENERGY OPERATING, LLC	EFFECTIVE DATE:	
FIELD DATA			
SAMPLE CYCLE:		SAMPLE TYPE:	
SAMPLE PRES. :	1737 psig	PROBE :	
FLOW PRES. :	psig	CYLINDER NO. :	ECA-753
LAB PRES:	psig	SAMPLED BY :	NICK CROY
SAMPLE TEMP. :	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	0.0156	0.0258	0.0020	0.0020
HELIUM	0.00	0.00	---	---
HYDROGEN	0.00	0.00	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.06	0.09	---	---
CARBON DIOXIDE	4.49	10.19	---	---
METHANE	88.7004	73.3590	---	---
ETHANE	3.9790	6.1681	1.0602	1.0660
PROPANE	1.0797	2.4544	0.2968	0.2984
I-BUTANE	0.2592	0.7767	0.0849	0.0854
N-BUTANE	0.2175	0.6517	0.0680	0.0683
I-PENTANE	0.1106	0.4109	0.0400	0.0402
N-PENTANE	0.0736	0.2738	0.0270	0.0271
HEXANES PLUS	1.0141	5.6001	0.4410	0.4423
TOTALS	100.00000	100.00000	2.0199	2.0297

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0176	0.0709
TOLUENE	0.0568	0.2698
ETHYLBENZENE	0.0127	0.0695
XYLENES	0.1253	0.6857
TOTAL BTEX	0.2124	1.0959

*(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 :	969.4 /scf	974.7 /scf
	NET WET REAL :	952.5 /scf	957.8 /scf
HHV	GROSS DRY REAL :	1072.2 /scf	1078.1 /scf
	GROSS WET REAL :	1053.5 /scf	1059.4 /scf
	NET HEATING VALUE (60 °F ideal reaction):		19012.5 Btu/lbm
	GROSS HEATING VALUE (60°F ideal reaction):		21029.7 Btu/lbm
	RELATIVE DENSITY (AIR=1):		0.6683
	DENSITY		0.05111 lbm/scf
	COMPRESSIBILITY FACTOR :		0.9976
	REGULAR WOBBE INDEX		1312.5

EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	202507033	ANALYSIS NO. :	01
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	JULY 20, 2025 17:10
ACCOUNT NO. :		SAMPLE DATE :	JUNE 30, 2025
PRODUCER :	QB ENERGY OPERATING, LLC	CYLINDER NO. :	ECA-753
LEASE NO. :		SAMPLED BY :	NICK CROY
NAME/DESCRIP :	PIEANCE CREEK UNIT T87X-3G2 PRODUCTION CASING		
FIELD DATA		SAMPLE TEMP. :	
SAMPLE PRES. :	1737	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm mol*		
COMMENTS :			

Componet	Mole %	Wt %
Helium	0.00	0.00
Hydrogen	0.00	0.00
Carbon Dioxide	4.49	10.19
Nitrogen	0.06	0.09
Methane	88.7004	73.3590
Ethane	3.9790	6.1681
Propane	1.0797	2.4544
Isobutane	0.2592	0.7767
n-Butane	0.2175	0.6517
Isopentane	0.1065	0.3961
n-Pentane	0.0736	0.2738
Cyclopentane	0.0041	0.0148
n-Hexane	0.0442	0.1964
Cyclohexane	0.0296	0.1284
Other Hexanes	0.0852	0.3762
Heptanes	0.1111	0.5714
Methylcyclohexane	0.0923	0.4672
2,2,4 Trimethylpentane	0.0000	0.0000
Benzene	0.0176	0.0709
Toluene	0.0568	0.2698
Ethylbenzene	0.0127	0.0695
Xylenes	0.1253	0.6857
C8+ Heavies	0.4393	2.7646
Subtotal	99.98440	99.97420
Oxygen/Argon	0.00	0.00
Alcohols	0.0156	0.0258
Total	100.00000	100.00000

Calculated Values BTU @ **14.65**		**Total Sample**	**C6+ Fraction**	**C8+ Fraction**	**C10+ Fraction**	
LHV	Net Dry Real:	969.4	5306.6	5830.3	7044.4	**Btu/scf**
	Net Wet Real:	952.5	5213.8	5728.4	6921.3	**Btu/scf**
HHV	Gross Dry Real:	1072.2	5685.2	6245.7	7572.1	**Btu/scf**
	Gross Wet Real:	1053.5	5585.8	6136.5	7439.7	**Btu/scf**
Other Calculated Values						
Regualr Wobbe Index*		1312.5	2954.9	3095.3	3427.5	**Btu/scf**
Net Heating Value (60 °F ideal reaction):		19012.5	19059.0	19088.8	19091.1	**Btu/lbm**
Gross Heating Value (60°F ideal reaction):		21029.7	20420.7	20447.8	20519.8	**Btu/lbm**
Molar Mass (MW):		19.39651	107.124	118.282	142.122	**g/mol**
Relative Density (AIR=1):		0.6683	3.6992	4.0839	4.9070	**SG**
Density:		0.05111	0.28231	0.31171	0.37451	**lbm/scf**
Compressiblity Factor:		0.9976	0.9965	0.9984	0.9996	**Z**
Liquid Volume real gas @:	**14.65**	17.7353	0.4396	0.2692	0.0209	**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.

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

EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PRIMARY DB KEY: **05-103-10501** NAME/DESCRIP : **PIEANCE CREEK UNIT T87X-3G2**
LEASE #: **PRODUCTION CASING**
FIELD/AREA:

PROJECT NO. : **202507033** ANALYSIS NO. : **01**
COMPANY NAME : **QB ENERGY OPERATING, LLC** ANALYSIS DATE: JULY 20, 2025 17:10
OFFICE / BRANCH: PARACHUTE, CO SAMPLE DATE : JUNE 30, 2025
CUSTOMER REF: TO:
PRODUCER : QB ENERGY OPERATING, LLC EFFECTIVE DATE:
FIELD DATA
SAMPLE CYCLE: SAMPLE TYPE:
SAMPLE PRES. : 1737 psig PROBE :
FLOW PRES. : psig CYLINDER NO. : ECA-753
LAB PRES: psig SAMPLED BY : NICK CROY
SAMPLE TEMP. : 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**
Nitrogen	---	0.06	0.09	---	---
Carbon Dioxide	---	4.49	10.19	---	---
Methane	P1	88.7004	73.3590	---	---
Ethane	P2	3.9790	6.1681	1.060	1.066
Propane	P3	1.0797	2.4544	0.297	0.298
i-Butane	I4	0.2592	0.7767	0.085	0.085
Methanol	X1	0.0156	0.0258	0.002	0.002
n-Butane	P4	0.2175	0.6517	0.068	0.068
2,2-Dimethylpropane	I5	0.0032	0.0119	0.001	0.001
i-Pentane	I5	0.1033	0.3842	0.038	0.038
n-Pentane	P5	0.0735	0.2734	0.027	0.027
2,2-Dimethylbutane	I6	0.0045	0.0200	0.002	0.002
Cyclopentane	N5	0.0041	0.0148	0.001	0.001
2,3-Dimethylbutane	I6	0.0079	0.0351	0.003	0.003
2-Methylpentane	I6	0.0324	0.1439	0.013	0.013
3-Methylpentane	I6	0.0187	0.0831	0.008	0.008
UnknownC5s	U5	0.0001	0.0004	0.000	0.000
n-Hexane	P6	0.0442	0.1964	0.018	0.018
2,2-Dimethylpentane	I7	0.0017	0.0088	0.001	0.001
Methylcyclopentane	N6	0.0217	0.0941	0.008	0.008
2,4-Dimethylpentane	I7	0.0029	0.0150	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0007	0.0036	0.000	0.000
Benzene	A6	0.0176	0.0709	0.005	0.005
3,3-Dimethylpentane	I7	0.0011	0.0057	0.000	0.000
Cyclohexane	N6	0.0296	0.1284	0.010	0.010
2-Methylhexane	I7	0.0160	0.0826	0.007	0.007
2,3-Dimethylpentane	I7	0.0039	0.0202	0.002	0.002
1,1-Dimethylcyclopentane	N7	0.0033	0.0167	0.001	0.001
3-Methylhexane	I7	0.0148	0.0765	0.007	0.007

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1c,3-Dimethylcyclopentane	N7	0.0053	0.0268	0.002	0.002
1t,3-Dimethylcyclopentane	N7	0.0050	0.0253	0.002	0.002
3-Ethylpentane	I7	0.0008	0.0041	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0079	0.0400	0.004	0.004
n-Heptane	P7	0.0437	0.2257	0.020	0.020
1c,2-Dimethylcyclopentane	N7	0.0006	0.0030	0.000	0.000
Methylcyclohexane	N7	0.0923	0.4672	0.037	0.037
2,2-Dimethylhexane	I8	0.0026	0.0153	0.001	0.001
1,1,3-Trimethylcyclopentane	N7	0.0003	0.0017	0.000	0.000
Ethylcyclopentane	N7	0.0031	0.0157	0.001	0.001
2,5-Dimethylhexane	I8	0.0028	0.0165	0.001	0.001
2,2,3-Trimethylpentane	I8	0.0027	0.0159	0.001	0.001
2,4-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0021	0.0122	0.001	0.001
3,3-Dimethylhexane	I8	0.0009	0.0053	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	0.0568	0.2698	0.019	0.019
2,3-Dimethylhexane	I8	0.0027	0.0159	0.001	0.001
2-Methyl-3-ethylpentane	I8	0.0002	0.0012	0.000	0.000
2-Methylheptane	I8	0.0172	0.1013	0.009	0.009
4-Methylheptane	I8	0.0053	0.0312	0.003	0.003
3-Methyl-3-ethylpentane	I8	0.0003	0.0017	0.000	0.000
3,4-Dimethylhexane	I8	0.0004	0.0024	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0002	0.0011	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
3-Methylheptane	I8	0.0136	0.0801	0.007	0.007
1c,2t,3-Trimethylcyclopentane	N8	0.0244	0.1412	0.012	0.012
3-Ethylhexane	I8	0.0005	0.0029	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0103	0.0596	0.005	0.005
1,1-Dimethylcyclohexane	N8	0.0033	0.0191	0.001	0.001
2,2,5-Trimethylhexane	I9	0.0005	0.0033	0.000	0.000
3c-Ethylmethylcyclopentane	N8	0.0009	0.0052	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0008	0.0046	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0010	0.0058	0.001	0.001
1,1-Methylethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
2,2,4-Trimethylhexane	I9	0.0003	0.0020	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0088	0.0509	0.004	0.004
1t,3-Dimethylcyclohexane	N8	0.0009	0.0052	0.000	0.000
n-Octane	P8	0.0743	0.4375	0.038	0.038
1c,4-Dimethylcyclohexane	N8	0.0060	0.0347	0.003	0.003
i-Propylcyclopentane	I8	0.0005	0.0029	0.000	0.000
2,4,4-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0016	0.0106	0.001	0.001
2,2,3,4-Tetramethylpentane	I9	0.0003	0.0020	0.000	0.000
2,3,4-Trimethylhexane	I9	0.0006	0.0040	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0002	0.0011	0.000	0.000
2,2-Dimethylheptane	I9	0.0046	0.0304	0.002	0.002
1,1,4-Trimethylcyclohexane	N9	0.0140	0.0911	0.007	0.007
2,4-Dimethylheptane	I9	0.0003	0.0020	0.000	0.000
4,4-Dimethylheptane	I9	0.0002	0.0013	0.000	0.000
Ethylcyclohexane	N8	0.0162	0.0937	0.007	0.007
n-Propylcyclopentane	N8	0.0048	0.0278	0.002	0.002
1c,3c,5-Trimethylcyclohexane	N9	0.0034	0.0221	0.002	0.002
2,5-Dimethylheptane	I9	0.0103	0.0681	0.006	0.006
3,3-Dimethylheptane	I9	0.0020	0.0132	0.001	0.001
3,5-Dimethylheptane	I9	0.0002	0.0013	0.000	0.000
2,6-Dimethylheptane	I9	0.0005	0.0033	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0007	0.0045	0.000	0.000
Ethylbenzene	I8	0.0127	0.0695	0.005	0.005
1c,2t,4t-Trimethylcyclohexane	N9	0.0005	0.0032	0.000	0.000

2,3-Dimethylheptane	I9	0.0002	0.0013	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0852	0.4663	0.033	0.033
1,4-Dimethylbenzene (p-Xylene)	A8	0.0263	0.1439	0.010	0.010
3,4-Dimethylheptane	I9	0.0007	0.0046	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0008	0.0053	0.000	0.000
4-Ethylheptane	I9	0.0013	0.0086	0.001	0.001
4-Methyloctane	I9	0.0088	0.0582	0.005	0.005
2-Methyloctane	I9	0.0137	0.0906	0.008	0.008
1c,2t,3-Trimethylcyclohexane	N9	0.0005	0.0032	0.000	0.000
3-Ethylheptane	I9	0.0007	0.0046	0.000	0.000
3-Methyloctane	I9	0.0017	0.0112	0.001	0.001
1c,2t,4c-Trimethylcyclohexane	I9	0.0126	0.0820	0.007	0.007
1,1,2-Trimethylcyclohexane	N9	0.0004	0.0026	0.000	0.000
3,3-Diethylpentane	I9	0.0008	0.0053	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0138	0.0755	0.005	0.005
i-Butylcyclopentane	N9	0.0075	0.0488	0.004	0.004
n-Nonane	P9	0.0584	0.3861	0.033	0.033
1,1-Methylethylcyclohexane	N9	0.0034	0.0221	0.002	0.002
i-Propylbenzene	A9	0.0010	0.0062	0.000	0.000
i-Propylcyclohexane	N9	0.0011	0.0072	0.001	0.001
2,2-Dimethyloctane	I10	0.0005	0.0037	0.000	0.000
2,4-Dimethyloctane	I10	0.0017	0.0125	0.001	0.001
2,6-Dimethyloctane	I10	0.0006	0.0044	0.000	0.000
2,5-Dimethyloctane	I10	0.0004	0.0029	0.000	0.000
n-Butylcyclopentane	N9	0.0042	0.0273	0.002	0.002
n-Propylbenzene	A9	0.0057	0.0353	0.002	0.002
3,6-Dimethyloctane	I10	0.0014	0.0103	0.001	0.001
3-Methyl-5-ethylheptane	I10	0.0006	0.0044	0.000	0.000
1,3-Methylethylbenzene	A9	0.0055	0.0341	0.003	0.003
1,4-Methylethylbenzene	A9	0.0019	0.0117	0.001	0.001
1,3,5-Trimethylbenzene	A9	0.0077	0.0477	0.003	0.003
2,3-Dimethyloctane	I10	0.0008	0.0059	0.000	0.000
5-Methylnonane	I10	0.0022	0.0161	0.001	0.001
2-Methylnonane	I10	0.0011	0.0081	0.001	0.001
3-Ethyloctane	I10	0.0005	0.0037	0.000	0.000
3-Methylnonane	I10	0.0018	0.0132	0.001	0.001
1,2,4-Trimethylbenzene	A9	0.0001	0.0006	0.000	0.000
t-Butylbenzene	A10	0.0057	0.0394	0.003	0.003
i-Butylcyclohexane	N10	0.0006	0.0043	0.000	0.000
1t-Methyl-2-n-propylcyclohexane	I10	0.0002	0.0014	0.000	0.000
i-Butylbenzene	A10	0.0002	0.0014	0.000	0.000
sec-Butylbenzene	A10	0.0001	0.0007	0.000	0.000
UnknownC9s	U9	0.0124	0.0820	0.007	0.007
n-Decane	P10	0.0076	0.0557	0.005	0.005
1,2,3-Trimethylbenzene	A9	0.0004	0.0025	0.000	0.000
1,3-Methyl-i-propylbenzene	A10	0.0002	0.0014	0.000	0.000
1,4-Methyl-i-propylbenzene	A10	0.0001	0.0007	0.000	0.000
Sec-Butylcyclohexane	A10	0.0001	0.0007	0.000	0.000
1,2-Methyl-i-propylbenzene	A10	0.0003	0.0021	0.000	0.000
3-Ethylnonane	I10	0.0007	0.0056	0.000	0.000
1,3-Diethylbenzene	A10	0.0004	0.0028	0.000	0.000
1,3-Methyl-n-propylbenzene	A10	0.0001	0.0007	0.000	0.000
1,4-Diethylbenzene	A10	0.0001	0.0007	0.000	0.000
1,4-Methyl-n-propylbenzene	A10	0.0001	0.0007	0.000	0.000
n-Butylbenzene	A10	0.0003	0.0021	0.000	0.000
1,3-Dimethyl-5-ethylbenzene	A10	0.0001	0.0007	0.000	0.000
1,2-Diethylbenzene	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
1,2-Dimethyl-4-ethylbenzene	A10	0.0001	0.0007	0.000	0.000
1,3-Dimethyl-2-ethylbenzene	A10	0.0001	0.0007	0.000	0.000
UnknownC10s	U10	0.0123	0.0902	0.008	0.008

n-Undecane	P11	0.0004	0.0032	0.000	0.000
UnknownC11s	U11	0.0007	0.0056	0.000	0.000
n-Dodecane	P12	0.0002	0.0017	0.000	0.000
1,2,3,4,5-Pentamethylbenzene	A13	0.0001	0.0008	0.000	0.000
UnknownC12s	U12	0.0002	0.0016	0.000	0.000
n-Tridecane	P13	0.0001	0.0009	0.000	0.000
n-Tetradecane	P14	0.0001	0.0010	0.000	0.000
n-Pentadecane	P15	0.0001	0.0011	0.000	0.000
n-Heptadecane	P17	0.0001	0.0012	0.000	0.000
TOTAL		100.00000	100.00000	2.0199	2.0297

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0176	0.0709
TOLUENE	0.0568	0.2698
ETHYLBENZENE	0.0127	0.0695
XYLENES	0.1253	0.6857
TOTAL BTEX	0.2124	1.0959

**(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 :	969.4 **/scf**	974.7 **/scf**
	NET WET REAL :	952.5 **/scf**	957.8 **/scf**
HHV	GROSS DRY REAL :	1072.2 **/scf**	1078.1 **/scf**
	GROSS WET REAL :	1053.5 **/scf**	1059.4 **/scf**
	NET HEATING VALUE (60 °F ideal reaction):		19012.5 **Btu/lbm**
	GROSS HEATING VALUE (60°F ideal reaction):		21029.7 **Btu/lbm**
	RELATIVE DENSITY (AIR=1):		0.6683
	DENSITY		0.05111 **lb/scf**
	COMPRESSIBILITY FACTOR :		0.9976
	REGULAR WOBBE INDEX		1312.5

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

Net Dry Ideal BTU	5304.7 **/scf**	Relative Density - SG (Air=1)	3.6992	***C6+factors***
Gross Dry Ideal BTU	5683.2 **/scf**	**Z** Compressiblity Factor	0.99652	0.99576
Net Dry Ideal BTU	19059 **/lb**	Density Factor	282.305 **lbm/1000 ft3**	
Gross Dry Ideal BTU	20420.7 **/lb**	Molar Mass or MW	107.124 **g/mol**	
		Volume Liquid Ideal gas	0.441 **scf/gal**	22.4

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.*

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