EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY:	**05-045-10462**	NAME/DESCRIP :	**300106010 003 LINDAUER 3-15**
LEASE #:			**BRADEN HEAD**
FIELD/AREA:			

PROJECT NO. :	**202508038**	ANALYSIS NO. :	**01**
COMPANY NAME :	**QB ENERGY OPERATING, LLC**	ANALYSIS DATE:	AUGUST 14, 2025 14:30
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	JULY 24, 2025
CUSTOMER REF:		TO:	
PRODUCER :		EFFECTIVE DATE:	JULY 24, 2025

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

SAMPLE CYCLE:			SAMPLE TYPE:	SPOT
SAMPLE PRES. :	117	psig	PROBE :	NO
FLOW PRES. :		psig	CYLINDER NO. :	ECA-735
LAB PRES:		psig	SAMPLED BY :	MIKE KELLEY
SAMPLE TEMP. :	83	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	0.0016	0.0045	0.0000	0.0000
HELIUM	0.01	0.00	---	---
HYDROGEN	0.01	0.00	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.13	0.21	---	---
CARBON DIOXIDE	0.02	0.05	---	---
METHANE	93.7407	86.4023	---	---
ETHANE	4.2084	7.2704	1.1221	1.1282
PROPANE	1.0516	2.6642	0.2888	0.2904
I-BUTANE	0.2246	0.7500	0.0729	0.0733
N-BUTANE	0.2197	0.7336	0.0689	0.0693
I-PENTANE	0.0941	0.3897	0.0350	0.0351
N-PENTANE	0.0646	0.2678	0.0230	0.0231
HEXANES PLUS	0.2248	1.2575	0.0880	0.0881
TOTALS	100.00000	100.00000	1.6987	1.7075

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0014	0.0063
TOLUENE	0.0006	0.0032
ETHYLBENZENE	0.0004	0.0024
XYLENES	0.0004	0.0024
TOTAL BTEX	0.0028	0.0143

**(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 :	973.6 **/scf**	979.0 **/scf**
	NET WET REAL :	956.6 **/scf**	962.0 **/scf**
HHV	GROSS DRY REAL :	1078.8 **/scf**	1084.6 **/scf**
	GROSS WET REAL :	1059.9 **/scf**	1065.7 **/scf**

NET HEATING VALUE (60 °F ideal reaction):	21267.4 **Btu/lbm**
GROSS HEATING VALUE (60°F ideal reaction):	23562.7 **Btu/lbm**
RELATIVE DENSITY (AIR=1):	0.6001
DENSITY	0.04586 **lbm/scf**
COMPRESSIBILITY FACTOR :	0.9977
REGULAR WOBBE INDEX	1393.6

EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	202508038	ANALYSIS NO. :	01
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	AUGUST 14, 2025 14:30
ACCOUNT NO. :		SAMPLE DATE :	JULY 24, 2025
PRODUCER :		CYLINDER NO. :	ECA-735
LEASE NO. :		SAMPLED BY :	MIKE KELLEY
NAME/DESCRIP :	300106010 003 LINDAUER 3-15 BRADEN HEAD		
FIELD DATA		SAMPLE TEMP. :	83
SAMPLE PRES. :	117	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm mol*		
COMMENTS :	*SPOT* *NO PROBE*		

Componet	Mole %	Wt %
Helium	0.01	0.00
Hydrogen	0.01	0.00
Carbon Dioxide	0.02	0.05
Nitrogen	0.13	0.21
Methane	93.7407	86.4023
Ethane	4.2084	7.2704
Propane	1.0516	2.6642
Isobutane	0.2246	0.7500
n-Butane	0.2197	0.7336
Isopentane	0.0909	0.3768
n-Pentane	0.0646	0.2678
Cyclopentane	0.0032	0.0129
n-Hexane	0.0306	0.1515
Cyclohexane	0.0145	0.0701
Other Hexanes	0.0588	0.2897
Heptanes	0.0503	0.2881
Methylcyclohexane	0.0260	0.1467
2,2,4 Trimethylpentane	0.0000	0.0000
Benzene	0.0014	0.0063
Toluene	0.0006	0.0032
Ethylbenzene	0.0004	0.0024
Xylenes	0.0004	0.0024
C8+ Heavies	0.0418	0.2971
Subtotal	99.99840	99.99550
Oxygen/Argon	0.00	0.00
Alcohols	0.0016	0.0045
Total	100.00000	100.00000

Calculated Values BTU @ **14.65**		**Total Sample**	**C6+ Fraction**	**C8+ Fraction**	**C10+ Fraction**	
LHV	Net Dry Real:	973.6	4935.2	6181.3	10014.6	**Btu/scf**
	Net Wet Real:	956.6	4848.9	6073.2	9839.5	**Btu/scf**
HHV	Gross Dry Real:	1078.8	5314.2	6656.0	10764.8	**Btu/scf**
	Gross Wet Real:	1059.9	5221.3	6539.6	10576.6	**Btu/scf**
Other Calculated Values						
Regualr Wobbe Index*		1393.6	2886.8	3230.5	4098.3	**Btu/scf**
Net Heating Value (60 °F ideal reaction):		21267.4	19470.8	19988.0	21332.9	**Btu/lbm**
Gross Heating Value (60°F ideal reaction):		23562.7	20968.8	21521.5	22932.2	**Btu/lbm**
Molar Mass (MW):		17.40547	97.324	123.146	201.039	**g/mol**
Relative Density (AIR=1):		0.6001	3.3601	4.2523	6.9415	**SG**
Density:		0.04586	0.25647	0.32452	0.52977	**lbm/scf**
Compressiblity Factor:		0.9977	0.9926	0.9977	0.9999	**Z**
Liquid Volume real gas @:	**14.65**	17.515	0.0877	0.014	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.

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

EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

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SAMPLE TEMP. :	83 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**
Helium	---	0.01	0.00	---	---
Hydrogen	---	0.01	0.00	---	---
Nitrogen	---	0.13	0.21	---	---
Carbon Dioxide	---	0.02	0.05	---	---
Methane	P1	93.7407	86.4023	---	---
Ethane	P2	4.2084	7.2704	1.122	1.128
Propane	P3	1.0516	2.6642	0.289	0.290
i-Butane	I4	0.2246	0.7500	0.073	0.073
Methanol	X1	0.0005	0.0009	0.000	0.000
n-Butane	P4	0.2197	0.7336	0.069	0.069
2,2-Dimethylpropane	I5	0.0044	0.0182	0.002	0.002
i-Pentane	I5	0.0865	0.3586	0.032	0.032
Acetone	X3	0.0010	0.0033	0.000	0.000
i-Propanol	X3	0.0001	0.0003	0.000	0.000
n-Pentane	P5	0.0646	0.2678	0.023	0.023
2,2-Dimethylbutane	I6	0.0041	0.0203	0.002	0.002
Cyclopentane	N5	0.0032	0.0129	0.001	0.001
2,3-Dimethylbutane	I6	0.0056	0.0278	0.002	0.002
2-Methylpentane	I6	0.0230	0.1139	0.010	0.010
3-Methylpentane	I6	0.0127	0.0629	0.005	0.005
n-Hexane	P6	0.0306	0.1515	0.013	0.013
2,2-Dimethylpentane	I7	0.0011	0.0063	0.001	0.001
Methylcyclopentane	N6	0.0134	0.0648	0.005	0.005
2,4-Dimethylpentane	I7	0.0016	0.0092	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0004	0.0023	0.000	0.000
Benzene	A6	0.0014	0.0063	0.000	0.000
3,3-Dimethylpentane	I7	0.0006	0.0035	0.000	0.000
Cyclohexane	N6	0.0145	0.0701	0.005	0.005

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2-Methylhexane	I7	0.0075	0.0432	0.003	0.003
2,3-Dimethylpentane	I7	0.0019	0.0109	0.001	0.001
1,1-Dimethylcyclopentane	N7	0.0016	0.0090	0.001	0.001
3-Methylhexane	I7	0.0069	0.0397	0.003	0.003
1c,3-Dimethylcyclopentane	N7	0.0023	0.0130	0.001	0.001
1t,3-Dimethylcyclopentane	N7	0.0020	0.0113	0.001	0.001
3-Ethylpentane	I7	0.0003	0.0017	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0032	0.0180	0.001	0.001
n-Heptane	P7	0.0171	0.0984	0.008	0.008
1c,2-Dimethylcyclopentane	N7	0.0026	0.0147	0.001	0.001
Methylcyclohexane	N7	0.0260	0.1467	0.010	0.010
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	0.0010	0.0056	0.000	0.000
2,5-Dimethylhexane	I8	0.0009	0.0059	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0007	0.0046	0.000	0.000
2,4-Dimethylhexane	I8	0.0002	0.0013	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0006	0.0039	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	0.0006	0.0032	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	0.0036	0.0236	0.002	0.002
4-Methylheptane	I8	0.0011	0.0072	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0001	0.0006	0.000	0.000
3-Methylheptane	I8	0.0026	0.0171	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0039	0.0252	0.002	0.002
3-Ethylhexane	I8	0.0004	0.0026	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0017	0.0110	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0006	0.0039	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	0.0001	0.0006	0.000	0.000
2,2,4-Trimethylhexane	I9	0.0001	0.0008	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0012	0.0078	0.001	0.001
1t,3-Dimethylcyclohexane	N8	0.0004	0.0026	0.000	0.000
n-Octane	P8	0.0071	0.0466	0.004	0.004
1c,4-Dimethylcyclohexane	N8	0.0008	0.0052	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
2,3,4-Trimethylhexane	I9	0.0001	0.0008	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
2,2-Dimethylheptane	I9	0.0003	0.0022	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0010	0.0072	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
4,4-Dimethylheptane	I9	0.0001	0.0008	0.000	0.000
Ethylcyclohexane	N8	0.0010	0.0064	0.000	0.000
n-Propylcyclopentane	N8	0.0004	0.0026	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0002	0.0014	0.000	0.000
2,5-Dimethylheptane	I9	0.0007	0.0052	0.000	0.000
3,3-Dimethylheptane	I9	0.0002	0.0015	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	0.0001	0.0008	0.000	0.000
Ethylbenzene	I8	0.0004	0.0024	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0003	0.0018	0.000	0.000
4-Ethylheptane	I9	0.0001	0.0008	0.000	0.000
4-Methyloctane	I9	0.0004	0.0029	0.000	0.000

2-Methyloctane	I9	0.0006	0.0044	0.000	0.000
3-Methyloctane	I9	0.0001	0.0008	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	0.0006	0.0044	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0001	0.0006	0.000	0.000
i-Butylcyclopentane	N9	0.0003	0.0022	0.000	0.000
UnknownC8s	U8	0.0001	0.0006	0.000	0.000
n-Nonane	P9	0.0020	0.0148	0.001	0.001
1,1-Methylethylcyclohexane	N9	0.0001	0.0008	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
1,3,5-Trimethylbenzene	A9	0.0001	0.0007	0.000	0.000
5-Methylnonane	I10	0.0001	0.0008	0.000	0.000
1,2-Methylethylbenzene	A9	0.0001	0.0007	0.000	0.000
3-Methylnonane	I10	0.0001	0.0008	0.000	0.000
t-Butylbenzene	A10	0.0001	0.0008	0.000	0.000
UnknownC9s	U9	0.0003	0.0022	0.000	0.000
n-Decane	P10	0.0004	0.0033	0.000	0.000
3-Ethylnonane	I10	0.0001	0.0009	0.000	0.000
UnknownC10s	U10	0.0004	0.0033	0.000	0.000
1-t-Butyl-3,5-dimethylbenzene	A12	0.0001	0.0009	0.000	0.000
n-Tetradecane	P14	0.0001	0.0012	0.000	0.000
n-Pentadecane	P15	0.0002	0.0024	0.000	0.000
n-Hexadecane	P16	0.0003	0.0039	0.000	0.000
UnknownC16s	U16	0.0001	0.0013	0.000	0.000
n-Heptadecane	P17	0.0002	0.0028	0.000	0.000
UnknownC17s	U17	0.0001	0.0014	0.000	0.000
n-Octadecane	P18	0.0001	0.0014	0.000	0.000
UnknownC18s	U18	0.0001	0.0014	0.000	0.000
UnknownC19s	U19	0.0004	0.0062	0.000	0.000
UnknownC20s	U20	0.0003	0.0048	0.000	0.000
TOTAL		100.00000	100.00000	1.6987	1.7075

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0014	0.0063
TOLUENE	0.0006	0.0032
ETHYLBENZENE	0.0004	0.0024
XYLENES	0.0004	0.0024
TOTAL BTEX	0.0028	0.0143

**(DETAILED HYDROCARBON ANALYSIS/NJ 1993) Mod ASTM D6730,GPA 2261 & GPA 2286.*

***(CALC: GPA 2172, GPA 2145 & TP-17 @14.696 & 60 F)*

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HHV	GROSS DRY REAL :	1078.8 /scf	1084.6	/scf
	GROSS WET REAL :	1059.9 /scf	1065.7	/scf
	NET HEATING VALUE (60 °F ideal reaction):		21267.4	Btu/lbm
	GROSS HEATING VALUE (60°F ideal reaction):		23562.7	Btu/lbm
	RELATIVE DENSITY (AIR=1):		0.6001	
	DENSITY		0.04586	lb/scf
	COMPRESSIBILITY FACTOR :		0.9977	
	REGULAR WOBBE INDEX		1393.6	

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

Net Dry Ideal BTU	4914.2 /scf	Relative Density - SG (Air=1)	3.3601		***C6+factors***
Gross Dry Ideal BTU	5291.6 /scf	**Z** Compressiblity Factor	0.99263		0.99174
Net Dry Ideal BTU	19470.8 /lb	Density Factor	256.469	lbm/1000 ft3	
Gross Dry Ideal BTU	20968.8 /lb	Molar Mass or MW	97.324	g/mol	
		Volume Liquid Ideal gas	0.088	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.