EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

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

PROJECT NO. : **202508038** ANALYSIS NO. : **02**
COMPANY NAME : **QB ENERGY OPERATING, LLC** ANALYSIS DATE: AUGUST 14, 2025 16:12
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. : 368 psig PROBE : NO
FLOW PRES. : psig CYLINDER NO. : ECA-744
LAB PRES: psig SAMPLED BY : MIKE KELLEY
SAMPLE TEMP. : 81 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	0.0011	0.0021	0.0000	0.0000
HELIUM	0.00	0.00	---	---
HYDROGEN	0.26	0.03	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.07	0.11	---	---
CARBON DIOXIDE	1.52	3.71	---	---
METHANE	91.1082	80.9617	---	---
ETHANE	4.6286	7.7093	1.2341	1.2409
PROPANE	1.3422	3.2784	0.3687	0.3708
I-BUTANE	0.2732	0.8796	0.0889	0.0894
N-BUTANE	0.2841	0.9147	0.0889	0.0894
I-PENTANE	0.1251	0.4995	0.0450	0.0452
N-PENTANE	0.0874	0.3493	0.0320	0.0322
HEXANES PLUS	0.3001	1.5558	0.1170	0.1173
TOTALS	100.00000	100.00000	1.9746	1.9852

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0092	0.0398
TOLUENE	0.0155	0.0791
ETHYLBENZENE	0.0005	0.0029
XYLENES	0.0041	0.0240
TOTAL BTEX	0.0293	0.1458

**(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 :	972.2 **/scf**	977.5 **/scf**
	NET WET REAL :	955.2 **/scf**	960.5 **/scf**
HHV	GROSS DRY REAL :	1076.7 **/scf**	1082.6 **/scf**
	GROSS WET REAL :	1057.9 **/scf**	1063.8 **/scf**

NET HEATING VALUE (60 °F ideal reaction):	20475.9 **Btu/lbm**
GROSS HEATING VALUE (60°F ideal reaction):	22675.4 **Btu/lbm**
RELATIVE DENSITY (AIR=1):	0.6224
DENSITY	0.04757 **lbm/scf**
COMPRESSIBILITY FACTOR :	0.9976
REGULAR WOBBE INDEX	1365.8

EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	202508038	ANALYSIS NO. :	02
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	AUGUST 14, 2025 16:12
ACCOUNT NO. :		SAMPLE DATE :	JULY 24, 2025
PRODUCER :		CYLINDER NO. :	ECA-744
LEASE NO. :		SAMPLED BY :	MIKE KELLEY
NAME/DESCRIP :	300106010 003 LINDAUER 3-15 PRODUCTION CASING		
FIELD DATA		SAMPLE TEMP. :	81
SAMPLE PRES. :	368	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm mol*		
COMMENTS :	*SPOT NO*		

Componet	Mole %	Wt %
Helium	0.00	0.00
Hydrogen	0.26	0.03
Carbon Dioxide	1.52	3.71
Nitrogen	0.07	0.11
Methane	91.1082	80.9617
Ethane	4.6286	7.7093
Propane	1.3422	3.2784
Isobutane	0.2732	0.8796
n-Butane	0.2841	0.9147
Isopentane	0.1205	0.4816
n-Pentane	0.0874	0.3493
Cyclopentane	0.0046	0.0179
n-Hexane	0.0413	0.1971
Cyclohexane	0.0220	0.1026
Other Hexanes	0.0781	0.3708
Heptanes	0.0689	0.3804
Methylcyclohexane	0.0290	0.1577
2,2,4 Trimethylpentane	0.0000	0.0000
Benzene	0.0092	0.0398
Toluene	0.0155	0.0791
Ethylbenzene	0.0005	0.0029
Xylenes	0.0041	0.0240
C8+ Heavies	0.0315	0.2014
Subtotal	99.99890	99.99790
Oxygen/Argon	0.00	0.00
Alcohols	0.0011	0.0021
Total	100.00000	100.00000

Calculated Values BTU @ **14.65**		**Total Sample**	**C6+ Fraction**	**C8+ Fraction**	**C10+ Fraction**	
LHV	Net Dry Real:	972.2	4724.7	5726.2	7959.3	**Btu/scf**
	Net Wet Real:	955.2	4642.1	5626.1	7820.2	**Btu/scf**
HHV	Gross Dry Real:	1076.7	5077.1	6153.2	8498.6	**Btu/scf**
	Gross Wet Real:	1057.9	4988.3	6045.6	8350.0	**Btu/scf**
Other Calculated Values						
Regualr Wobbe Index*		1365.8	2810.8	3094.3	3595.2	**Btu/scf**
Net Heating Value (60 °F ideal reaction):		20475.9	19257.0	19781.6	18620.8	**Btu/lbm**
Gross Heating Value (60°F ideal reaction):		22675.4	20697.4	21260.9	19886.1	**Btu/lbm**
Molar Mass (MW):		18.05198	93.652	114.639	162.799	**g/mol**
Relative Density (AIR=1):		0.6224	3.2334	3.9584	5.6211	**SG**
Density:		0.04757	0.24677	0.30209	0.42900	**lbm/scf**
Compressiblity Factor:		0.9976	0.9924	0.9974	0.9998	**Z**
Liquid Volume real gas @:	**14.65**	17.6167	0.1166	0.012	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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CUSTOMER REF:		TO:	
PRODUCER :		EFFECTIVE DATE:	JULY 24, 2025
FIELD DATA			
SAMPLE CYCLE:		SAMPLE TYPE:	SPOT
SAMPLE PRES. :	368 psig	PROBE :	NO
FLOW PRES. :	psig	CYLINDER NO. :	ECA-744
LAB PRES:	psig	SAMPLED BY :	MIKE KELLEY
SAMPLE TEMP. :	81 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**
Hydrogen	---	0.26	0.03	---	---
Nitrogen	---	0.07	0.11	---	---
Carbon Dioxide	---	1.52	3.71	---	---
Methane	P1	91.1082	80.9617	---	---
Ethane	P2	4.6286	7.7093	1.234	1.241
Propane	P3	1.3422	3.2784	0.369	0.371
i-Butane	I4	0.2732	0.8796	0.089	0.089
Methanol	X1	0.0010	0.0018	0.000	0.000
n-Butane	P4	0.2841	0.9147	0.089	0.089
2,2-Dimethylpropane	I5	0.0033	0.0132	0.001	0.001
i-Pentane	I5	0.1172	0.4684	0.043	0.043
i-Propanol	X3	0.0001	0.0003	0.000	0.000
n-Pentane	P5	0.0874	0.3493	0.032	0.032
2,2-Dimethylbutane	I6	0.0048	0.0229	0.002	0.002
Cyclopentane	N5	0.0046	0.0179	0.001	0.001
2,3-Dimethylbutane	I6	0.0072	0.0343	0.003	0.003
2-Methylpentane	I6	0.0318	0.1518	0.013	0.013
3-Methylpentane	I6	0.0172	0.0821	0.007	0.007
n-Hexane	P6	0.0413	0.1971	0.017	0.017
2,2-Dimethylpentane	I7	0.0015	0.0083	0.001	0.001
Methylcyclopentane	N6	0.0171	0.0797	0.006	0.006
2,4-Dimethylpentane	I7	0.0022	0.0122	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0005	0.0028	0.000	0.000
Benzene	A6	0.0092	0.0398	0.003	0.003
3,3-Dimethylpentane	I7	0.0008	0.0044	0.000	0.000
Cyclohexane	N6	0.0220	0.1026	0.007	0.007
2-Methylhexane	I7	0.0100	0.0555	0.005	0.005
2,3-Dimethylpentane	I7	0.0025	0.0139	0.001	0.001

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1,1-Dimethylcyclopentane	N7	0.0019	0.0104	0.001	0.001
3-Methylhexane	I7	0.0088	0.0489	0.004	0.004
1c,3-Dimethylcyclopentane	N7	0.0028	0.0152	0.001	0.001
1t,3-Dimethylcyclopentane	N7	0.0025	0.0136	0.001	0.001
3-Ethylpentane	I7	0.0005	0.0028	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0040	0.0218	0.002	0.002
n-Heptane	P7	0.0201	0.1116	0.009	0.009
1c,2-Dimethylcyclopentane	N7	0.0093	0.0506	0.004	0.004
Methylcyclohexane	N7	0.0290	0.1577	0.012	0.012
2,2-Dimethylhexane	I8	0.0008	0.0050	0.000	0.000
1,1,3-Trimethylcyclopentane	N7	0.0003	0.0019	0.000	0.000
Ethylcyclopentane	N7	0.0011	0.0060	0.000	0.000
2,5-Dimethylhexane	I8	0.0009	0.0057	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0007	0.0044	0.000	0.000
2,4-Dimethylhexane	I8	0.0002	0.0013	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0006	0.0037	0.000	0.000
3,3-Dimethylhexane	I8	0.0003	0.0019	0.000	0.000
2,3,4-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
Toluene	A7	0.0155	0.0791	0.005	0.005
2,3-Dimethylhexane	I8	0.0007	0.0044	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0001	0.0006	0.000	0.000
2-Methylheptane	I8	0.0034	0.0215	0.002	0.002
4-Methylheptane	I8	0.0010	0.0063	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
1c,2c,4-Trimethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
3-Methylheptane	I8	0.0024	0.0152	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0033	0.0205	0.002	0.002
3-Ethylhexane	I8	0.0008	0.0050	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0017	0.0106	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0006	0.0037	0.000	0.000
2,2,5-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
3c-Ethylmethylcyclopentane	N8	0.0002	0.0012	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0002	0.0012	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0002	0.0012	0.000	0.000
2,2,4-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0012	0.0075	0.001	0.001
1t,3-Dimethylcyclohexane	N8	0.0015	0.0093	0.001	0.001
UnknownC7s	U7	0.0001	0.0005	0.000	0.000
n-Octane	P8	0.0040	0.0253	0.002	0.002
1c,4-Dimethylcyclohexane	N8	0.0007	0.0044	0.000	0.000
i-Propylcyclopentane	I8	0.0001	0.0006	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
2,2-Dimethylheptane	I9	0.0003	0.0021	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0008	0.0056	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	0.0005	0.0031	0.000	0.000
n-Propylcyclopentane	N8	0.0002	0.0012	0.000	0.000
2,5-Dimethylheptane	I9	0.0005	0.0035	0.000	0.000
3,3-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
Ethylbenzene	I8	0.0005	0.0029	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0028	0.0164	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0009	0.0053	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	0.0002	0.0014	0.000	0.000
2-Methyloctane	I9	0.0003	0.0021	0.000	0.000
1c,2t,3-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000

3-Methyloctane	I9	0.0001	0.0007	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	0.0003	0.0021	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0004	0.0023	0.000	0.000
i-Butylcyclopentane	N9	0.0001	0.0007	0.000	0.000
n-Nonane	P9	0.0002	0.0014	0.000	0.000
1,1-Methylethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
1,3-Methylethylbenzene	A9	0.0001	0.0007	0.000	0.000
t-Butylbenzene	A10	0.0001	0.0007	0.000	0.000
UnknownC9s	U9	0.0002	0.0014	0.000	0.000
UnknownC10s	U10	0.0001	0.0008	0.000	0.000
1-t-Butyl-3,5-dimethylbenzene	A12	0.0001	0.0009	0.000	0.000
n-Pentadecane	P15	0.0001	0.0012	0.000	0.000
TOTAL		100.00000	100.00000	1.9746	1.9852

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0092	0.0398
TOLUENE	0.0155	0.0791
ETHYLBENZENE	0.0005	0.0029
XYLENES	0.0041	0.0240
TOTAL BTEX	0.0293	0.1458

**(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 :	972.2 /scf	977.5 /scf
NET WET REAL :	955.2 /scf	960.5 /scf
HHV GROSS DRY REAL :	1076.7 /scf	1082.6 /scf
GROSS WET REAL :	1057.9 /scf	1063.8 /scf
NET HEATING VALUE (60 °F ideal reaction):		20475.9 Btu/lbm
GROSS HEATING VALUE (60°F ideal reaction):		22675.4 Btu/lbm
RELATIVE DENSITY (AIR=1):		0.6224
DENSITY		0.04757 lb/scf
COMPRESSIBILITY FACTOR :		0.9976
REGULAR WOBBE INDEX		1365.8

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

Net Dry Ideal BTU	4703.4 /scf	Relative Density - SG (Air=1)	3.2334		***C6+factors***
Gross Dry Ideal BTU	5054.2 /scf	**Z** Compressiblity Factor	0.99238		0.9916
Net Dry Ideal BTU	19257 /lb	Density Factor	246.774	lbm/1000 ft3	
Gross Dry Ideal BTU	20697.4 /lb	Molar Mass or MW	93.652	g/mol	
		Volume Liquid Ideal gas	0.117	scf/gal	24.3

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.