EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY:	**05-045-11253**	NAME/DESCRIP :	**110165219 NP I30 EF 01D 595**
LEASE #:	**05-045-11253**		**BRADEN HEAD**
FIELD/AREA:	**GRAND VALLEY**		
PROJECT NO. :	**202512048**	ANALYSIS NO. :	**02**
COMPANY NAME :	**QB ENERGY OPERATING, LLC**	ANALYSIS DATE:	DECEMBER 20, 2025 17:39
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	NOVEMBER 20, 2025 8:30 AM
CUSTOMER REF:		TO:	
PRODUCER :	QB ENERGY OPERATING LLC	EFFECTIVE DATE:	

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

SAMPLE CYCLE:			SAMPLE TYPE:	SPOT	
SAMPLE PRES. :	213	psig	PROBE :	NO	
FLOW PRES. :		psig	CYLINDER NO. :	ECA-701	
LAB PRES:		psig	SAMPLED BY :	ALEX GALLEGOS	
SAMPLE TEMP. :	37	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	0.0061	0.0113	0.0010	0.0010
HELIUM	0.01	0.00	---	---
HYDROGEN	0.00	0.00	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.17	0.27	---	---
CARBON DIOXIDE	0.75	1.87	---	---
METHANE	93.2056	84.8125	---	---
ETHANE	3.8074	6.4937	1.0152	1.0208
PROPANE	1.0917	2.7305	0.2998	0.3014
I-BUTANE	0.2051	0.6762	0.0669	0.0673
N-BUTANE	0.3077	1.0144	0.0969	0.0975
I-PENTANE	0.1072	0.4382	0.0390	0.0392
N-PENTANE	0.0934	0.3822	0.0340	0.0342
HEXANES PLUS	0.2458	1.3010	0.0910	0.0912
TOTALS	100.00000	100.00000	1.6438	1.6526

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0185	0.0820
TOLUENE	0.0098	0.0512
ETHYLBENZENE	0.0009	0.0054
XYLENES	0.0029	0.0175
TOTAL BTEX	0.0321	0.1561

**(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 :	967.5	/scf	972.7	/scf
	NET WET REAL :	950.6	/scf	955.8	/scf
HHV	GROSS DRY REAL :	1071.8	/scf	1077.6	/scf
	GROSS WET REAL :	1053.1	/scf	1058.9	/scf
	NET HEATING VALUE (60 °F ideal reaction):			20856.6	Btu/lbm
	GROSS HEATING VALUE (60°F ideal reaction):			23106.4	Btu/lbm
	RELATIVE DENSITY (AIR=1):			0.6081	
	DENSITY			0.04646	lbm/scf
	COMPRESSIBILITY FACTOR :			0.9976	
	REGULAR WOBBE INDEX			1375.5	

EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	202512048	ANALYSIS NO. :	02
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	DECEMBER 20, 2025 17:39
ACCOUNT NO. :		SAMPLE DATE :	NOVEMBER 20, 2025 8:30 AM
PRODUCER :	QB ENERGY OPERATING LLC	CYLINDER NO. :	ECA-701
LEASE NO. :	05-045-11253	SAMPLED BY :	ALEX GALLEGOS
NAME/DESCRIP :	110165219 NP I30 EF 01D 595 BRADEN HEAD		
FIELD DATA		SAMPLE TEMP. :	37
SAMPLE PRES. :	213	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm mol*		
COMMENTS :	*SPOT* *NO PROBE*		

Componet	Mole %	Wt %
Helium	0.01	0.00
Hydrogen	0.00	0.00
Carbon Dioxide	0.75	1.87
Nitrogen	0.17	0.27
Methane	93.2056	84.8125
Ethane	3.8074	6.4937
Propane	1.0917	2.7305
Isobutane	0.2051	0.6762
n-Butane	0.3077	1.0144
Isopentane	0.1020	0.4175
n-Pentane	0.0934	0.3822
Cyclopentane	0.0052	0.0207
n-Hexane	0.0325	0.1589
Cyclohexane	0.0190	0.0907
Other Hexanes	0.0678	0.3296
Heptanes	0.0450	0.2545
Methylcyclohexane	0.0221	0.1231
2,2,4 Trimethylpentane	0.0000	0.0000
Benzene	0.0185	0.0820
Toluene	0.0098	0.0512
Ethylbenzene	0.0009	0.0054
Xylenes	0.0029	0.0175
C8+ Heavies	0.0273	0.1881
Subtotal	99.99390	99.98870
Oxygen/Argon	0.00	0.00
Alcohols	0.0061	0.0113
Total	100.00000	100.00000

Calculated Values BTU @ **14.65**		**Total Sample**	**C6+ Fraction**	**C8+ Fraction**	**C10+ Fraction**	
LHV	Net Dry Real:	967.5	4690.7	5969.3	10137.3	**Btu/scf**
	Net Wet Real:	950.6	4608.7	5864.9	9960.1	**Btu/scf**
HHV	Gross Dry Real:	1071.8	5035.5	6413.3	10896.8	**Btu/scf**
	Gross Wet Real:	1053.1	4947.5	6301.2	10706.3	**Btu/scf**
Other Calculated Values						
Regualr Wobbe Index*		1375.5	2792.5	3155.9	4134.7	**Btu/scf**
Net Heating Value (60 °F ideal reaction):		20856.6	19204.2	19748.1	21627.5	**Btu/lbm**
Gross Heating Value (60°F ideal reaction):		23106.4	20619.8	21218.9	23249.7	**Btu/lbm**
Molar Mass (MW):		17.63086	93.327	119.8	202.393	**g/mol**
Relative Density (AIR=1):		0.6081	3.2220	4.1365	6.9881	**SG**
Density:		0.04646	0.24594	0.31570	0.53334	**lbm/scf**
Compressiblity Factor:		0.9976	0.9923	0.9977	0.9999	**Z**
Liquid Volume real gas @:	**14.65**	17.4991	0.0907	0.009	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.

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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FLOW PRES. :	psig	CYLINDER NO. :	ECA-701
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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	---	---
Nitrogen	---	0.17	0.27	---	---
Carbon Dioxide	---	0.75	1.87	---	---
Methane	P1	93.2056	84.8125	---	---
Ethane	P2	3.8074	6.4937	1.015	1.021
Propane	P3	1.0917	2.7305	0.300	0.301
i-Butane	I4	0.2051	0.6762	0.067	0.067
Methanol	X1	0.0059	0.0107	0.001	0.001
n-Butane	P4	0.3077	1.0144	0.097	0.098
2,2-Dimethylpropane	I5	0.0035	0.0144	0.001	0.001
Ethanol	X2	0.0001	0.0003	0.000	0.000
i-Pentane	I5	0.0985	0.4031	0.036	0.036
Acetone	X3	0.0001	0.0003	0.000	0.000
n-Pentane	P5	0.0934	0.3822	0.034	0.034
2,2-Dimethylbutane	I6	0.0040	0.0196	0.002	0.002
Cyclopentane	N5	0.0052	0.0207	0.002	0.002
2,3-Dimethylbutane	I6	0.0058	0.0284	0.002	0.002
2-Methylpentane	I6	0.0267	0.1305	0.011	0.011
3-Methylpentane	I6	0.0146	0.0714	0.006	0.006
n-Hexane	P6	0.0325	0.1589	0.013	0.013
2,2-Dimethylpentane	I7	0.0009	0.0051	0.000	0.000
Methylcyclopentane	N6	0.0167	0.0797	0.006	0.006
2,4-Dimethylpentane	I7	0.0015	0.0085	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0004	0.0023	0.000	0.000
Benzene	A6	0.0185	0.0820	0.005	0.005
3,3-Dimethylpentane	I7	0.0006	0.0034	0.000	0.000
Cyclohexane	N6	0.0190	0.0907	0.006	0.006

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2-Methylhexane	I7	0.0071	0.0403	0.003	0.003
2,3-Dimethylpentane	I7	0.0023	0.0131	0.001	0.001
1,1-Dimethylcyclopentane	N7	0.0014	0.0078	0.001	0.001
3-Methylhexane	I7	0.0067	0.0381	0.003	0.003
1c,3-Dimethylcyclopentane	N7	0.0022	0.0123	0.001	0.001
1t,3-Dimethylcyclopentane	N7	0.0020	0.0111	0.001	0.001
3-Ethylpentane	I7	0.0004	0.0023	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0032	0.0178	0.001	0.001
n-Heptane	P7	0.0134	0.0762	0.006	0.006
1c,2-Dimethylcyclopentane	N7	0.0019	0.0106	0.001	0.001
Methylcyclohexane	N7	0.0221	0.1231	0.009	0.009
2,2-Dimethylhexane	I8	0.0008	0.0052	0.000	0.000
1,1,3-Trimethylcyclopentane	N7	0.0001	0.0006	0.000	0.000
Ethylcyclopentane	N7	0.0009	0.0050	0.000	0.000
2,5-Dimethylhexane	I8	0.0006	0.0039	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0006	0.0039	0.000	0.000
2,4-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0005	0.0032	0.000	0.000
3,3-Dimethylhexane	I8	0.0002	0.0013	0.000	0.000
Toluene	A7	0.0098	0.0512	0.003	0.003
2,3-Dimethylhexane	I8	0.0006	0.0039	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0001	0.0006	0.000	0.000
2-Methylheptane	I8	0.0028	0.0182	0.001	0.001
4-Methylheptane	I8	0.0008	0.0052	0.000	0.000
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	0.0018	0.0117	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0028	0.0178	0.001	0.001
3-Ethylhexane	I8	0.0001	0.0006	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0011	0.0070	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0004	0.0026	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	0.0002	0.0013	0.000	0.000
2,2,4-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0009	0.0057	0.000	0.000
1t,3-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
n-Octane	P8	0.0039	0.0252	0.002	0.002
1c,4-Dimethylcyclohexane	N8	0.0005	0.0032	0.000	0.000
2,2-Dimethylheptane	I9	0.0002	0.0015	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0008	0.0057	0.000	0.000
2,2,3-Trimethylhexane	I9	0.0002	0.0015	0.000	0.000
Ethylcyclohexane	N8	0.0006	0.0038	0.000	0.000
n-Propylcyclopentane	N8	0.0002	0.0013	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
2,5-Dimethylheptane	I9	0.0003	0.0022	0.000	0.000
3,3-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
2,6-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
Ethylbenzene	I8	0.0009	0.0054	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0019	0.0115	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0004	0.0024	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0001	0.0007	0.000	0.000
4-Methyloctane	I9	0.0002	0.0015	0.000	0.000
2-Methyloctane	I9	0.0004	0.0029	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	0.0004	0.0028	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0006	0.0036	0.000	0.000
i-Butylcyclopentane	N9	0.0002	0.0014	0.000	0.000
n-Nonane	P9	0.0011	0.0080	0.001	0.001
1,1-Methylethylcyclohexane	N9	0.0001	0.0007	0.000	0.000

i-Propylbenzene	A9	0.0001	0.0007	0.000	0.000
n-Butylcyclopentane	N9	0.0002	0.0014	0.000	0.000
n-Propylbenzene	A9	0.0001	0.0007	0.000	0.000
3,6-Dimethyloctane	I10	0.0001	0.0008	0.000	0.000
1,3-Methylethylbenzene	A9	0.0001	0.0007	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0002	0.0014	0.000	0.000
t-Butylbenzene	A10	0.0001	0.0007	0.000	0.000
UnknownC9s	U9	0.0003	0.0022	0.000	0.000
n-Decane	P10	0.0001	0.0008	0.000	0.000
UnknownC10s	U10	0.0004	0.0032	0.000	0.000
1,3-Di-n-propylbenzene	A12	0.0001	0.0009	0.000	0.000
UnknownC18s	U18	0.0009	0.0130	0.001	0.001
TOTAL		100.00000	100.00000	1.6438	1.6526

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0185	0.0820
TOLUENE	0.0098	0.0512
ETHYLBENZENE	0.0009	0.0054
XYLENES	0.0029	0.0175
TOTAL BTEX	0.0321	0.1561

**(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 :	967.5	**/scf**	972.7	**/scf**
	NET WET REAL :	950.6	**/scf**	955.8	**/scf**
HHV	GROSS DRY REAL :	1071.8	**/scf**	1077.6	**/scf**
	GROSS WET REAL :	1053.1	**/scf**	1058.9	**/scf**
	NET HEATING VALUE (60 °F ideal reaction):			20856.6	**Btu/lbm**
	GROSS HEATING VALUE (60°F ideal reaction):			23106.4	**Btu/lbm**
	RELATIVE DENSITY (AIR=1):			0.6081	
	DENSITY			0.04646	**lb/scf**
	COMPRESSIBILITY FACTOR :			0.9976	
	REGULAR WOBBE INDEX			1375.5	

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

Net Dry Ideal BTU	4669.4 **/scf**	Relative Density - SG (Air=1)	3.222	***C6+factors***
Gross Dry Ideal BTU	5012.6 **/scf**	**Z** Compressiblity Factor	0.99234	0.99167
Net Dry Ideal BTU	19204.2 **/lb**	Density Factor	245.937 **lbm/1000 ft3**	
Gross Dry Ideal BTU	20619.8 **/lb**	Molar Mass or MW	93.327 **g/mol**	
		Volume Liquid Ideal gas	0.091 **scf/gal**	24.5

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.