



**EXTENDED NATURAL GAS ANALYSIS (\*DHA)**

**MAIN PAGE**

PRIMARY DB KEY: <b>05-103-10975</b>	NAME/DESCRIP : <b>YELLOW CREEK FEDERAL 2-22-1</b>
LEASE #:	<b>BRAIDEN HEAD</b>
FIELD/AREA:	
PROJECT NO. : <b>202502021</b>	ANALYSIS NO. : <b>01</b>
COMPANY NAME : <b>QB ENERGY OPERATING, LLC</b>	ANALYSIS DATE: <b>FEBRUARY 05, 2025 22:06</b>
OFFICE / BRANCH: <b>PARACHUTE, CO</b>	SAMPLE DATE : <b>JANUARY 27, 2025 14:30</b>
CUSTOMER REF:	TO:
PRODUCER : <b>QB ENERGY OPERATING, LLC</b>	EFFECTIVE DATE:

**\*\*\*FIELD DATA\*\*\***

SAMPLE CYCLE:		SAMPLE TYPE:	SPOT
SAMPLE PRES. : 716 psig		PROBE :	
FLOW PRES. : psig		CYLINDER NO. :	ECA-799
LAB PRES: psig		SAMPLED BY :	NICK CROY
SAMPLE TEMP. : 23 °f		SAMPLING COMPANY:	QB ENERGY
AMBIENT TEMP.: °f		H2S BY STAIN TUBE:	— ppm mol
H2O BY STAIN TUBE: — #/mmcf		CO2 BY STAIN TUBE:	— Mol %
FIELD COMMENTS:			
LAB COMMENTS:			

<u>COMPONENT</u>	<u>MOLE %</u>	<u>MASS %</u>	<u>GPM @ 14.65</u>	<u>GPM @ 14.73</u>
HELIUM	0.02	0.00	---	---
HYDROGEN	0.09	0.01	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.45	0.69	---	---
CARBON DIOXIDE	0.02	0.05	---	---
METHANE	90.4210	79.3109	---	---
ETHANE	4.8698	8.0062	1.2983	1.3054
PROPANE	2.3567	5.6819	0.6477	0.6512
I-BUTANE	0.5424	1.7237	0.1769	0.1779
N-BUTANE	0.6459	2.0526	0.2029	0.2040
I-PENTANE	0.2286	0.9010	0.0830	0.0834
N-PENTANE	0.1719	0.6781	0.0620	0.0623
HEXANES PLUS	0.1837	0.8956	0.0730	0.0732
<u>TOTALS</u>	<u>100.0000</u>	<u>100.0000</u>	<u>2.5438</u>	<u>2.5574</u>

<u>BTEX COMPONENTS</u>	<u>MOLE%</u>	<u>WT%</u>
BENZENE	0.0013	0.0056
TOLUENE	0.0002	0.0010
ETHYLBENZENE	0.0000	0.0000
XYLENES	0.0005	0.0030
<u>TOTAL BTEX</u>	<u>0.0020</u>	<u>0.0096</u>

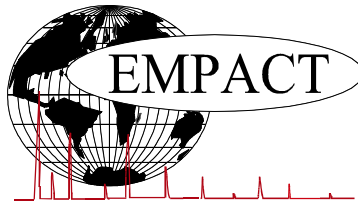
	<u>CALCULATED VALUES**</u>	
	<u>14.65</u>	<u>14.73</u>
<b>BTU @</b>		
<b>LHV NET DRY REAL :</b>	1013.8 /scf	1019.3 /scf
<b>NET WET REAL :</b>	996.1 /scf	1001.6 /scf
<b>HHV GROSS DRY REAL :</b>	1121.9 /scf	1128.1 /scf
<b>GROSS WET REAL :</b>	1102.3 /scf	1108.5 /scf
<b>NET HEATING VALUE (60 °F ideal reaction):</b>		21054.8 Btu/lbm
<b>GROSS HEATING VALUE (60°F ideal reaction):</b>		23295.2 Btu/lbm
<b>RELATIVE DENSITY (AIR=1):</b>		0.6310
<b>DENSITY</b>		0.04819 lbm/scf
<b>COMPRESSIBILITY FACTOR :</b>		0.9974
<b>REGULAR WOBBE INDEX</b>		1413.1

\*(DETAILED HYDROCARBON ANALYSIS/NJ 1993)

Mod ASTM D6730,GPA 2261 & GPA 2286.

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

The data presented herein has been acquired by means of current analytical techniques and represents the judicious conclusion EMPACT Analytical Systems, Inc. Results of the analysis can be affected by the sampling conditions, therefore, are only warranted through proper lab protocol. EMPACT assumes no responsibility for interpretation or any consequences from application of the reported information and is the sole liability of the user. The reproduction in any media of this reported information may not be made, in portion or as a whole, without the written permission of EMPACT Analytical Systems, Inc.



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GLYCALC INFORMATION**

PROJECT NO. :	202502021	ANALYSIS NO. :	01
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	FEBRUARY 05, 2025 22:06
ACCOUNT NO. :		SAMPLE DATE :	JANUARY 27, 2025 14:30
PRODUCER :	QB ENERGY OPERATING, LLC	CYLINDER NO. :	ECA-799
LEASE NO. :		SAMPLED BY :	NICK CROY
NAME/DESCRIP :	YELLOW CREEK FEDERAL 2-22-1 BRAIDEN HEAD		

***FIELD DATA***		SAMPLE TEMP. :	23
SAMPLE PRES. :	716	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	—		
COMMENTS :	<i>SPOT</i>		

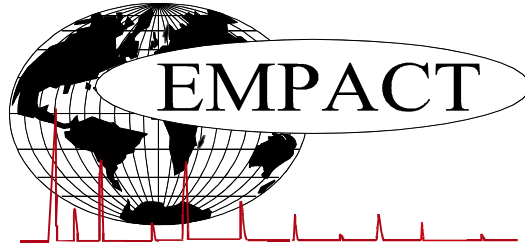
<u>Componet</u>	<u>Mole %</u>	<u>Wt %</u>
Helium	0.02	0.00
Hydrogen	0.09	0.01
Carbon Dioxide	0.02	0.05
Nitrogen	0.45	0.69
Methane	90.4210	79.3109
Ethane	4.8698	8.0062
Propane	2.3567	5.6819
Isobutane	0.5424	1.7237
n-Butane	0.6459	2.0526
Isopentane	0.2206	0.8703
n-Pentane	0.1719	0.6781
Cyclopentane	0.0080	0.0307
n-Hexane	0.0449	0.2115
Cyclohexane	0.0099	0.0455
Other Hexanes	0.0910	0.4272
Heptanes	0.0244	0.1332
Methylcyclohexane	0.0066	0.0354
2,2,4 Trimethylpentane	0.0001	0.0006
Benzene	0.0013	0.0056
Toluene	0.0002	0.0010
Ethylbenzene	0.0000	0.0000
Xylenes	0.0005	0.0030
C8+ Heavies	0.0048	0.0326
<u>Subtotal</u>	<u>100.00000</u>	<u>100.00000</u>
<u>Oxygen/Argon</u>	<u>0.00</u>	<u>0.00</u>
<b>Total</b>	<b>100.00000</b>	<b>100.00000</b>

	<b>Total</b>	<b>C6+</b>	<b>C8+</b>	<b>C10+</b>	
<b>Calculated Values BTU @</b>	<b>Sample</b>	<b>Fraction</b>	<b>Fraction</b>	<b>Fraction</b>	
<b>LHV</b> Net Dry Real:	1013.8	4555.1	5971.3	7211.5	<b>Btu/scf</b>
Net Wet Real:	996.1	4475.5	5866.9	7085.4	<b>Btu/scf</b>
<b>HHV</b> Gross Dry Real:	1121.9	4911.2	6428.1	7812.6	<b>Btu/scf</b>
Gross Wet Real:	1102.3	4825.3	6315.7	7676.0	<b>Btu/scf</b>

<b>Other Calculated Values</b>					
Regualr Wobbe Index*	1413.1	2777.3	3138.9	3530.9	<b>Btu/scf</b>
Net Heating Value (60 °F ideal reaction):	21054.8	19326.2	18907.1	19249.9	<b>Btu/lbm</b>
Gross Heating Value (60°F ideal reaction):	23295.2	20837.0	20348.0	20840.7	<b>Btu/lbm</b>
Molar Mass (MW):	18.28993	89.131	121.786	142.582	<b>g/mol</b>
Relative Density (AIR=1):	0.6310	3.0776	4.2050	4.9230	<b>SG</b>
Density:	0.04819	0.23489	0.32093	0.37572	<b>lbm/scf</b>
Compressibility Factor:	0.9974	0.9890	0.9982	0.9996	<b>Z</b>
Liquid Volume real gas @:	<b>14.65</b>	17.841	0.0728	0	<b>0 gal/1000 scf</b>

\* 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 underscore) indicates there was no tube pulled for H2S.

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**EXTENDED NATURAL GAS ANALYSIS (\*DHA)**

**DHA COMPONENT LIST**

PRIMARY DB KEY: **05-103-10975** NAME/DESCRIP : **YELLOW CREEK FEDERAL 2-22-1**  
 LEASE #: **BRAIDEN HEAD**  
 FIELD/AREA:

PROJECT NO. : **202502021** ANALYSIS NO. : **01**  
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 CUSTOMER REF: **TO:**  
 PRODUCER : **QB ENERGY OPERATING, LLC** EFFECTIVE DATE:

**\*\*\*FIELD DATA\*\*\***

SAMPLE CYCLE: SAMPLE TYPE: **SPOT**  
 SAMPLE PRES. : 716 psig PROBE :  
 FLOW PRES. : psig CYLINDER NO. : **ECA-799**  
 LAB PRES: psig SAMPLED BY : **NICK CROY**  
 SAMPLE TEMP. : 23 °f SAMPLING COMPANY: **QB ENERGY**  
 AMBIENT TEMP.: °f 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	---	0.02	0.00	---	---
Hydrogen	---	0.09	0.01	---	---
Nitrogen	---	0.45	0.69	---	---
Carbon Dioxide	---	0.02	0.05	---	---
Methane	P1	90.4210	79.3109	---	---
Ethane	P2	4.8698	8.0062	1.298	1.305
Propane	P3	2.3567	5.6819	0.648	0.651
i-Butane	I4	0.5424	1.7237	0.177	0.178
n-Butane	P4	0.6459	2.0526	0.203	0.204
2,2-Dimethylpropane	I5	0.0043	0.0170	0.002	0.002
i-Pentane	I5	0.2163	0.8533	0.079	0.079
n-Pentane	P5	0.1718	0.6777	0.062	0.062
2,2-Dimethylbutane	I6	0.0037	0.0174	0.002	0.002
Cyclopentane	N5	0.0080	0.0307	0.002	0.002
2,3-Dimethylbutane	I6	0.0076	0.0358	0.003	0.003
2-Methylpentane	I6	0.0442	0.2083	0.018	0.018
3-Methylpentane	I6	0.0209	0.0985	0.009	0.009
UnknownC5s	U5	0.0001	0.0004	0.000	0.000
n-Hexane	P6	0.0449	0.2115	0.018	0.018
2,2-Dimethylpentane	I7	0.0005	0.0027	0.000	0.000
Methylcyclopentane	N6	0.0146	0.0672	0.005	0.005
2,4-Dimethylpentane	I7	0.0013	0.0071	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0002	0.0011	0.000	0.000
Benzene	A6	0.0013	0.0056	0.000	0.000
3,3-Dimethylpentane	I7	0.0003	0.0016	0.000	0.000

Cyclohexane	N6	0.0099	0.0455	0.003	0.003
2-Methylhexane	I7	0.0046	0.0252	0.002	0.002
2,3-Dimethylpentane	I7	0.0014	0.0077	0.001	0.001
1,1-Dimethylcyclopentane	N7	0.0008	0.0043	0.000	0.000
3-Methylhexane	I7	0.0038	0.0208	0.002	0.002
1c,3-Dimethylcyclopentane	N7	0.0014	0.0075	0.001	0.001
1t,3-Dimethylcyclopentane	N7	0.0012	0.0065	0.001	0.001
3-Ethylpentane	I7	0.0002	0.0011	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0019	0.0102	0.001	0.001
2,2,4-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
n-Heptane	P7	0.0064	0.0351	0.003	0.003
1c,2-Dimethylcyclopentane	N7	0.0001	0.0006	0.000	0.000
Methylcyclohexane	N7	0.0066	0.0354	0.003	0.003
2,2-Dimethylhexane	I8	0.0002	0.0013	0.000	0.000
1,1,3-Trimethylcyclopentane	N7	0.0001	0.0006	0.000	0.000
Ethylcyclopentane	N7	0.0002	0.0011	0.000	0.000
2,5-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0002	0.0012	0.000	0.000
Toluene	A7	0.0002	0.0010	0.000	0.000
2,3-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0001	0.0006	0.000	0.000
2-Methylheptane	I8	0.0004	0.0025	0.000	0.000
4-Methylheptane	I8	0.0001	0.0006	0.000	0.000
3-Methylheptane	I8	0.0002	0.0013	0.000	0.000
1c,2t,3-Trimethylcyclopentane	N8	0.0003	0.0019	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
n-Octane	P8	0.0004	0.0025	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
Ethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0003	0.0018	0.000	0.000
1,4-Dimethylbenzene (p-Xylene)	A8	0.0001	0.0006	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0001	0.0006	0.000	0.000
n-Nonane	P9	0.0003	0.0021	0.000	0.000
n-Butylcyclopentane	N9	0.0001	0.0007	0.000	0.000
n-Propylbenzene	A9	0.0001	0.0007	0.000	0.000
1,3-Methylethylbenzene	A9	0.0001	0.0007	0.000	0.000
1,4-Methylethylbenzene	A9	0.0001	0.0007	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
2-Methylnonane	I10	0.0001	0.0008	0.000	0.000
3-Methylnonane	I10	0.0001	0.0008	0.000	0.000
t-Butylbenzene	A10	0.0001	0.0007	0.000	0.000
n-Decane	P10	0.0005	0.0039	0.000	0.000
1,2,3-Trimethylbenzene	A9	0.0001	0.0007	0.000	0.000
1,2-Methyl-i-propylbenzene	A10	0.0001	0.0007	0.000	0.000
1,3-Dimethyl-4-ethylbenzene	A10	0.0001	0.0007	0.000	0.000
n-Undecane	P11	0.0002	0.0017	0.000	0.000
<b>TOTAL</b>		<b>100.00000</b>	<b>100.00000</b>	<b>2.5438</b>	<b>2.5574</b>

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0013	0.0056
TOLUENE	0.0002	0.0010
ETHYLBENZENE	0.0000	0.0000
XYLENES	0.0005	0.0030
TOTAL BTEX	0.0020	0.0096

\*(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 :	1013.8 /scf	1019.3 /scf
NET WET REAL :	996.1 /scf	1001.6 /scf
HHV GROSS DRY REAL :	1121.9 /scf	1128.1 /scf
GROSS WET REAL :	1102.3 /scf	1108.5 /scf
NET HEATING VALUE (60 °F ideal reaction):		21054.8 Btu/lbm
GROSS HEATING VALUE (60°F ideal reaction):		23295.2 Btu/lbm
RELATIVE DENSITY (AIR=1):		0.6310
DENSITY		0.04819 lb/scf
COMPRESSIBILITY FACTOR :		0.9974
REGULAR WOBBE INDEX		1413.1

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

Net Dry Ideal BTU	4519 /scf	Relative Density - SG (Air=1)	3.0776	<b>C6+ factors</b>
Gross Dry Ideal BTU	4872.3 /scf	Z Compressibility Factor	0.98897	0.98839
Net Dry Ideal BTU	19326.2 /lb	Density Factor	234.885 lbm/1000 ft3	
Gross Dry Ideal BTU	20837 /lb	Molar Mass or MW	89.131 g/mol	
		Volume Liquid Ideal gas	0.073 scf/gal	24

**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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