



EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY: **05-103-10782** NAME/DESCRIP : **FED 4S-95-1-21-DP**
 LEASE #: **SURFACE CASING**
 FIELD/AREA:

PROJECT NO. : **202506059** ANALYSIS NO. : **01**
 COMPANY NAME : **QB ENERGY OPERATING, LLC** ANALYSIS DATE: **JUNE 20, 2025 09:28**
 OFFICE / BRANCH: **PARACHUTE, CO** SAMPLE DATE : **MAY 19, 2025**
 CUSTOMER REF: TO:
 PRODUCER : **QB ENERGY OPERATING, LLC** EFFECTIVE DATE:

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

SAMPLE CYCLE: SAMPLE TYPE:
 SAMPLE PRES. : 20 psig PROBE :
 FLOW PRES. : psig CYLINDER NO. : QB-1003
 LAB PRES: psig SAMPLED BY : NICK CROY
 SAMPLE TEMP. : 43 °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 @</u>	
			<u>14.65</u>	<u>14.73</u>
ALCOHOLS	0.0057	0.0171	0.0010	0.0010
HELIUM	0.01	0.00	---	---
HYDROGEN	0.02	0.00	---	---
OXYGEN/ARGON	0.20	0.39	---	---
NITROGEN	1.04	1.76	---	---
CARBON DIOXIDE	0.02	0.05	---	---
METHANE	97.4787	94.6969	---	---
ETHANE	0.8758	1.5947	0.2337	0.2350
PROPANE	0.1298	0.3466	0.0360	0.0362
I-BUTANE	0.0369	0.1299	0.0120	0.0121
N-BUTANE	0.0250	0.0880	0.0080	0.0080
I-PENTANE	0.0172	0.0750	0.0060	0.0060
N-PENTANE	0.0080	0.0349	0.0030	0.0030
HEXANES PLUS	0.1329	0.8168	0.0450	0.0450
TOTALS	100.0000	100.0000	0.3447	0.3463

<u>BTEX COMPONENTS</u>	<u>MOLE%</u>	<u>WT%</u>
BENZENE	0.0057	0.0269
TOLUENE	0.0096	0.0536
ETHYLBENZENE	0.0006	0.0039
XYLENES	0.0052	0.0335
TOTAL BTEX	0.0211	0.1179

	<u>CALCULATED VALUES**</u>	
	<u>BTU @</u>	<u>BTU @</u>
	<u>14.65</u>	<u>14.73</u>
LHV NET DRY REAL :	911.7 /scf	916.7 /scf
NET WET REAL :	895.8 /scf	900.8 /scf
HHV GROSS DRY REAL :	1011.6 /scf	1017.1 /scf
GROSS WET REAL :	993.9 /scf	999.4 /scf
NET HEATING VALUE (60 °F ideal reaction):		20988.9 Btu/lbm
GROSS HEATING VALUE (60°F ideal reaction):		23297.4 Btu/lbm
RELATIVE DENSITY (AIR=1):		0.5689
DENSITY		0.04352 lbm/scf
COMPRESSIBILITY FACTOR :		0.9980
REGULAR WOBBE INDEX		1342.7

**(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.



**EXTENDED NATURAL GAS ANALYSIS (*DHA)
GLYCALC INFORMATION**

PROJECT NO. :	202506059	ANALYSIS NO. :	01
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	JUNE 20, 2025 09:28
ACCOUNT NO. :		SAMPLE DATE :	MAY 19, 2025
PRODUCER :	QB ENERGY OPERATING, LLC	CYLINDER NO. :	QB-1003
LEASE NO. :		SAMPLED BY :	NICK CROY
NAME/DESCRIP :	FED 4S-95-1-21-DP SURFACE CASING		

FIELD DATA

SAMPLE PRES. :	20	SAMPLE TEMP. :	43
H2S BY STAIN TUBE:	— ppm mol	AMBIENT TEMP.:	
COMMENTS :			

<u>Componet</u>	<u>Mole %</u>	<u>Wt %</u>
Helium	0.01	0.00
Hydrogen	0.02	0.00
Carbon Dioxide	0.02	0.05
Nitrogen	1.04	1.76
Methane	97.4787	94.6969
Ethane	0.8758	1.5947
Propane	0.1298	0.3466
Isobutane	0.0369	0.1299
n-Butane	0.0250	0.0880
Isopentane	0.0164	0.0716
n-Pentane	0.0080	0.0349
Cyclopentane	0.0008	0.0034
n-Hexane	0.0062	0.0323
Cyclohexane	0.0086	0.0438
Other Hexanes	0.0214	0.1109
Heptanes	0.0224	0.1353
Methylcyclohexane	0.0178	0.1059
2,2,4 Trimethylpentane	0.0000	0.0000
Benzene	0.0057	0.0269
Toluene	0.0096	0.0536
Ethylbenzene	0.0006	0.0039
Xylenes	0.0052	0.0335
C8+ Heavies	0.0354	0.2707
<u>Subtotal</u>	<u>99.79430</u>	<u>99.59290</u>
Oxygen/Argon	0.20	0.39
Alcohols	0.0057	0.0171
Total	100.00000	100.00000

Calculated Values BTU @	14.65	Total	C6+	C8+	C10+
		Sample	Fraction	Fraction	Fraction
LHV Net Dry Real:		911.7	5055.2	6119.7	7435.1 Btu/scf
Net Wet Real:		895.8	4966.8	6012.7	7305.1 Btu/scf
HHV Gross Dry Real:		1011.6	5423.9	6581.5	8057.4 Btu/scf
Gross Wet Real:		993.9	5329.1	6466.4	7916.5 Btu/scf

Other Calculated Values

Regualr Wobbe Index*	1342.7	2893.1	3197.7	3587.4 Btu/scf	
Net Heating Value (60 °F ideal reaction):	20988.9	19057.7	19145.5	18816.7 Btu/lbm	
Gross Heating Value (60 °F ideal reaction):	23297.4	20452.5	20589.5	20383.7 Btu/lbm	
Molar Mass (MW):	16.51525	101.408	123.123	146.955 g/mol	
Relative Density (AIR=1):	0.5689	3.5016	4.2500	5.0736 SG	
Density:	0.04352	0.26723	0.32444	0.38726 lbm/scf	
Compressibility Factor:	0.9980	0.9950	0.9985	0.9997 Z	
Liquid Volume real gas @:	14.65	16.9129	0.0449	0.009	0.002 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 underscore) indicates there was no tube pulled for H2S.

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EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

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 FIELD COMMENTS:
 LAB COMMENTS:

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.65	GPM @ 14.73
Helium	---	0.01	0.00	---	---
Hydrogen	---	0.02	0.00	---	---
Oxygen/Argon	---	0.20	0.39	---	---
Nitrogen	---	1.04	1.76	---	---
Carbon Dioxide	---	0.02	0.05	---	---
Methane	P1	97.4787	94.6969	---	---
Ethane	P2	0.8758	1.5947	0.234	0.235
Propane	P3	0.1298	0.3466	0.036	0.036
i-Butane	I4	0.0369	0.1299	0.012	0.012
Methanol	X1	0.0019	0.0037	0.000	0.000
n-Butane	P4	0.0240	0.0845	0.008	0.008
2,2-Dimethylpropane	I5	0.0014	0.0061	0.001	0.001
i-Pentane	I5	0.0150	0.0655	0.005	0.005
Acetone	X3	0.0038	0.0134	0.001	0.001
UnknownC4s	U4	0.0010	0.0035	0.000	0.000
n-Pentane	P5	0.0080	0.0349	0.003	0.003
2,2-Dimethylbutane	I6	0.0022	0.0115	0.001	0.001
Cyclopentane	N5	0.0008	0.0034	0.000	0.000
2,3-Dimethylbutane	I6	0.0019	0.0099	0.001	0.001
2-Methylpentane	I6	0.0063	0.0329	0.003	0.003
3-Methylpentane	I6	0.0041	0.0214	0.002	0.002
n-Hexane	P6	0.0062	0.0323	0.003	0.003
2,2-Dimethylpentane	I7	0.0004	0.0024	0.000	0.000
Methylcyclopentane	N6	0.0064	0.0326	0.002	0.002
2,4-Dimethylpentane	I7	0.0009	0.0055	0.000	0.000
2,2,3-Trimethylbutane	I7	0.0004	0.0024	0.000	0.000
Benzene	A6	0.0057	0.0269	0.002	0.002
3,3-Dimethylpentane	I7	0.0006	0.0036	0.000	0.000

Cyclohexane	N6	0.0086	0.0438	0.003	0.003
2-Methylhexane	I7	0.0031	0.0188	0.001	0.001
2,3-Dimethylpentane	I7	0.0017	0.0103	0.001	0.001
1,1-Dimethylcyclopentane	N7	0.0009	0.0053	0.000	0.000
3-Methylhexane	I7	0.0034	0.0207	0.002	0.002
1c,3-Dimethylcyclopentane	N7	0.0012	0.0071	0.001	0.001
1t,3-Dimethylcyclopentane	N7	0.0011	0.0065	0.001	0.001
3-Ethylpentane	I7	0.0003	0.0018	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0016	0.0095	0.001	0.001
UnknownC6s	U6	0.0005	0.0026	0.000	0.000
n-Heptane	P7	0.0049	0.0297	0.002	0.002
1c,2-Dimethylcyclopentane	N7	0.0002	0.0012	0.000	0.000
Methylcyclohexane	N7	0.0178	0.1059	0.007	0.007
2,2-Dimethylhexane	I8	0.0002	0.0014	0.000	0.000
1,1,3-Trimethylcyclopentane	N7	0.0004	0.0027	0.000	0.000
Ethylcyclopentane	N7	0.0006	0.0036	0.000	0.000
2,5-Dimethylhexane	I8	0.0006	0.0042	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0006	0.0042	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0002	0.0013	0.000	0.000
3,3-Dimethylhexane	I8	0.0002	0.0014	0.000	0.000
Toluene	A7	0.0096	0.0536	0.003	0.003
2,3-Dimethylhexane	I8	0.0003	0.0021	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0001	0.0007	0.000	0.000
2-Methylheptane	I8	0.0018	0.0125	0.001	0.001
4-Methylheptane	I8	0.0007	0.0048	0.000	0.000
3-Methyl-3-ethylpentane	I8	0.0001	0.0007	0.000	0.000
3-Methylheptane	I8	0.0009	0.0062	0.000	0.000
1c,2t,3-Trimethylcyclopentane	N8	0.0028	0.0190	0.001	0.001
3-Ethylhexane	I8	0.0003	0.0021	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0011	0.0075	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0004	0.0027	0.000	0.000
2,2,5-Trimethylhexane	I9	0.0001	0.0008	0.000	0.000
3c-Ethylmethylcyclopentane	N8	0.0001	0.0007	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0001	0.0007	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0001	0.0007	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0007	0.0048	0.000	0.000
UnknownC7s	U7	0.0007	0.0042	0.000	0.000
n-Octane	P8	0.0030	0.0208	0.002	0.002
1c,4-Dimethylcyclohexane	N8	0.0006	0.0041	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0001	0.0008	0.000	0.000
2,2-Dimethylheptane	I9	0.0001	0.0008	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0009	0.0069	0.000	0.000
2,2,3-Trimethylhexane	I9	0.0003	0.0023	0.000	0.000
2,4-Dimethylheptane	I9	0.0002	0.0016	0.000	0.000
Ethylcyclohexane	N8	0.0004	0.0027	0.000	0.000
n-Propylcyclopentane	N8	0.0003	0.0021	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0001	0.0008	0.000	0.000
2,5-Dimethylheptane	I9	0.0005	0.0039	0.000	0.000
3,3-Dimethylheptane	I9	0.0002	0.0016	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0001	0.0008	0.000	0.000
Ethylbenzene	I8	0.0006	0.0039	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0034	0.0219	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0011	0.0071	0.000	0.000
3,4-Dimethylheptane	I9	0.0002	0.0016	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0001	0.0008	0.000	0.000
4-Ethylheptane	I9	0.0001	0.0008	0.000	0.000
4-Methyloctane	I9	0.0005	0.0039	0.000	0.000
2-Methyloctane	I9	0.0007	0.0055	0.000	0.000
3-Methyloctane	I9	0.0001	0.0008	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	0.0006	0.0046	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0007	0.0045	0.000	0.000

i-Butylcyclopentane	N9	0.0002	0.0015	0.000	0.000
n-Nonane	P9	0.0017	0.0132	0.001	0.001
1,1-Methylethylcyclohexane	N9	0.0002	0.0015	0.000	0.000
i-Propylbenzene	A9	0.0001	0.0007	0.000	0.000
2,4-Dimethyloctane	I10	0.0001	0.0009	0.000	0.000
n-Butylcyclopentane	N9	0.0002	0.0015	0.000	0.000
3,3-Dimethyloctane	I10	0.0001	0.0009	0.000	0.000
n-Propylbenzene	A9	0.0003	0.0022	0.000	0.000
3,6-Dimethyloctane	I10	0.0002	0.0017	0.000	0.000
1,3-Methylethylbenzene	A9	0.0008	0.0058	0.000	0.000
1,4-Methylethylbenzene	A9	0.0003	0.0022	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0007	0.0051	0.000	0.000
2,3-Dimethyloctane	I10	0.0001	0.0009	0.000	0.000
5-Methylnonane	I10	0.0002	0.0017	0.000	0.000
1,2-Methylethylbenzene	A9	0.0002	0.0015	0.000	0.000
2-Methylnonane	I10	0.0003	0.0026	0.000	0.000
3-Ethylloctane	I10	0.0001	0.0009	0.000	0.000
3-Methylnonane	I10	0.0002	0.0017	0.000	0.000
t-Butylbenzene	A10	0.0010	0.0081	0.000	0.000
i-Butylcyclohexane	N10	0.0001	0.0009	0.000	0.000
i-Butylbenzene	A10	0.0001	0.0008	0.000	0.000
UnknownC9s	U9	0.0008	0.0062	0.000	0.000
n-Decane	P10	0.0012	0.0104	0.001	0.001
1,2,3-Trimethylbenzene	A9	0.0001	0.0007	0.000	0.000
1,3-Methyl-i-propylbenzene	A10	0.0002	0.0016	0.000	0.000
Sec-Butylcyclohexane	A10	0.0001	0.0009	0.000	0.000
1,2-Methyl-i-propylbenzene	A10	0.0001	0.0008	0.000	0.000
1,4-Diethylbenzene	A10	0.0001	0.0008	0.000	0.000
1,4-Methyl-n-propylbenzene	A10	0.0001	0.0008	0.000	0.000
1,3-Dimethyl-5-ethylbenzene	A10	0.0002	0.0016	0.000	0.000
1,2-Diethylbenzene	A10	0.0001	0.0008	0.000	0.000
1,2-Methyl-n-propylbenzene	A10	0.0001	0.0008	0.000	0.000
1,2-Dimethyl-4-ethylbenzene	A10	0.0002	0.0016	0.000	0.000
1,2-Ethyl-i-propylbenzene	A10	0.0001	0.0009	0.000	0.000
1,4-Methyl-t-butylbenzene	A11	0.0002	0.0018	0.000	0.000
UnknownC10s	U10	0.0008	0.0069	0.000	0.000
n-Undecane	P11	0.0008	0.0076	0.001	0.001
1,4-Ethyl-i-propylbenzene	A11	0.0001	0.0009	0.000	0.000
1,2,4,5-Tetramethylbenzene	A11	0.0001	0.0008	0.000	0.000
1,2,3,5-Tetramethylbenzene	A11	0.0001	0.0008	0.000	0.000
5-Methylindan	A11	0.0001	0.0008	0.000	0.000
n-Pentylbenzene	A11	0.0001	0.0009	0.000	0.000
1,4-Di-i-propylbenzene	A11	0.0001	0.0010	0.000	0.000
UnknownC11s	U11	0.0002	0.0019	0.000	0.000
n-Dodecane	P12	0.0005	0.0052	0.000	0.000
1,3,5-Triethylbenzene	A12	0.0001	0.0010	0.000	0.000
n-Hexylbenzene	A12	0.0001	0.0010	0.000	0.000
1,2,3,4,5-Pentamethylbenzene	A13	0.0001	0.0009	0.000	0.000
2-Methylnaphthalene	A11	0.0004	0.0035	0.000	0.000
n-Tridecane	P13	0.0002	0.0022	0.000	0.000
UnknownC13s	U13	0.0001	0.0011	0.000	0.000
n-Pentadecane	P15	0.0002	0.0025	0.000	0.000
TOTAL		100.00000	100.00000	0.3447	0.3463

BTEX COMPONENTS	MOLE%	WT%	CALCULATED VALUES**		
			BTU @	14.65	14.73
BENZENE	0.0057	0.0269	LHV NET DRY REAL :	911.7 /scf	916.7 /scf
TOLUENE	0.0096	0.0536	NET WET REAL :	895.8 /scf	900.8 /scf
ETHYLBENZENE	0.0006	0.0039	HHV GROSS DRY REAL :	1011.6 /scf	1017.1 /scf
XYLENES	0.0052	0.0335	GROSS WET REAL :	993.9 /scf	999.4 /scf
TOTAL BTEX	0.0211	0.1179	NET HEATING VALUE (60 °F ideal reaction):		20988.9 Btu/lbm
			GROSS HEATING VALUE (60°F ideal reaction):		23297.4 Btu/lbm
			RELATIVE DENSITY (AIR=1):		0.5689
			DENSITY		0.04352 lb/scf
			COMPRESSIBILITY FACTOR :		0.9980
			REGULAR WOBBE INDEX		1342.7

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

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

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

Net Dry Ideal BTU	<u>5045.7</u> /scf	Relative Density - SG (Air=1)	<u>3.5016</u>	C6+ factors
Gross Dry Ideal BTU	<u>5413.7</u> /scf	Z Compressibility Factor	<u>0.99499</u>	<u>0.99397</u>
Net Dry Ideal BTU	<u>19057.7</u> /lb	Density Factor	<u>267.234</u> lbm/1000 ft3	
Gross Dry Ideal BTU	<u>20452.5</u> /lb	Molar Mass or MW	<u>101.408</u> g/mol	
		Volume Liquid Ideal gas	<u>0.045</u> scf/gal	<u>22.9</u>
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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