



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

**MAIN PAGE**

PRIMARY DB KEY:	<b>05-045-09419</b>	NAME/DESCRIP :	<b>YOUBERG #2-342D</b>
LEASE #:	<b>COC-60679</b>	CASING	
FIELD/AREA:	<b>RULISON - #75400</b>		
PROJECT NO. :	<b>202311019</b>	ANALYSIS NO. :	<b>02</b>
COMPANY NAME :	<b>CAERUS OIL &amp; GAS LLC</b>	ANALYSIS DATE:	NOVEMBER 08, 2023 06:36
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	OCTOBER 26, 2023 8:00
CUSTOMER REF:		TO:	
PRODUCER :	CAERUS PICEANCE LLC	EFFECTIVE DATE:	

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

SAMPLE CYCLE:		SAMPLE TYPE:	SPOT
SAMPLE PRES. :	371 psig	PROBE :	NO
FLOW PRES. :	psig	CYLINDER NO. :	ECA-760
LAB PRES:	psig	SAMPLED BY :	MIKE KELLEY
SAMPLE TEMP. :	37 °f	SAMPLING COMPANY:	CAERUS OIL & GAS
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>
ALCOHOLS	0.0054	0.0098	0.0010	0.0010
HELIUM	0.01	0.00	---	---
HYDROGEN	0.11	0.01	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.10	0.15	---	---
CARBON DIOXIDE	0.36	0.87	---	---
METHANE	90.2183	79.6233	---	---
ETHANE	6.0702	10.0415	1.6181	1.6269
PROPANE	1.7981	4.3620	0.4937	0.4964
I-BUTANE	0.3784	1.2099	0.1239	0.1246
N-BUTANE	0.3835	1.2263	0.1209	0.1216
I-PENTANE	0.1677	0.6649	0.0610	0.0613
N-PENTANE	0.1194	0.4739	0.0430	0.0432
HEXANES PLUS	0.2790	1.3584	0.1110	0.1112
<b>TOTALS</b>	<b>100.0000</b>	<b>100.0000</b>	<b>2.5726</b>	<b>2.5862</b>

<u>BTEX COMPONENTS</u>	<u>MOLE%</u>	<u>WT%</u>
BENZENE	0.0159	0.0683
TOLUENE	0.0083	0.0421
ETHYLBENZENE	0.0000	0.0000
XYLENES	0.0000	0.0000
<b>TOTAL BTEX</b>	<b>0.0242</b>	<b>0.1104</b>

	<u>BTU @ 14.65</u>	<u>14.73</u>
<b>LHV NET DRY REAL :</b>	1005.7 /scf	1011.2 /scf
<b>NET WET REAL :</b>	988.1 /scf	993.6 /scf
<b>HHV GROSS DRY REAL :</b>	1112.9 /scf	1119.0 /scf
<b>GROSS WET REAL :</b>	1093.4 /scf	1099.5 /scf
<b>NET HEATING VALUE (60 °F ideal reaction):</b>		21014.5 Btu/lbm
<b>GROSS HEATING VALUE (60°F ideal reaction):</b>		23255.7 Btu/lbm
<b>RELATIVE DENSITY (AIR=1):</b>		0.6277
<b>DENSITY</b>		0.04790 lbm/scf
<b>COMPRESSIBILITY FACTOR :</b>		0.9974
<b>REGULAR WOBBE INDEX</b>		1405.4

\*(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. :	202311019	ANALYSIS NO. :	02
COMPANY NAME :	CAERUS OIL & GAS LLC	ANALYSIS DATE:	NOVEMBER 08, 2023 06:36
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 26, 2023 8:40
PRODUCER :	CAERUS PICEANCE LLC	CYLINDER NO. :	ECA-760
LEASE NO. :	COC-60679	SAMPLED BY :	MIKE KELLEY
NAME/DESCRIP :	YOUBERG #2-342D CASING		

***FIELD DATA***		SAMPLE TEMP. :	37
SAMPLE PRES. :	371	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	— ppm mol		
COMMENTS :	SPOT NO PROBE		

Componet	Mole %	Wt %
Helium	0.01	0.00
Hydrogen	0.11	0.01
Carbon Dioxide	0.36	0.87
Nitrogen	0.10	0.15
Methane	90.2183	79.6233
Ethane	6.0702	10.0415
Propane	1.7981	4.3620
Isobutane	0.3784	1.2099
n-Butane	0.3835	1.2263
Isopentane	0.1607	0.6379
n-Pentane	0.1194	0.4739
Cyclopentane	0.0070	0.0270
n-Hexane	0.0549	0.2603
Cyclohexane	0.0282	0.1306
Other Hexanes	0.1091	0.5142
Heptanes	0.0410	0.2250
Methylcyclohexane	0.0200	0.1081
2,2,4 Trimethylpentane	0.0001	0.0006
Benzene	0.0159	0.0683
Toluene	0.0083	0.0421
Ethylbenzene	0.0000	0.0000
Xylenes	0.0000	0.0000
C8+ Heavies	0.0015	0.0092
<b>Subtotal</b>	<b>99.99460</b>	<b>99.99020</b>
Oxygen/Argon	0.00	0.00
Alcohols	0.0054	0.0098
<b>Total</b>	<b>100.00000</b>	<b>100.00000</b>

	Total	C6+	C8+	C10+	
<b>Calculated Values BTU @</b>	<b>14.65</b>				
LHV Net Dry Real:	1005.7	4477.3	5538.3	#DIV/0!	Btu/scf
Net Wet Real:	988.1	4399.0	5441.5	#DIV/0!	Btu/scf
HHV Gross Dry Real:	1112.9	4813.0	5972.6	#DIV/0!	Btu/scf
Gross Wet Real:	1093.4	4728.9	5868.2	#DIV/0!	Btu/scf
<b>Other Calculated Values</b>					
Regualr Wobbe Index*	1405.4	2735.4	3011.8	#DIV/0!	Btu/scf
Net Heating Value (60 °F ideal reaction):	21014.5	19171.5	19758.3	#DIV/0!	Btu/lbm
Gross Heating Value (60°F ideal reaction):	23255.7	20610.2	21309.3	#DIV/0!	Btu/lbm
Molar Mass (MW):	18.17892	88.503	113.596	#DIV/0!	g/mol
Relative Density (AIR=1):	0.6277	3.0555	3.9222	#DIV/0!	SG
Density:	0.04790	0.23322	0.29935	#DIV/0!	lbm/scf
Compressibility Factor:	0.9974	0.9903	0.9956	#DIV/0!	Z
Liquid Volume real gas @:	<b>14.65</b>	17.8569	0.1107	0	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 underscore) indicates there was no tube pulled for H2S.

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

**DHA COMPONENT LIST**

PRIMARY DB KEY: **05-045-09419**  
 LEASE #: **COC-60679**  
 FIELD/AREA: **RULISON - #75400**

NAME/DESCRIP : **YOUBERG #2-342D**  
**CASING**

PROJECT NO. : **202311019**  
 COMPANY NAME : **CAERUS OIL & GAS LLC**  
 OFFICE / BRANCH: **PARACHUTE, CO**  
 CUSTOMER REF:  
 PRODUCER : **CAERUS PICEANCE LLC**

ANALYSIS NO. : **02**  
 ANALYSIS DATE: **NOVEMBER 08, 2023 06:36**  
 SAMPLE DATE : **OCTOBER 26, 2023 8:40**  
 TO:  
 EFFECTIVE DATE:

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

SAMPLE CYCLE:  
 SAMPLE PRES. : 371 psig  
 FLOW PRES. : psig  
 LAB PRES: psig  
 SAMPLE TEMP. : 37 °f  
 AMBIENT TEMP.: °f  
 H2O BY STAIN TUBE: - #/mmcf  
 FIELD COMMENTS:  
 LAB COMMENTS:

SAMPLE TYPE: SPOT  
 PROBE : NO  
 CYLINDER NO. : ECA-760  
 SAMPLED BY : MIKE KELLEY  
 SAMPLING COMPANY: CAERUS OIL & GAS  
 H2S BY STAIN TUBE: - ppm mol  
 CO2 BY STAIN TUBE: - Mol %

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.65	GPM @ 14.73
Helium	---	0.01	0.00	---	---
Hydrogen	---	0.11	0.01	---	---
Oxygen/Argon	---	0.00	0.00	---	---
Nitrogen	---	0.10	0.15	---	---
Carbon Dioxide	---	0.36	0.87	---	---
Methane	P1	90.2183	79.6233	---	---
Ethane	P2	6.0702	10.0415	1.618	1.627
Propane	P3	1.7981	4.3620	0.494	0.496
i-Butane	I4	0.3784	1.2099	0.124	0.125
Methanol	X1	0.0053	0.0094	0.001	0.001
n-Butane	P4	0.3835	1.2263	0.121	0.122
2,2-Dimethylpropane	I5	0.0049	0.0195	0.002	0.002
i-Pentane	I5	0.1558	0.6184	0.057	0.057
n-Pentane	P5	0.1194	0.4739	0.043	0.043
t-Butanol	X4	0.0001	0.0004	0.000	0.000
2,2-Dimethylbutane	I6	0.0055	0.0261	0.002	0.002
Cyclopentane	N5	0.0070	0.0270	0.002	0.002
2,3-Dimethylbutane	I6	0.0100	0.0474	0.004	0.004
2-Methylpentane	I6	0.0428	0.2029	0.018	0.018
3-Methylpentane	I6	0.0238	0.1128	0.010	0.010
n-Hexane	P6	0.0549	0.2603	0.023	0.023
2,2-Dimethylpentane	I7	0.0013	0.0072	0.001	0.001
Methylcyclopentane	N6	0.0270	0.1250	0.010	0.010
2,4-Dimethylpentane	I7	0.0022	0.0121	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0005	0.0028	0.000	0.000
Benzene	A6	0.0159	0.0683	0.004	0.004
3,3-Dimethylpentane	I7	0.0007	0.0039	0.000	0.000
Cyclohexane	N6	0.0282	0.1306	0.010	0.010
2-Methylhexane	I7	0.0072	0.0397	0.003	0.003
2,3-Dimethylpentane	I7	0.0021	0.0116	0.001	0.001

1,1-Dimethylcyclopentane	N7	0.0017	0.0092	0.001	0.001
3-Methylhexane	I7	0.0061	0.0336	0.003	0.003
1c,3-Dimethylcyclopentane	N7	0.0026	0.0140	0.001	0.001
1t,3-Dimethylcyclopentane	N7	0.0022	0.0119	0.001	0.001
3-Ethylpentane	I7	0.0003	0.0017	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0034	0.0184	0.002	0.002
2,2,4-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
n-Heptane	P7	0.0098	0.0540	0.005	0.005
1c,2-Dimethylcyclopentane	N7	0.0003	0.0016	0.000	0.000
Methylcyclohexane	N7	0.0200	0.1081	0.008	0.008
2,2-Dimethylhexane	I8	0.0003	0.0019	0.000	0.000
1,1,3-Trimethylcyclopentane	N7	0.0001	0.0006	0.000	0.000
Ethylcyclopentane	N7	0.0005	0.0027	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
2,3,3-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
Toluene	A7	0.0083	0.0421	0.003	0.003
2,3-Dimethylhexane	I8	0.0002	0.0013	0.000	0.000
2-Methylheptane	I8	0.0001	0.0006	0.000	0.000
3-Methylheptane	I8	0.0001	0.0006	0.000	0.000
1c,2t,3-Trimethylcyclopentane	N8	0.0002	0.0012	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
<b>TOTAL</b>		<b>100.00000</b>	<b>100.00000</b>	<b>2.5726</b>	<b>2.5862</b>

**CALCULATED VALUES\*\***

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.65	14.73
BENZENE	0.0159	0.0683	LHV NET DRY REAL :	1005.7 /scf	1011.2 /scf
TOLUENE	0.0083	0.0421	NET WET REAL :	988.1 /scf	993.6 /scf
ETHYLBENZENE	0.0000	0.0000	HHV GROSS DRY REAL :	1112.9 /scf	1119.0 /scf
XYLENES	0.0000	0.0000	GROSS WET REAL :	1093.4 /scf	1099.5 /scf
TOTAL BTEX	0.0242	0.1104	NET HEATING VALUE (60 °F ideal reaction):		21014.5 Btu/lbm
			GROSS HEATING VALUE (60°F ideal reaction):		23255.7 Btu/lbm
			RELATIVE DENSITY (AIR=1):		0.6277
			DENSITY		0.04790 lb/scf
			COMPRESSIBILITY FACTOR :		0.9974
			REGULAR WOBBE INDEX		1405.4

\*(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	4448 /scf	Relative Density - SG (Air=1)	3.0555	<b>C6+ factors</b>
Gross Dry Ideal BTU	4781.5 /scf	Z Compressibility Factor	0.99034	0.98984
Net Dry Ideal BTU	19171.5 /lb	Density Factor	233.219 lbm/1000 ft3	
Gross Dry Ideal BTU	20610.2 /lb	Molar Mass or MW	88.503 g/mol	
		Volume Liquid Ideal gas	0.111 scf/gal	25.7

**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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