

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

**MAIN PAGE**

PRIMARY DB KEY:	<b>05-045-15092</b>	NAME/DESCRIP :	<b>110250216 DWU E34 #CP08B-33</b>
LEASE #:	<b>05-045-15092</b>		<b>FEDERAL LEASE # COC-65556</b>
FIELD/AREA:	<b>GRAND VALLEY - #31290</b>		<b>BRAIDEN HEAD</b>
PROJECT NO. :	<b>202304096</b>	ANALYSIS NO. :	<b>02</b>
COMPANY NAME :	<b>CAERUS OIL &amp; GAS LLC</b>	ANALYSIS DATE:	<b>APRIL 22, 2023 14:49</b>
OFFICE / BRANCH:	<b>PARACHUTE, CO</b>	SAMPLE DATE :	<b>APRIL 10, 2023 10:55</b>
CUSTOMER REF:		TO:	
PRODUCER :	<b>CAERUS PICEANCE LLC - 10456</b>	EFFECTIVE DATE:	

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

SAMPLE CYCLE:		SAMPLE TYPE:	SPOT
SAMPLE PRES. :	179 psig	PROBE :	NO
FLOW PRES. :	psig	CYLINDER NO. :	ECA-820
LAB PRES:	psig	SAMPLED BY :	MIKE KELLY
SAMPLE TEMP. :	50 °f	SAMPLING COMPANY:	CAERUS
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	0.0027	0.0050	0.0000	0.0000
HELIUM	0.00	0.00	---	---
HYDROGEN	0.01	0.00	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.06	0.09	---	---
CARBON DIOXIDE	2.18	5.18	---	---
METHANE	89.0275	77.1729	---	---
ETHANE	6.1009	9.9125	1.6260	1.6349
PROPANE	1.6029	3.8192	0.4397	0.4421
I-BUTANE	0.3732	1.1721	0.1219	0.1226
N-BUTANE	0.2481	0.7792	0.0780	0.0784
I-PENTANE	0.0897	0.3494	0.0330	0.0331
N-PENTANE	0.0486	0.1894	0.0180	0.0181
HEXANES PLUS	0.2564	1.3303	0.1020	0.1022
<u>TOTALS</u>	<u>100.00000</u>	<u>100.00000</u>	<u>2.4186</u>	<u>2.4314</u>

<u>BTEX COMPONENTS</u>	<u>MOLE%</u>	<u>WT%</u>
BENZENE	0.0094	0.0397
TOLUENE	0.0344	0.1713
ETHYLBENZENE	0.0001	0.0006
XYLENES	0.0003	0.0017
<u>TOTAL BTEX</u>	<u>0.0442</u>	<u>0.2133</u>

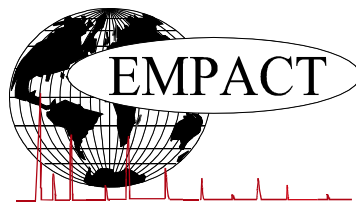
	<u>BTU @ 14.65</u>	<u>14.73</u>
<b>LHV NET DRY REAL :</b>	980.7 /scf	986.1 /scf
<b>NET WET REAL :</b>	963.6 /scf	969.0 /scf
<b>HHV GROSS DRY REAL :</b>	1085.5 /scf	1091.5 /scf
<b>GROSS WET REAL :</b>	1066.5 /scf	1072.5 /scf
<b>NET HEATING VALUE (60 °F ideal reaction):</b>		20130.2 Btu/lbm
<b>GROSS HEATING VALUE (60°F ideal reaction):</b>		22281.3 Btu/lbm
<b>RELATIVE DENSITY (AIR=1):</b>		0.6388
<b>DENSITY</b>		0.04877 lbm/scf
<b>COMPRESSIBILITY FACTOR :</b>		0.9975
<b>REGULAR WOBBE INDEX</b>		1359.0

\*(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. :	202304096	ANALYSIS NO. :	02
COMPANY NAME :	CAERUS OIL & GAS LLC	ANALYSIS DATE:	APRIL 22, 2023 14:49
ACCOUNT NO. :		SAMPLE DATE :	APRIL 10, 2023 10:55
PRODUCER :	CAERUS PICEANCE LLC - 10456	CYLINDER NO. :	ECA-820
LEASE NO. :	05-045-15092	SAMPLED BY :	MIKE KELLY
NAME/DESCRIP :	110250216 DWU E34 #CP08B-33 FEDERAL LEASE # COC-65556 BRAIDEN HEAD		

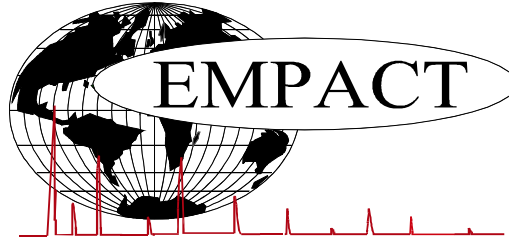
***FIELD DATA***		SAMPLE TEMP. :	50
SAMPLE PRES. :	179	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	—		
COMMENTS :	<i>SPOT</i> <i>ppm mol</i> <i>NO PROBE</i>		

<u>Componet</u>	<u>Mole %</u>	<u>Wt %</u>
Helium	0.00	0.00
Hydrogen	0.01	0.00
Carbon Dioxide	2.18	5.18
Nitrogen	0.06	0.09
Methane	89.0275	77.1729
Ethane	6.1009	9.9125
Propane	1.6029	3.8192
Isobutane	0.3732	1.1721
n-Butane	0.2481	0.7792
Isopentane	0.0877	0.3418
n-Pentane	0.0486	0.1894
Cyclopentane	0.0020	0.0076
n-Hexane	0.0156	0.0726
Cyclohexane	0.0131	0.0596
Other Hexanes	0.0415	0.1920
Heptanes	0.0597	0.3219
Methylcyclohexane	0.0439	0.2329
2,2,4 Trimethylpentane	0.0000	0.0000
Benzene	0.0094	0.0397
Toluene	0.0344	0.1713
Ethylbenzene	0.0001	0.0006
Xylenes	0.0003	0.0017
C8+ Heavies	0.0384	0.2380
<u>Subtotal</u>	<u>99.99730</u>	<u>99.99500</u>
Oxygen/Argon	0.00	0.00
Alcohols	0.0027	0.0050
<u>Total</u>	<u>100.00000</u>	<u>100.00000</u>

	<u>Total</u>	<u>C6+</u>	<u>C8+</u>	<u>C10+</u>
<b>Calculated Values BTU @ <u>14.65</u></b>	<b>Sample</b>	<b>Fraction</b>	<b>Fraction</b>	<b>Fraction</b>
LHV Net Dry Real:	980.7	4796.1	5788.0	10359.4 Btu/scf
Net Wet Real:	963.6	4712.3	5686.8	10178.3 Btu/scf
HHV Gross Dry Real:	1085.5	5142.7	6238.4	11141.9 Btu/scf
Gross Wet Real:	1066.5	5052.8	6129.3	10947.1 Btu/scf
<b>Other Calculated Values</b>				
Regualr Wobbe Index*	1359.0	2815.9	3133.7	4182.7 Btu/scf
Net Heating Value (60 °F ideal reaction):	20130.2	19184.8	20106.6	19343.2 Btu/lbm
Gross Heating Value (60°F ideal reaction):	22281.3	20573.4	21670.3	20804.7 Btu/lbm
Molar Mass (MW):	18.50797	96.029	114.724	206.807 g/mol
Relative Density (AIR=1):	0.6388	3.3151	3.9613	7.1406 SG
Density:	0.04877	0.25305	0.30232	0.54497 lbm/scf
Compressibility Factor:	0.9975	0.9939	0.9967	1.0000 Z
Liquid Volume real gas @:	<u>14.65</u>	17.7971	0.1017	0.0179
				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: **05-045-15092** NAME/DESCRIP : **110250216 DWU E34 #CP08B-33**  
 LEASE #: **05-045-15092** FEDERAL LEASE # **COC-65556**  
 FIELD/AREA: **GRAND VALLEY - #31290** BRAIDEN HEAD

PROJECT NO. : **202304096** ANALYSIS NO. : **02**  
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 OFFICE / BRANCH: **PARACHUTE, CO** SAMPLE DATE : **APRIL 10, 2023 10:55**  
 CUSTOMER REF: TO:  
 PRODUCER : **CAERUS PICEANCE LLC - 10456** EFFECTIVE DATE:

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

SAMPLE CYCLE: SAMPLE TYPE: SPOT  
 SAMPLE PRES. : 179 psig PROBE : NO  
 FLOW PRES. : psig CYLINDER NO. : ECA-820  
 LAB PRES: psig SAMPLED BY : MIKE KELLY  
 SAMPLE TEMP. : 50 °f SAMPLING COMPANY: CAERUS  
 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	---	0.00	0.00	---	---
Hydrogen	---	0.01	0.00	---	---
Oxygen/Argon	---	0.00	0.00	---	---
Nitrogen	---	0.06	0.09	---	---
Carbon Dioxide	---	2.18	5.18	---	---
Methane	P1	89.0275	77.1729	---	---
Ethane	P2	6.1009	9.9125	1.626	1.635
Propane	P3	1.6029	3.8192	0.440	0.442
i-Butane	I4	0.3732	1.1721	0.122	0.123
Methanol	X1	0.0025	0.0043	0.000	0.000
n-Butane	P4	0.2481	0.7792	0.078	0.078
2,2-Dimethylpropane	I5	0.0053	0.0206	0.002	0.002
i-Pentane	I5	0.0824	0.3212	0.030	0.030
Acetone	X3	0.0002	0.0007	0.000	0.000
n-Pentane	P5	0.0486	0.1894	0.018	0.018
2,2-Dimethylbutane	I6	0.0031	0.0144	0.001	0.001
Cyclopentane	N5	0.0020	0.0076	0.001	0.001
2,3-Dimethylbutane	I6	0.0042	0.0196	0.002	0.002
2-Methylpentane	I6	0.0146	0.0680	0.006	0.006
3-Methylpentane	I6	0.0083	0.0386	0.003	0.003
n-Hexane	P6	0.0156	0.0726	0.006	0.006
2,2-Dimethylpentane	I7	0.0002	0.0011	0.000	0.000
Methylcyclopentane	N6	0.0113	0.0514	0.004	0.004
2,4-Dimethylpentane	I7	0.0015	0.0081	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0004	0.0022	0.000	0.000
Benzene	A6	0.0094	0.0397	0.003	0.003
3,3-Dimethylpentane	I7	0.0007	0.0038	0.000	0.000
Cyclohexane	N6	0.0131	0.0596	0.004	0.004
2-Methylhexane	I7	0.0088	0.0477	0.004	0.004
2,3-Dimethylpentane	I7	0.0031	0.0168	0.001	0.001

1,1-Dimethylcyclopentane	N7	0.0019	0.0101	0.001	0.001
3-Methylhexane	I7	0.0092	0.0498	0.004	0.004
1c,3-Dimethylcyclopentane	N7	0.0030	0.0159	0.001	0.001
1t,3-Dimethylcyclopentane	N7	0.0028	0.0149	0.001	0.001
3-Ethylpentane	I7	0.0003	0.0016	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0046	0.0244	0.002	0.002
n-Heptane	P7	0.0207	0.1121	0.010	0.010
1c,2-Dimethylcyclopentane	N7	0.0007	0.0037	0.000	0.000
Methylcyclohexane	N7	0.0439	0.2329	0.018	0.018
2,2-Dimethylhexane	I8	0.0014	0.0086	0.001	0.001
1,1,3-Trimethylcyclopentane	N7	0.0002	0.0012	0.000	0.000
Ethylcyclopentane	N7	0.0016	0.0085	0.001	0.001
2,5-Dimethylhexane	I8	0.0016	0.0099	0.001	0.001
2,2,3-Trimethylpentane	I8	0.0015	0.0092	0.001	0.001
1c,2t,4-Trimethylcyclopentane	N8	0.0009	0.0055	0.000	0.000
3,3-Dimethylhexane	I8	0.0004	0.0025	0.000	0.000
2,3,3-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
Toluene	A7	0.0344	0.1713	0.011	0.011
2,3-Dimethylhexane	I8	0.0012	0.0074	0.001	0.001
2-Methyl-3-ethylpentane	I8	0.0001	0.0006	0.000	0.000
1,1,2-Trimethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
2-Methylheptane	I8	0.0060	0.0370	0.003	0.003
4-Methylheptane	I8	0.0018	0.0111	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0003	0.0018	0.000	0.000
3,4-Dimethylhexane	I8	0.0002	0.0012	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	0.0043	0.0265	0.002	0.002
1c,2t,3-Trimethylcyclopentane	N8	0.0066	0.0400	0.003	0.003
3-Ethylhexane	I8	0.0005	0.0031	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0030	0.0182	0.002	0.002
1,1-Dimethylcyclohexane	N8	0.0011	0.0067	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	0.0001	0.0006	0.000	0.000
1,1-Methylethylcyclopentane	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	0.0015	0.0091	0.001	0.001
n-Octane	P8	0.0029	0.0179	0.001	0.001
1c,4-Dimethylcyclohexane	N8	0.0010	0.0061	0.001	0.001
1,1,4-Trimethylcyclohexane	N9	0.0002	0.0014	0.000	0.000
Ethylbenzene	I8	0.0001	0.0006	0.000	0.000
1,4-Dimethylbenzene (p-Xylene)	A8	0.0003	0.0017	0.000	0.000
3,4-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
n-Tridecane	P13	0.0001	0.0010	0.000	0.000
n-Tetradecane	P14	0.0001	0.0011	0.000	0.000
n-Pentadecane	P15	0.0001	0.0011	0.000	0.000
UnknownC15s	U15	0.0001	0.0011	0.000	0.000
UnknownC16s	U16	0.0001	0.0012	0.000	0.000
<b>TOTAL</b>		<b>100.00000</b>	<b>100.00000</b>	<b>2.4186</b>	<b>2.4314</b>

**CALCULATED VALUES\*\***

BTX COMPONENTS	MOLE%	WT%	BTU @		
				14.65	14.73
BENZENE	0.0094	0.0397	LHV NET DRY REAL :	980.7 /scf	986.1 /scf
TOLUENE	0.0344	0.1713	NET WET REAL :	963.6 /scf	969.0 /scf
ETHYLBENZENE	0.0001	0.0006	HHV GROSS DRY REAL :	1085.5 /scf	1091.5 /scf
XYLENES	0.0003	0.0017	GROSS WET REAL :	1066.5 /scf	1072.5 /scf
TOTAL BTX	0.0442	0.2133	NET HEATING VALUE (60 °F ideal reaction):		20130.2 Btu/lbm
			GROSS HEATING VALUE (60°F ideal reaction):		22281.3 Btu/lbm
			RELATIVE DENSITY (AIR=1):		0.6388
			DENSITY		0.04877 lb/scf
			COMPRESSIBILITY FACTOR :		0.9975
			REGULAR WOBBE INDEX		1359.0

\*(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>4781.6</u> /scf	Relative Density - SG (Air=1)	<u>3.3151</u>	<b>C6+ factors</b>
Gross Dry Ideal BTU	<u>5127.1</u> /scf	Z Compressibility Factor	<u>0.99385</u>	<u>0.99334</u>
Net Dry Ideal BTU	<u>19184.8</u> /lb	Density Factor	<u>253.045</u> lbm/1000 ft3	
Gross Dry Ideal BTU	<u>20573.4</u> /lb	Molar Mass or MW	<u>96.029</u> g/mol	
		Volume Liquid Ideal gas	<u>0.102</u> scf/gal	<u>24.5</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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