

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY: **05-045-16304** NAME/DESCRIP : **NP D09A MF04D-9 696**
 LEASE #: **110166074** CASING
 FIELD/AREA:

PROJECT NO. : **202007041** ANALYSIS NO. : **01**
 COMPANY NAME : **CAERUS OIL & GAS LLC** ANALYSIS DATE: **JULY 14, 2020 07:31**
 OFFICE / BRANCH: **PARACHUTE, CO** SAMPLE DATE : **JULY 8, 2020**
 CUSTOMER REF: TO:
 PRODUCER : **CAERUS OIL & GAS LLC** EFFECTIVE DATE:

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

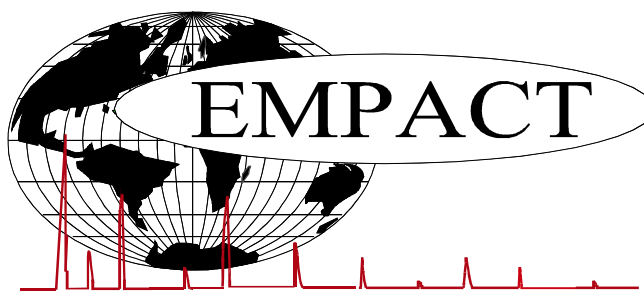
SAMPLE CYCLE: SAMPLE TYPE: SPOT
 SAMPLE PRES. : 396 psig PROBE : NO
 FLOW PRES. : psig CYLINDER NO. : ECA-774
 LAB PRES: psig SAMPLED BY : ELDON KING
 SAMPLE TEMP. : 62 °f SAMPLING COMPANY: CAERUS
 AMBIENT TEMP.: °f H2S BY STAIN TUBE: - ppm
 H2O BY STAIN TUBE: - #/mmcf CO2 BY STAIN TUBE: - Mol %
 FIELD COMMENTS:
 LAB COMMENTS:

<u>COMPONENT</u>	<u>MOLE %</u>	<u>MASS %</u>	<u>GPM @ 14.65</u>	<u>GPM @ 14.73</u>
HELIUM	0.00	0.00	---	---
HYDROGEN	0.01	0.00	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.07000	0.10000	---	---
CARBON DIOXIDE	4.66000	10.97000	---	---
METHANE	88.49220	75.95830	---	---
ETHANE	5.1811	8.3355	1.3810	1.3886
PROPANE	1.0121	2.3879	0.2778	0.2793
I-BUTANE	0.2030	0.6313	0.0660	0.0663
N-BUTANE	0.0906	0.2818	0.0280	0.0281
I-PENTANE	0.0471	0.1816	0.0170	0.0171
N-PENTANE	0.0229	0.0884	0.0080	0.0080
HEXANES PLUS	0.2110	1.0652	0.0800	0.0800
TOTALS	100.00000	100.00000	1.8578	1.8674

<u>BTEX COMPONENTS</u>	<u>MOLE%</u>	<u>WT%</u>	<u>BTU @ 14.65</u>	<u>14.73</u>	
BENZENE	0.0106	0.0443	LHV NET DRY REAL :	932.4 /scf	937.5 /scf
TOLUENE	0.0178	0.0877	NET WET REAL :	916.1 /scf	921.2 /scf
ETHYLBENZENE	0.0002	0.0011	HHV GROSS DRY REAL :	1032.7 /scf	1038.3 /scf
XYLENES	0.0015	0.0085	GROSS WET REAL :	1014.6 /scf	1020.2 /scf
TOTAL BTEX	0.0301	0.1416	NET HEATING VALUE (60 °F ideal reaction):		18954.2 Btu/lbm
			GROSS HEATING VALUE (60°F ideal reaction):		20996.6 Btu/lbm
			RELATIVE DENSITY (AIR=1):		0.6449
			DENSITY		0.04925 lbm/scf
			COMPRESSIBILITY FACTOR :		0.9976
			REGULAR WOBBE INDEX		1286.8

*(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

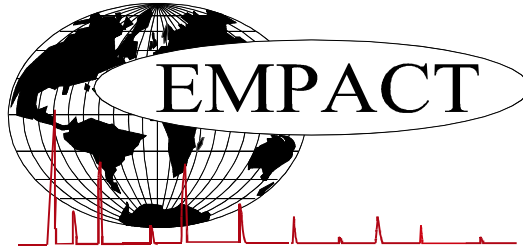
PROJECT NO. :	202007041	ANALYSIS NO. :	01
COMPANY NAME :	CAERUS OIL & GAS LLC	ANALYSIS DATE:	JULY 14, 2020 07:31
ACCOUNT NO. :		SAMPLE DATE :	JULY 8, 2020
PRODUCER :	CAERUS OIL & GAS LLC	CYLINDER NO. :	ECA-774
LEASE NO. :	110166074	SAMPLED BY :	ELDON KING
NAME/DESCRIP :	NP D09A MF04D-9 696 CASING		

FIELD DATA		SAMPLE TEMP. :	62
SAMPLE PRES. :	396	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	- ppm		
COMMENTS :	<i>SPOT NO PROBE</i>		

<u>Componet</u>	<u>Mole %</u>	<u>Wt %</u>
Helium	0.00	0.00
Hydrogen	0.01	0.00
Carbon Dioxide	4.66000	10.97000
Nitrogen	0.07000	0.10000
Methane	88.49220	75.95830
Ethane	5.1811	8.3355
Propane	1.0121	2.3879
Isobutane	0.2030	0.6313
n-Butane	0.0906	0.2818
Isopentane	0.0457	0.1764
n-Pentane	0.0229	0.0884
Cyclopentane	0.0014	0.0052
n-Hexane	0.0178	0.0821
Cyclohexane	0.0137	0.0617
Other Hexanes	0.0485	0.2225
Heptanes	0.0502	0.2685
Methylcyclohexane	0.0243	0.1277
2,2,4 Trimethylpentane	0.0003	0.0018
Benzene	0.0106	0.0443
Toluene	0.0178	0.0877
Ethylbenzene	0.0002	0.0011
Xylenes	0.0015	0.0085
C8+ Heavies	0.0261	0.1593
<u>Subtotal</u>	<u>100.00000</u>	<u>100.00000</u>
<u>Oxygen/Argon</u>	<u>0.00</u>	<u>0.00</u>
Total	100.00000	100.00000

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 DATA*****

SAMPLE CYCLE: SAMPLE TYPE: SPOT
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 FLOW PRES. : psig CYLINDER NO. : ECA-774
 LAB PRES: psig SAMPLED BY : ELDON KING
 SAMPLE TEMP. : 62 °f SAMPLING COMPANY: CAERUS
 AMBIENT TEMP.: °f H2S BY STAIN TUBE: - ppm
 H2O BY STAIN TUBE: - #/mmcf CO2 BY STAIN TUBE: - Mol %
 FIELD COMMENTS:
 LAB COMMENTS:

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.65	GPM @ 14.73
Hydrogen	---	0.01	0.00	---	---
Nitrogen	---	0.07	0.10	---	---
Carbon Dioxide	---	4.66	10.97	---	---
Methane	P1	88.4922	75.9583	---	---
Ethane	P2	5.1811	8.3355	1.381	1.389
Propane	P3	1.0121	2.3879	0.278	0.279
i-Butane	I4	0.2030	0.6313	0.066	0.066
n-Butane	P4	0.0906	0.2818	0.028	0.028
2,2-Dimethylpropane	I5	0.0029	0.0112	0.001	0.001
i-Pentane	I5	0.0428	0.1652	0.016	0.016
n-Pentane	P5	0.0229	0.0884	0.008	0.008
2,2-Dimethylbutane	I6	0.0035	0.0162	0.001	0.001
Cyclopentane	N5	0.0014	0.0052	0.000	0.000
2,3-Dimethylbutane	I6	0.0049	0.0226	0.002	0.002
2-Methylpentane	I6	0.0180	0.0830	0.007	0.007
3-Methylpentane	I6	0.0106	0.0489	0.004	0.004
n-Hexane	P6	0.0178	0.0821	0.007	0.007
Methylcyclopentane	N6	0.0115	0.0518	0.004	0.004
2,4-Dimethylpentane	I7	0.0021	0.0112	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0010	0.0054	0.000	0.000
Benzene	A6	0.0106	0.0443	0.003	0.003
3,3-Dimethylpentane	I7	0.0002	0.0011	0.000	0.000
Cyclohexane	N6	0.0137	0.0617	0.005	0.005
2-Methylhexane	I7	0.0080	0.0429	0.004	0.004
2,3-Dimethylpentane	I7	0.0059	0.0316	0.003	0.003
1,1-Dimethylcyclopentane	N7	0.0012	0.0063	0.000	0.000
3-Methylhexane	I7	0.0092	0.0493	0.004	0.004
1c,3-Dimethylcyclopentane	N7	0.0021	0.0110	0.001	0.001

1t,3-Dimethylcyclopentane	N7	0.0018	0.0095	0.001	0.001
3-Ethylpentane	I7	0.0001	0.0005	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0033	0.0173	0.002	0.002
2,2,4-Trimethylpentane	I8	0.0003	0.0018	0.000	0.000
n-Heptane	P7	0.0136	0.0729	0.006	0.006
1c,2-Dimethylcyclopentane	N7	0.0002	0.0011	0.000	0.000
Methylcyclohexane	N7	0.0243	0.1277	0.010	0.010
2,2-Dimethylhexane	I8	0.0004	0.0025	0.000	0.000
1,1,3-Trimethylcyclopentane	N7	0.0007	0.0042	0.000	0.000
Ethylcyclopentane	N7	0.0008	0.0042	0.000	0.000
2,5-Dimethylhexane	I8	0.0009	0.0055	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0005	0.0031	0.000	0.000
2,4-Dimethylhexane	I8	0.0009	0.0055	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0003	0.0018	0.000	0.000
3,3-Dimethylhexane	I8	0.0004	0.0025	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0004	0.0024	0.000	0.000
Toluene	A7	0.0178	0.0877	0.006	0.006
2,3-Dimethylhexane	I8	0.0005	0.0031	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0001	0.0006	0.000	0.000
2-Methylheptane	I8	0.0031	0.0189	0.002	0.002
4-Methylheptane	I8	0.0014	0.0086	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0002	0.0012	0.000	0.000
3,4-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
3-Methylheptane	I8	0.0003	0.0018	0.000	0.000
1c,2t,3-Trimethylcyclopentane	N8	0.0040	0.0240	0.002	0.002
3-Ethylhexane	I8	0.0006	0.0037	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0018	0.0108	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0005	0.0030	0.000	0.000
2,2,5-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0002	0.0012	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0002	0.0012	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
2,2,4-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0008	0.0048	0.000	0.000
n-Octane	P8	0.0061	0.0373	0.003	0.003
1c,4-Dimethylcyclohexane	N8	0.0007	0.0042	0.000	0.000
2,4,4-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0004	0.0027	0.000	0.000
Ethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
n-Propylcyclopentane	N8	0.0001	0.0006	0.000	0.000
Ethylbenzene	I8	0.0002	0.0011	0.000	0.000
2,3-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0009	0.0051	0.000	0.000
1,4-Dimethylbenzene (p-Xylene)	A8	0.0004	0.0023	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0002	0.0011	0.000	0.000
UnknownC8s	U8	0.0004	0.0025	0.000	0.000
TOTAL		100.0000	100.0000	1.8578	1.8674

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0106	0.0443
TOLUENE	0.0178	0.0877
ETHYLBENZENE	0.0002	0.0011
XYLENES	0.0015	0.0085
TOTAL BTEX	0.0301	0.1416

BTU @	14.65	14.73
LHV NET DRY REAL :	932.4 /scf	937.5 /scf
NET WET REAL :	916.1 /scf	921.2 /scf
HHV GROSS DRY REAL :	1032.7 /scf	1038.3 /scf
GROSS WET REAL :	1014.6 /scf	1020.2 /scf
NET HEATING VALUE (60 °F ideal reaction):		18954.2 Btu/lbm
GROSS HEATING VALUE (60 °F ideal reaction):		20996.6 Btu/lbm
RELATIVE DENSITY (AIR=1):		0.6449
DENSITY		0.04925 lb/scf
COMPRESSIBILITY FACTOR :		0.9976
REGULAR WOBBE INDEX		1286.8

*(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>4713.5</u> /scf	Relative Density - SG (Air=1)	<u>3.2571</u>	C6+ factors
Gross Dry Ideal BTU	<u>5060.1</u> /scf	Z Compressibility Factor	<u>0.99293</u>	<u>0.99227</u>
Net Dry Ideal BTU	<u>19201.6</u> /lb	Density Factor	<u>248.591</u> lbm/1000 ft3	
Gross Dry Ideal BTU	<u>20613</u> /lb	Molar Mass or MW	<u>94.333</u> g/mol	
		Volume Liquid Ideal gas	<u>0.08</u> scf/gal	<u>24.4</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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