EMPACT

## EXTENDED NATURAL GAS ANALYSIS (*DHA)

### MAIN PAGE

| | | | |
|---|---|---|---|
| PRIMARY DB KEY: | **05-077-09058** | NAME/DESCRIP : | **HYRUP #15-44C** |
| LEASE #: | **COC-66496X** | | **CASING** |
| FIELD/AREA: | | | **METER #300108607** |

| | | | |
|---|---|---|---|
| PROJECT NO. : | **202206040** | ANALYSIS NO. : | **01** |
| COMPANY NAME : | **CAERUS OIL & GAS LLC** | ANALYSIS DATE: | JUNE 09, 2022 10:46 |
| OFFICE / BRANCH: | PARACHUTE, CO | SAMPLE DATE : | MAY 26, 2022 |
| CUSTOMER REF: | | TO: | |
| PRODUCER : | | EFFECTIVE DATE: | |

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

| | | | | |
|---|---|---|---|---|
| SAMPLE CYCLE: | | | SAMPLE TYPE: | SPOT |
| SAMPLE PRES. : | 1160 | psig | PROBE : | NO |
| FLOW PRES. : | | psig | CYLINDER NO. : | ECA-741 |
| LAB PRES: | | psig | SAMPLED BY : | MIKE KELLEY |
| SAMPLE TEMP. : | 53 | ºf | SAMPLING COMPANY: | CAERUS OIL & GAS LLC |
| AMBIENT TEMP.: | | ºf | H2S BY STAIN TUBE: | - ppm mol |
| H2O BY STAIN TUBE: | - | #/mmcf | CO2 BY STAIN TUBE: | - Mol % |

FIELD COMMENTS:

LAB COMMENTS:

| COMPONENT | MOLE % | MASS % | GPM @ 14.65 | GPM @ 14.73 |
|---|---|---|---|---|
| HELIUM | 0.00 | 0.00 | --- | --- |
| HYDROGEN | 0.40 | 0.04 | --- | --- |
| OXYGEN/ARGON | 0.00 | 0.00 | --- | --- |
| NITROGEN | 0.12 | 0.19 | --- | --- |
| CARBON DIOXIDE | 0.40 | 0.98 | --- | --- |
| METHANE | 91.6604 | 81.5623 | --- | --- |
| ETHANE | 4.6268 | 7.7168 | 1.2331 | 1.2399 |
| PROPANE | 1.3263 | 3.2439 | 0.3637 | 0.3657 |
| I-BUTANE | 0.2802 | 0.9033 | 0.0909 | 0.0914 |
| N-BUTANE | 0.3000 | 0.9672 | 0.0939 | 0.0944 |
| I-PENTANE | 0.1569 | 0.6274 | 0.0560 | 0.0563 |
| N-PENTANE | 0.1013 | 0.4054 | 0.0370 | 0.0372 |
| HEXANES PLUS | 0.6281 | 3.3637 | 0.2610 | 0.2618 |
| TOTALS | 100.00000 | 100.00000 | 2.1356 | 2.1467 |

| BTEX COMPONENTS | MOLE% | WT% |
|---|---|---|
| BENZENE | 0.0134 | 0.0581 |
| TOLUENE | 0.0538 | 0.2749 |
| ETHYLBENZENE | 0.0017 | 0.0100 |
| XYLENES | 0.0185 | 0.1089 |
| TOTAL BTEX | 0.0874 | 0.4519 |

**(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 : | 996.4 | **/scf** | 1001.8 | **/scf** |
| | NET WET REAL : | 979.0 | **/scf** | 984.4 | **/scf** |
| HHV | GROSS DRY REAL : | 1103.0 | **/scf** | 1109.0 | **/scf** |
| | GROSS WET REAL : | 1083.7 | **/scf** | 1089.7 | **/scf** |

| | | |
|---|---|---|
| NET HEATING VALUE (60 °F ideal reaction): | 21001.6 | **Btu/lbm** |
| GROSS HEATING VALUE (60°F ideal reaction): | 23245.2 | **Btu/lbm** |
| RELATIVE DENSITY (AIR=1): | 0.6220 | |
| DENSITY | 0.04750 | **lbm/scf** |
| COMPRESSIBILITY FACTOR : | 0.9976 | |
| REGULAR WOBBE INDEX | 1399.6 | |

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

**GLYCALC INFORMATION**

| | | | |
|---|---|---|---|
| PROJECT NO. : | 202206040 | ANALYSIS NO. : | 01 |
| COMPANY NAME : | CAERUS OIL & GAS LLC | ANALYSIS DATE: | JUNE 09, 2022 10:46 |
| ACCOUNT NO. : | | SAMPLE DATE : | MAY 26, 2022 |
| PRODUCER : | | CYLINDER NO. : | ECA-741 |
| LEASE NO. : | COC-66496X | SAMPLED BY : | MIKE KELLEY |
| NAME/DESCRIP : | HYRUP #15-44C<br>CASING<br>METER #300108607 | | |
| ***FIELD DATA*** | | SAMPLE TEMP. : | 53 |
| SAMPLE PRES. : | 1160 | AMBIENT TEMP.: | |
| H2S BY STAIN TUBE: | _ *ppm mol* | | |
| COMMENTS : | ***SPOT*** ***NO PROBE*** | | |

| Componet | Mole % | Wt % |
|---|---|---|
| Helium | 0.00 | 0.00 |
| Hydrogen | 0.40 | 0.04 |
| Carbon Dioxide | 0.40 | 0.98 |
| Nitrogen | 0.12 | 0.19 |
| Methane | 91.6604 | 81.5623 |
| Ethane | 4.6268 | 7.7168 |
| Propane | 1.3263 | 3.2439 |
| Isobutane | 0.2802 | 0.9033 |
| n-Butane | 0.3000 | 0.9672 |
| Isopentane | 0.1522 | 0.6091 |
| n-Pentane | 0.1013 | 0.4054 |
| Cyclopentane | 0.0047 | 0.0183 |
| n-Hexane | 0.0568 | 0.2715 |
| Cyclohexane | 0.0332 | 0.1550 |
| Other Hexanes | 0.1139 | 0.5411 |
| Heptanes | 0.1286 | 0.7117 |
| Methylcyclohexane | 0.0987 | 0.5375 |
| 2,2,4 Trimethylpentane | 0.0002 | 0.0013 |
| Benzene | 0.0134 | 0.0581 |
| Toluene | 0.0538 | 0.2749 |
| Ethylbenzene | 0.0017 | 0.0100 |
| Xylenes | 0.0185 | 0.1089 |
| C8+ Heavies | 0.1093 | 0.6937 |
| ***Subtotal*** | 100.00000 | 100.00000 |
| Oxygen/Argon | 0.00 | 0.00 |
| **Total** | 100.00000 | 100.00000 |

| **Calculated Values BTU @** **14.65** | | **Total Sample** | **C6+ Fraction** | **C8+ Fraction** | **C10+ Fraction** | |
|---|---|---|---|---|---|---|
| **LHV** | Net Dry Real: | 996.4 | 4835.8 | 5640.6 | #DIV/0! | **Btu/scf** |
| | Net Wet Real: | 979.0 | 4751.3 | 5542.0 | #DIV/0! | **Btu/scf** |
| **HHV** | Gross Dry Real: | 1103.0 | 5189.8 | 6058.5 | #DIV/0! | **Btu/scf** |
| | Gross Wet Real: | 1083.7 | 5099.1 | 5952.6 | #DIV/0! | **Btu/scf** |
| **Other Calculated Values** | | | | | | |
| Regualr Wobbe Index* | | 1399.6 | 2833.1 | 3065.6 | #DIV/0! | **Btu/scf** |
| Net Heating Value (60 °F ideal reaction): | | 21001.6 | 19194.8 | 19599.5 | #DIV/0! | **Btu/lbm** |
| Gross Heating Value (60°F ideal reaction): | | 23245.2 | 20603.1 | 21055.3 | #DIV/0! | **Btu/lbm** |
| Molar Mass (MW): | | 18.02845 | 96.565 | 113.212 | #DIV/0! | **g/mol** |
| Relative Density (AIR=1): | | 0.6220 | 3.3347 | 3.9085 | #DIV/0! | **SG** |
| Density: | | 0.04750 | 0.25449 | 0.29832 | #DIV/0! | **lbm/scf** |
| Compressiblity Factor: | | 0.9976 | 0.9937 | 0.9972 | #DIV/0! | **Z** |
| Liquid Volume real gas @: | **14.65** | 17.6974 | 0.2602 | 0.0618 | 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 uderscore) indicates there was no tube pulled for H2S.***



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# EXTENDED NATURAL GAS ANALYSIS (*DHA)

## DHA COMPONENT LIST

| | | | |
|---|---|---|---|
| PRIMARY DB KEY: | **05-045-20651** | NAME/DESCRIP : | **SGU #8506B-22 N22496** |
| LEASE #: | **COC-64814** | | **BRADENHEAD** |
| FIELD/AREA: | | | **METER #110140212** |
| PROJECT NO. : | **202206040** | ANALYSIS NO. : | **02** |
| COMPANY NAME : | **CAERUS OIL & GAS LLC** | ANALYSIS DATE: | JUNE 08, 2022 09:23 |
| OFFICE / BRANCH: | PARACHUTE, CO | SAMPLE DATE : | MAY 26, 2022 |
| CUSTOMER REF: | | TO: | |
| PRODUCER : | | EFFECTIVE DATE: | |
| ***FIELD DATA*** | | | |
| SAMPLE CYCLE: | | SAMPLE TYPE: | SPOT |
| SAMPLE PRES. : | 440 psig | PROBE : | NO |
| FLOW PRES. : | psig | CYLINDER NO. : | ECA-717 |
| LAB PRES: | psig | SAMPLED BY : | MIKE KELLEY |
| SAMPLE TEMP. : | 68 ºf | SAMPLING COMPANY: | CAERUS OIL & GAS LLC |
| AMBIENT TEMP.: | ºf | 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 | --- | 0.09 | 0.14 | --- | --- |
| Carbon Dioxide | --- | 3.97 | 9.41 | --- | --- |
| Methane | P1 | 89.5142 | 77.3493 | --- | --- |
| Ethane | P2 | 4.3557 | 7.0545 | 1.161 | 1.168 |
| Propane | P3 | 0.9064 | 2.1528 | 0.249 | 0.250 |
| i-Butane | I4 | 0.2479 | 0.7761 | 0.081 | 0.081 |
| Methanol | X1 | 0.2957 | 0.5103 | 0.038 | 0.038 |
| n-Butane | P4 | 0.1666 | 0.5216 | 0.052 | 0.052 |
| 2,2-Dimethylpropane | I5 | 0.0041 | 0.0159 | 0.002 | 0.002 |
| i-Pentane | I5 | 0.0942 | 0.3661 | 0.034 | 0.034 |
| n-Pentane | P5 | 0.0506 | 0.1967 | 0.018 | 0.018 |
| 2,2-Dimethylbutane | I6 | 0.0052 | 0.0241 | 0.002 | 0.002 |
| Cyclopentane | N5 | 0.0028 | 0.0106 | 0.001 | 0.001 |
| 2,3-Dimethylbutane | I6 | 0.0065 | 0.0302 | 0.003 | 0.003 |
| 2-Methylpentane | I6 | 0.0238 | 0.1105 | 0.010 | 0.010 |
| 3-Methylpentane | I6 | 0.0134 | 0.0622 | 0.005 | 0.005 |
| UnknownC5s | U5 | 0.0002 | 0.0007 | 0.000 | 0.000 |
| n-Hexane | P6 | 0.0239 | 0.1110 | 0.010 | 0.010 |
| Methylcyclopentane | N6 | 0.0158 | 0.0716 | 0.006 | 0.006 |
| 2,2,3-Trimethylbutane | I7 | 0.0018 | 0.0097 | 0.001 | 0.001 |
| Benzene | A6 | 0.0151 | 0.0636 | 0.004 | 0.004 |
| 3,3-Dimethylpentane | I7 | 0.0007 | 0.0038 | 0.000 | 0.000 |
| Cyclohexane | N6 | 0.0151 | 0.0685 | 0.005 | 0.005 |
| 2-Methylhexane | I7 | 0.0077 | 0.0416 | 0.004 | 0.004 |
| 2,3-Dimethylpentane | I7 | 0.0038 | 0.0205 | 0.002 | 0.002 |
| 1,1-Dimethylcyclopentane | N7 | 0.0018 | 0.0095 | 0.001 | 0.001 |
| 3-Methylhexane | I7 | 0.0085 | 0.0459 | 0.004 | 0.004 |



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| | | | | | |
|---|---|---|---|---|---|
| 1c,3-Dimethylcyclopentane | N7 | 0.0025 | 0.0132 | 0.001 | 0.001 |
| 1t,3-Dimethylcyclopentane | N7 | 0.0023 | 0.0122 | 0.001 | 0.001 |
| 3-Ethylpentane | I7 | 0.0001 | 0.0005 | 0.000 | 0.000 |
| 1t,2-Dimethylcyclopentane | N7 | 0.0039 | 0.0206 | 0.002 | 0.002 |
| 2,2,4-Trimethylpentane | I8 | 0.0001 | 0.0006 | 0.000 | 0.000 |
| n-Heptane | P7 | 0.0180 | 0.0972 | 0.008 | 0.008 |
| 1c,2-Dimethylcyclopentane | N7 | 0.0004 | 0.0021 | 0.000 | 0.000 |
| Methylcyclohexane | N7 | 0.0380 | 0.2010 | 0.015 | 0.015 |
| 2,2-Dimethylhexane | I8 | 0.0013 | 0.0080 | 0.001 | 0.001 |
| Ethylcyclopentane | N7 | 0.0012 | 0.0064 | 0.000 | 0.000 |
| 2,5-Dimethylhexane | I8 | 0.0013 | 0.0080 | 0.001 | 0.001 |
| 2,4-Dimethylhexane | I8 | 0.0013 | 0.0080 | 0.001 | 0.001 |
| 1c,2t,4-Trimethylcyclopentane | N8 | 0.0005 | 0.0030 | 0.000 | 0.000 |
| 3,3-Dimethylhexane | I8 | 0.0004 | 0.0025 | 0.000 | 0.000 |
| 1t,2c,4-Trimethylcyclopentane | N8 | 0.0006 | 0.0036 | 0.000 | 0.000 |
| Toluene | A7 | 0.0275 | 0.1365 | 0.009 | 0.009 |
| 2,3-Dimethylhexane | I8 | 0.0009 | 0.0055 | 0.000 | 0.000 |
| 2-Methyl-3-ethylpentane | I8 | 0.0001 | 0.0006 | 0.000 | 0.000 |
| 2-Methylheptane | I8 | 0.0053 | 0.0326 | 0.003 | 0.003 |
| 4-Methylheptane | I8 | 0.0017 | 0.0104 | 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 | 0.0039 | 0.0240 | 0.002 | 0.002 |
| 1c,2t,3-Trimethylcyclopentane | N8 | 0.0056 | 0.0338 | 0.003 | 0.003 |
| 3-Ethylhexane | I8 | 0.0008 | 0.0049 | 0.000 | 0.000 |
| 1t,4-Dimethylcyclohexane | N8 | 0.0025 | 0.0151 | 0.001 | 0.001 |
| 1,1-Dimethylcyclohexane | N8 | 0.0010 | 0.0060 | 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 | 0.0002 | 0.0012 | 0.000 | 0.000 |
| 1,1-Methylethylcyclopentane | N8 | 0.0002 | 0.0012 | 0.000 | 0.000 |
| 1t,2-Dimethylcyclohexane | N8 | 0.0015 | 0.0090 | 0.001 | 0.001 |
| UnknownC7s | U7 | 0.0005 | 0.0027 | 0.000 | 0.000 |
| n-Octane | P8 | 0.0091 | 0.0560 | 0.005 | 0.005 |
| 1c,4-Dimethylcyclohexane | N8 | 0.0018 | 0.0109 | 0.001 | 0.001 |
| 1c,2-Dimethylcyclohexane | N8 | 0.0005 | 0.0030 | 0.000 | 0.000 |
| 1,1,4-Trimethylcyclohexane | N9 | 0.0012 | 0.0081 | 0.001 | 0.001 |
| 2,2,3-Trimethylhexane | I9 | 0.0006 | 0.0041 | 0.000 | 0.000 |
| Ethylcyclohexane | N8 | 0.0003 | 0.0018 | 0.000 | 0.000 |
| n-Propylcyclopentane | N8 | 0.0009 | 0.0054 | 0.000 | 0.000 |
| 1c,3c,5-Trimethylcyclohexane | N9 | 0.0001 | 0.0007 | 0.000 | 0.000 |
| Ethylbenzene | I8 | 0.0006 | 0.0034 | 0.000 | 0.000 |
| 1c,2t,4t-Trimethylcyclohexane | N9 | 0.0001 | 0.0007 | 0.000 | 0.000 |
| 1,3-Dimethylbenzene (m-Xylene) | A8 | 0.0043 | 0.0246 | 0.002 | 0.002 |
| 1,4-Dimethylbenzene (p-Xylene) | A8 | 0.0017 | 0.0097 | 0.001 | 0.001 |
| 4-Methyloctane | I9 | 0.0002 | 0.0014 | 0.000 | 0.000 |
| 2-Methyloctane | I9 | 0.0004 | 0.0027 | 0.000 | 0.000 |
| 3-Methyloctane | I9 | 0.0004 | 0.0027 | 0.000 | 0.000 |
| 1,2-Dimethylbenzene (o-Xylene) | A8 | 0.0005 | 0.0028 | 0.000 | 0.000 |
| i-Butylcyclopentane | N9 | 0.0001 | 0.0007 | 0.000 | 0.000 |
| n-Nonane | P9 | 0.0008 | 0.0055 | 0.000 | 0.000 |
| 1,3-Methylethylbenzene | A9 | 0.0001 | 0.0006 | 0.000 | 0.000 |
| 1,3,5-Trimethylbenzene | A9 | 0.0001 | 0.0006 | 0.000 | 0.000 |
| UnknownC9s | U9 | 0.0002 | 0.0014 | 0.000 | 0.000 |
| n-Decane | P10 | 0.0001 | 0.0007 | 0.000 | 0.000 |
| TOTAL | | 100.00000 | 100.00000 | 1.7529 | 1.7619 |



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| BTEX COMPONENTS | MOLE% | WT% |
|---|---|---|
| BENZENE | 0.0151 | 0.0636 |
| TOLUENE | 0.0275 | 0.1365 |
| ETHYLBENZENE | 0.0006 | 0.0034 |
| XYLENES | 0.0065 | 0.0371 |
| TOTAL BTEX | 0.0497 | 0.2406 |

*(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 : | 938.6 | /scf | 943.8 | /scf |
| | NET WET REAL : | 922.2 | /scf | 927.4 | /scf |
| HHV | GROSS DRY REAL : | 1039.8 | /scf | 1045.4 | /scf |
| | GROSS WET REAL : | 1021.6 | /scf | 1027.2 | /scf |
| | NET HEATING VALUE (60 °F ideal reaction): | | | 19210.7 | Btu/lbm |
| | GROSS HEATING VALUE (60°F ideal reaction): | | | 21281.6 | Btu/lbm |
| | RELATIVE DENSITY (AIR=1): | | | 0.6410 | |
| | DENSITY | | | 0.04892 | lb/scf |
| | COMPRESSIBILITY FACTOR : | | | 0.9976 | |
| | REGULAR WOBBE INDEX | | | 1299.6 | |

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

| | | | | | |
|---|---|---|---|---|---|
| Net Dry Ideal BTU | 4745.1 /scf | Relative Density - SG (Air=1) | 3.2881 | | ***C6+factors*** |
| Gross Dry Ideal BTU | 5088.8 /scf | **Z** Compressiblity Factor | 0.99339 | | 0.99264 |
| Net Dry Ideal BTU | 19135.9 /lb | Density Factor | 250.95 | lbm/1000 ft3 | |
| Gross Dry Ideal BTU | 20525.7 /lb | Molar Mass or MW | 95.228 | g/mol | |
| | | Volume Liquid Ideal gas | 0.117 | scf/gal | 24.6 |

***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.***