

## MONELL CO2, LLC.

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## EXTENDED HYDROCARBON GAS (GLYCALC) STUDY CERTIFICATE OF ANALYSIS

Company ..... **MONELL CO2, LLC.**

Lab Number ..... CR-16699

Date Sampled ..... 8-31-2016

Study Number ..... CR-1

Date Tested ..... 9-2-2016

Sample Identification..... **INLET GAS TO PLANT**

Sample Location ..... MONELL GAS PLANT, MONELL, WYOMING.

Sample Pressure ..... 619 PSIG

Type Sample ..... SPOT

Test Method ..... GPA-2286

Sample Temperature ..... 95 F

County ..... SWEETWATER

Cylinder ID ..... AMR 155

| Components            | Mole % | Weight % | Liq. Vol. % |
|-----------------------|--------|----------|-------------|
| Carbon Dioxide.....   | 89.560 | 93.594   | 87.510      |
| Hydrogen Sulfide..... | 0.014  | 0.011    | 0.011       |
| Nitrogen.....         | 0.276  | 0.184    | 0.174       |
| Methane.....          | 6.680  | 2.545    | 6.484       |
| Ethane.....           | 1.641  | 1.172    | 2.513       |
| Propane.....          | 0.892  | 0.934    | 1.407       |
| iso-Butane.....       | 0.211  | 0.291    | 0.395       |
| n-Butane.....         | 0.292  | 0.403    | 0.527       |
| iso-Pentane.....      | 0.109  | 0.187    | 0.228       |
| n-Pentane.....        | 0.087  | 0.149    | 0.181       |
| Cyclopentane.....     | 0.004  | 0.007    | 0.007       |
| n-Hexane.....         | 0.026  | 0.053    | 0.061       |
| Cyclohexane.....      | 0.015  | 0.030    | 0.029       |

|                          |                |                |                |
|--------------------------|----------------|----------------|----------------|
| Other Hexanes .....      | 0.057          | 0.117          | 0.134          |
| Heptanes.....            | 0.071          | 0.169          | 0.188          |
| Methylcyclohexane.....   | 0.013          | 0.030          | 0.030          |
| 2,2,4-Trimethylpentane.. | 0.004          | 0.011          | 0.012          |
| Benzene.....             | 0.008          | 0.015          | 0.013          |
| Toluene.....             | 0.013          | 0.028          | 0.025          |
| Ethylbenzene.....        | 0.002          | 0.005          | 0.004          |
| Xylenes.....             | 0.008          | 0.020          | 0.018          |
| C8+ Heavies.....         | 0.017          | 0.046          | 0.050          |
| <b>Totals .....</b>      | <b>100.000</b> | <b>100.000</b> | <b>100.000</b> |

#### ADDITIONAL BETX DATA

| <b>Components</b>      | <b>Mole %</b> | <b>Weight %</b> | <b>Liq. Vol. %</b> |
|------------------------|---------------|-----------------|--------------------|
| Cyclopentane           | 0.004         | 0.007           | 0.007              |
| Cyclohexane            | 0.015         | 0.030           | 0.029              |
| 2-Methylpentane        | 0.041         | 0.084           | 0.096              |
| 3-Methylpentane        | 0.016         | 0.033           | 0.038              |
| n-Hexane               | 0.026         | 0.053           | 0.061              |
| Methylcyclohexane      | 0.013         | 0.030           | 0.030              |
| 2,2,4-Trimethylpentane | 0.004         | 0.011           | 0.012              |
| Benzene                | 0.008         | 0.015           | 0.013              |
| Toluene                | 0.013         | 0.028           | 0.025              |
| Ethylbenzene           | 0.002         | 0.005           | 0.004              |
| m-Xylene               | 0.001         | 0.003           | 0.003              |
| p-Xylene               | 0.005         | 0.012           | 0.011              |
| o-Xylene               | 0.002         | 0.005           | 0.004              |

|                                                        |         |
|--------------------------------------------------------|---------|
| SPECIFIC GRAVITY AT 60/60 F, calculated.....           | 1.4540  |
| TOTAL GPM ( ETHANE INCLUSIVE ).....                    | 1.014   |
| CALCULATED BTU / REAL CF AT 14.73 PSIA, dry basis..... | 157.006 |
| CALCULATED BTU / REAL CF AT 14.73 PSIA, wet basis..... | 154.531 |
| AVERAGE MOLECULAR WEIGHT.....                          | 42.113  |
| MOLAR MASS RATIO.....                                  | 1.4540  |
| RELATIVE DENSITY ( G x Z (Air) / Z ), calculated.....  | 1.4622  |

|                                                                           |         |
|---------------------------------------------------------------------------|---------|
| IDEAL GROSS HEATING VALUE, BTU / IDEAL CF AT 14.696 PSIA, calculated..... | 155.767 |
| COMPRESSIBILITY FACTOR ( Z ).....                                         | 0.99439 |

|                                           |        |
|-------------------------------------------|--------|
| PROPANE GPM.....                          | 0.2451 |
| BUTANE GPM.....                           | 0.1607 |
| GASOLINE GPM ( PENTANE AND HEAVIER )..... | 0.1704 |

NOTATION: ALL CALCULATIONS PERFORMED USING PHYSICAL CONSTANTS FROM GPA 2145-09, THE TABLES  
OF PHYSICAL CONSTANTS FOR HYDROCARBONS AND OTHER COMPOUNDS OF INTEREST  
TO THE NATURAL GAS INDUSTRY.

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## CERTIFICATE OF ANALYSIS SULFUR FRACTIONAL STUDY OF GASEOUS PRODUCTS

COMPANY ..... MONELL CO2, LLC.

LAB NUMBER ..... CR-16699

STUDY NUMBER ..... CR-1B

DATE SAMPLED ..... 8-31-2016

DATE TESTED ..... 9-2-2016

SAMPLE IDENTIFICATION ..... INLET GAS TO PLANT

SAMPLE LOCATION..... MONELL GAS PLANT, MONELL, WYOMING

COUNTY..... SWEETWATER

SAMPLE PRESSURE..... 619 PSIG

SAMPLE TEMP..... 95 F

METHOD OF ANALYSIS..... SCD CHROMATOGRAPHY

SAMPLE METHOD ..... GPA-2166

TEST METHOD..... ASTM D-5504

CONTAINER..... AMR 155

INSTRUMENTATION..... SIEVERS MODEL 355 SULFUR CHEMILUMINESCENCE DETECTOR.

|                                    | RESULTS<br>PPM/VOLUME | RESULTS<br>Mg/M3 | RESULTS<br>GRAINS / 100SCF |
|------------------------------------|-----------------------|------------------|----------------------------|
| <b>LIGHT END COMPONENTS</b>        |                       |                  |                            |
| CARBONYL SULFIDE (COS).....        | 11.993 PPMV           | 29.503 Mg/M3     | 0.777 GRAINS               |
| HYDROGEN SULFIDE (H2S).....        | 138.47 PPMV           | 192.473 Mg/M3    | 8.974 GRAINS               |
| CARBON DISULFIDE (CS2).....        | 0.081 PPMV            | 0.252 Mg/M3      | 0.005 GRAINS               |
| DIMETHYL SULFIDE (CH3)2S).....     | 0.154 PPMV            | 0.391 Mg/M3      | 0.010 GRAINS               |
| DIMETHYL DISULFIDE (CH3)2S2).....  | 0.097 PPMV            | 0.373 Mg/M3      | 0.006 GRAINS               |
| SULFUR DIOXIDE (SO2).....          | < 0.010 PPMV          | < 0.031 Mg/M3    | < 0.001 GRAINS             |
| TOTAL LIGHT END SULFURS.....       | 150.795 PPM           | 222.993 Mg/M3    | 9.773 GRAINS               |
| <b>MERCAPTANS &amp; THIOPHENES</b> |                       |                  |                            |
| METHYL MERCAPTAN.....              | 2.073 PPMV            | 4.084 Mg/M3      | 0.134 GRAINS               |
| ETHYL MERCAPTAN.....               | 0.849 PPMV            | 2.156 Mg/M3      | 0.055 GRAINS               |
| iso-PROPYL MERCAPTAN.....          | 0.230 PPMV            | 0.715 Mg/M3      | 0.015 GRAINS               |

|                                    |              |               |                |
|------------------------------------|--------------|---------------|----------------|
| n-PROPYL MERCAPTAN.....            | 0.187 PPMV   | 0.582 Mg/M3   | 0.012 GRAINS   |
| ETHYL METHYL SULFIDE .....         | < 0.010 PPMV | < 0.031 Mg/M3 | < 0.001 GRAINS |
| iso-BUTYL MERCAPTAN.....           | 0.096 PPMV   | 0.354 Mg/M3   | 0.006 GRAINS   |
| n-BUTYL MERCAPTAN.....             | 0.172 PPMV   | 0.635 Mg/M3   | 0.011 GRAINS   |
| DIETHYL SULFIDE .....              | < 0.010 PPMV | < 0.037 Mg/M3 | < 0.001 GRAINS |
| sec-BUTYL MERCAPTAN.....           | < 0.010 PPMV | < 0.037 Mg/M3 | < 0.001 GRAINS |
| tert-BUTYL MERCAPTAN.....          | < 0.010 PPMV | < 0.026 Mg/M3 | < 0.001 GRAINS |
| PENTYL AND HEAVIER MERCAPTANS..... | < 0.010 PPMV | < 0.039 Mg/M3 | < 0.001 GRAINS |
| 2-METHYLTHIOPHENE.....             | < 0.010 PPMV | < 0.034 Mg/M3 | < 0.001 GRAINS |
| 3-METHYLTHIOPHENE.....             | < 0.010 PPMV | < 0.034 Mg/M3 | < 0.001 GRAINS |
| THIOPHENE.....                     | 0.155 PPMV   | 0.533 Mg/M3   | 0.010 GRAINS   |
| TOTAL BENZOTHIOPHENES.....         | < 0.010 PPMV | < 0.039 Mg/M3 | < 0.001 GRAINS |
| TOTAL METHYLBENZOTHIOPHENES.....   | < 0.010 PPMV | < 0.039 Mg/M3 | < 0.001 GRAINS |
| TOTAL MERCAPTANS & THIOPHENES..... | 3.762 PPMV   | 9.059 Mg/M3   | 0.244 GRAINS   |
| TOTAL ALL SULFURS.....             | 154.557 PPMV | 232.052 Mg/M3 | 10.017 GRAINS  |

ALL COMPONENTS ANALYZED AS PPM/VOLUME, THEN CONVERTED TO MILLIGRAMS PER CUBIC METER  
USING FACTORS OUTLINED IN ASTM D-5504.

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## EXTENDED HYDROCARBON GAS (GLYCALC) STUDY CERTIFICATE OF ANALYSIS

Company ..... **MONELL CO2, LLC.**

Lab Number ..... CR-16699

Date Sampled ..... 8-31-2016

Study Number ..... CR-2

Date Tested ..... 9-2-2016

Sample Identification..... **GAS OUTLET**

Sample Location ..... MONELL GAS PLANT, MONELL, WYOMING.

Sample Pressure ..... 610 PSIG

Type Sample ..... SPOT

Test Method ..... GPA-2286

Sample Temperature ..... 69 F

County ..... SWEETWATER

Cylinder ID ..... AMR 157

| Components            | Mole % | Weight % | Liq. Vol. % |
|-----------------------|--------|----------|-------------|
| Carbon Dioxide.....   | 90.574 | 95.288   | 89.536      |
| Hydrogen Sulfide..... | 0.015  | 0.012    | 0.012       |
| Nitrogen.....         | 0.352  | 0.236    | 0.224       |
| Methane.....          | 6.771  | 2.597    | 6.649       |
| Ethane.....           | 1.641  | 1.180    | 2.542       |
| Propane.....          | 0.631  | 0.665    | 1.007       |
| iso-Butane.....       | 0.011  | 0.015    | 0.021       |
| n-Butane.....         | 0.005  | 0.007    | 0.009       |
| iso-Pentane.....      | 0.000  | 0.000    | 0.000       |
| n-Pentane.....        | 0.000  | 0.000    | 0.000       |
| Cyclopentane.....     | 0.000  | 0.000    | 0.000       |
| n-Hexane.....         | 0.000  | 0.000    | 0.000       |
| Cyclohexane.....      | 0.000  | 0.000    | 0.000       |

|                          |                |                |                |
|--------------------------|----------------|----------------|----------------|
| Other Hexanes .....      | 0.000          | 0.000          | 0.000          |
| Heptanes.....            | 0.000          | 0.000          | 0.000          |
| Methylcyclohexane.....   | 0.000          | 0.000          | 0.000          |
| 2,2,4-Trimethylpentane.. | 0.000          | 0.000          | 0.000          |
| Benzene.....             | 0.000          | 0.000          | 0.000          |
| Toluene.....             | 0.000          | 0.000          | 0.000          |
| Ethylbenzene.....        | 0.000          | 0.000          | 0.000          |
| Xylenes.....             | 0.000          | 0.000          | 0.000          |
| C8+ Heavies.....         | 0.000          | 0.000          | 0.000          |
| <b>Totals .....</b>      | <b>100.000</b> | <b>100.000</b> | <b>100.000</b> |

#### ADDITIONAL BETX DATA

| <b>Components</b>      | <b>Mole %</b> | <b>Weight %</b> | <b>Liq. Vol. %</b> |
|------------------------|---------------|-----------------|--------------------|
| Cyclopentane           | 0.000         | 0.000           | 0.000              |
| Cyclohexane            | 0.000         | 0.000           | 0.000              |
| 2-Methylpentane        | 0.000         | 0.000           | 0.000              |
| 3-Methylpentane        | 0.000         | 0.000           | 0.000              |
| n-Hexane               | 0.000         | 0.000           | 0.000              |
| Methylcyclohexane      | 0.000         | 0.000           | 0.000              |
| 2,2,4-Trimethylpentane | 0.000         | 0.000           | 0.000              |
| Benzene                | 0.000         | 0.000           | 0.000              |
| Toluene                | 0.000         | 0.000           | 0.000              |
| Ethylbenzene           | 0.000         | 0.000           | 0.000              |
| m-Xylene               | 0.000         | 0.000           | 0.000              |
| p-Xylene               | 0.000         | 0.000           | 0.000              |
| o-Xylene               | 0.000         | 0.000           | 0.000              |

|                                                        |         |
|--------------------------------------------------------|---------|
| SPECIFIC GRAVITY AT 60/60 F, calculated.....           | 1.4443  |
| TOTAL GPM ( ETHANE INCLUSIVE ).....                    | 0.616   |
| CALCULATED BTU / REAL CF AT 14.73 PSIA, dry basis..... | 114.799 |
| CALCULATED BTU / REAL CF AT 14.73 PSIA, wet basis..... | 113.057 |
| AVERAGE MOLECULAR WEIGHT.....                          | 41.832  |
| MOLAR MASS RATIO.....                                  | 1.4443  |
| RELATIVE DENSITY ( G x Z (Air) / Z ), calculated.....  | 1.4521  |

|                                                                           |         |
|---------------------------------------------------------------------------|---------|
| IDEAL GROSS HEATING VALUE, BTU / IDEAL CF AT 14.696 PSIA, calculated..... | 113.921 |
| COMPRESSIBILITY FACTOR ( Z ).....                                         | 0.99464 |

|                                           |        |
|-------------------------------------------|--------|
| PROPANE GPM.....                          | 0.1734 |
| BUTANE GPM.....                           | 0.0052 |
| GASOLINE GPM ( PENTANE AND HEAVIER )..... | 0.0000 |

NOTATION: ALL CALCULATIONS PERFORMED USING PHYSICAL CONSTANTS FROM GPA 2145-09, THE TABLES  
OF PHYSICAL CONSTANTS FOR HYDROCARBONS AND OTHER COMPOUNDS OF INTEREST  
TO THE NATURAL GAS INDUSTRY.

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## CERTIFICATE OF ANALYSIS SULFUR FRACTIONAL STUDY OF GASEOUS PRODUCTS

COMPANY ..... MONELL CO2, LLC.

LAB NUMBER ..... CR-16699

STUDY NUMBER ..... CR-2B

DATE SAMPLED ..... 8-31-2016

DATE TESTED ..... 9-2-2016

SAMPLE IDENTIFICATION ..... GAS OUTLET

SAMPLE LOCATION..... MONELL GAS PLANT, MONELL, WYOMING

COUNTY..... SWEETWATER

SAMPLE PRESSURE..... 610 PSIG

SAMPLE TEMP..... 69 F

METHOD OF ANALYSIS..... SCD CHROMATOGRAPHY

SAMPLE METHOD ..... GPA-2166

TEST METHOD..... ASTM D-5504

CONTAINER..... AMR 157

INSTRUMENTATION..... SIEVERS MODEL 355 SULFUR CHEMILUMINESCENCE DETECTOR.

|                                    | RESULTS<br>PPM/VOLUME | RESULTS<br>Mg/M3 | RESULTS<br>GRAINS / 100SCF |
|------------------------------------|-----------------------|------------------|----------------------------|
| <b>LIGHT END COMPONENTS</b>        |                       |                  |                            |
| CARBONYL SULFIDE (COS).....        | 1.970 PPMV            | 4.846 Mg/M3      | 0.128 GRAINS               |
| HYDROGEN SULFIDE (H2S).....        | 153.065 PPMV          | 212.760 Mg/M3    | 9.920 GRAINS               |
| CARBON DISULFIDE (CS2).....        | 0.053 PPMV            | 0.165 Mg/M3      | 0.003 GRAINS               |
| DIMETHYL SULFIDE (CH3)2S).....     | < 0.010 PPMV          | < 0.025 Mg/M3    | < 0.001 GRAINS             |
| DIMETHYL DISULFIDE (CH3)2S2).....  | 0.062 PPMV            | 0.239 Mg/M3      | 0.004 GRAINS               |
| SULFUR DIOXIDE (SO2).....          | < 0.010 PPMV          | < 0.031 Mg/M3    | < 0.001 GRAINS             |
| TOTAL LIGHT END SULFURS.....       | 155.150 PPM           | 218.010 Mg/M3    | 10.055 GRAINS              |
| <b>MERCAPTANS &amp; THIOPHENES</b> |                       |                  |                            |
| METHYL MERCAPTAN.....              | 0.226 PPMV            | 0.445 Mg/M3      | 0.015 GRAINS               |
| ETHYL MERCAPTAN.....               | 0.039 PPMV            | 0.099 Mg/M3      | 0.003 GRAINS               |
| iso-PROPYL MERCAPTAN.....          | < 0.010 PPMV          | < 0.031 Mg/M3    | < 0.001 GRAINS             |

|                                    |              |               |                |
|------------------------------------|--------------|---------------|----------------|
| n-PROPYL MERCAPTAN.....            | < 0.010 PPMV | < 0.031 Mg/M3 | < 0.001 GRAINS |
| ETHYL METHYL SULFIDE .....         | < 0.010 PPMV | < 0.031 Mg/M3 | < 0.001 GRAINS |
| iso-BUTYL MERCAPTAN.....           | < 0.010 PPMV | < 0.037 Mg/M3 | < 0.001 GRAINS |
| n-BUTYL MERCAPTAN.....             | < 0.010 PPMV | < 0.037 Mg/M3 | < 0.001 GRAINS |
| DIETHYL SULFIDE .....              | < 0.010 PPMV | < 0.037 Mg/M3 | < 0.001 GRAINS |
| sec-BUTYL MERCAPTAN.....           | < 0.010 PPMV | < 0.037 Mg/M3 | < 0.001 GRAINS |
| tert-BUTYL MERCAPTAN.....          | < 0.010 PPMV | < 0.026 Mg/M3 | < 0.001 GRAINS |
| PENTYL AND HEAVIER MERCAPTANS..... | < 0.010 PPMV | < 0.039 Mg/M3 | < 0.001 GRAINS |
| 2-METHYLTHIOPHENE.....             | < 0.010 PPMV | < 0.034 Mg/M3 | < 0.001 GRAINS |
| 3-METHYLTHIOPHENE.....             | < 0.010 PPMV | < 0.034 Mg/M3 | < 0.001 GRAINS |
| THIOPHENE.....                     | < 0.010 PPMV | < 0.034 Mg/M3 | < 0.001 GRAINS |
| TOTAL BENZOTHIOPHENES.....         | < 0.010 PPMV | < 0.039 Mg/M3 | < 0.001 GRAINS |
| TOTAL METHYLBENZOTHIOPHENES.....   | < 0.010 PPMV | < 0.039 Mg/M3 | < 0.001 GRAINS |
| TOTAL MERCAPTANS & THIOPHENES..... | 0.265 PPMV   | 0.544 Mg/M3   | 0.017 GRAINS   |
| TOTAL ALL SULFURS.....             | 155.415 PPMV | 218.554 Mg/M3 | 10.072 GRAINS  |

ALL COMPONENTS ANALYZED AS PPM/VOLUME, THEN CONVERTED TO MILLIGRAMS PER CUBIC METER  
USING FACTORS OUTLINED IN ASTM D-5504.

---

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### EXTENDED HYDROCARBON (GLYCALC) LIQUID STUDY CERTIFICATE OF ANALYSIS

Company ..... **MONELL CO2, LLC.**

Lab Number ..... CR-16699

Date Sampled ..... 8-31-2016

Study Number ..... CR-3

Date Tested ..... 9-2-2016

Sample Identification ..... **TOTAL LIQUIDS**

Sample Location ..... MONELL GAS PLANT, MONELL, WYOMING.

Sample Pressure ..... 619 PSIG

Type Sample ..... SPOT

Test Method ..... GPA 2186

Sample Temperature ..... 84 F

County ..... SWEETWATER

Sampling Method ..... GPA-2174

| Components             | Mole % | Weight % | Liq. Vol. % |
|------------------------|--------|----------|-------------|
| Hydrogen Sulfide ..... | 0.003  | 0.002    | 0.001       |
| Oxygen .....           | 0.000  | 0.000    | 0.000       |
| Carbon Dioxide .....   | 11.450 | 8.266    | 6.187       |
| Nitrogen .....         | 0.000  | 0.000    | 0.000       |
| Methane .....          | 0.000  | 0.000    | 0.000       |
| Ethane .....           | 0.000  | 0.000    | 0.000       |
| Propane .....          | 21.776 | 15.751   | 18.996      |
| iso-Butane .....       | 15.417 | 14.698   | 15.974      |
| n-Butane .....         | 21.946 | 20.923   | 21.907      |
| iso-Pentane .....      | 8.456  | 10.007   | 9.792       |
| n-Pentane .....        | 6.791  | 8.037    | 7.794       |
| Hexanes .....          | 3.863  | 5.460    | 5.030       |
| Heptanes .....         | 4.204  | 6.910    | 6.141       |

|                           |         |         |         |
|---------------------------|---------|---------|---------|
| Octanes .....             | 1.425   | 2.670   | 2.311   |
| Nonanes .....             | 0.293   | 0.616   | 0.522   |
| Decanes+ .....            | 0.126   | 0.305   | 0.253   |
| Benzene .....             | 0.540   | 0.692   | 0.478   |
| Toluene .....             | 0.973   | 1.471   | 1.031   |
| Ethylbenzene .....        | 0.081   | 0.141   | 0.099   |
| Xylenes .....             | 0.621   | 1.081   | 0.764   |
| n-Hexane .....            | 1.830   | 2.587   | 2.383   |
| 2,2,4-Trimethylpentane .. | 0.205   | 0.384   | 0.337   |
| Totals .....              | 100.000 | 100.000 | 100.000 |

#### **ADDITIONAL BETX DATA**

| <b>Components</b>      | <b>Mole %</b> | <b>Weight %</b> | <b>Liq. Vol. %</b> |
|------------------------|---------------|-----------------|--------------------|
| 2-Methylpentane        | 2.762         | 3.904           | 3.596              |
| 3-Methylpentane        | 1.101         | 1.556           | 1.433              |
| n-Hexane               | 1.830         | 2.587           | 2.383              |
| 2,2,4-Trimethylpentane | 0.205         | 0.384           | 0.337              |
| Benzene                | 0.540         | 0.692           | 0.478              |
| Toluene                | 0.973         | 1.471           | 1.031              |
| Ethylbenzene           | 0.081         | 0.141           | 0.099              |
| m-Xylene               | 0.071         | 0.124           | 0.088              |
| p-Xylene               | 0.444         | 0.773           | 0.546              |
| o-Xylene               | 0.106         | 0.184           | 0.130              |

|                                                                         |           |
|-------------------------------------------------------------------------|-----------|
| API GRAVITY AT 60/60 F, calculated .....                                | 99.8      |
| SPECIFIC GRAVITY AT 60/60 F, calculated .....                           | 0.61168   |
| RELATIVE SPECIFIC GRAVITY OF DECANES+ (C10+) FRACTION, calculated ..... | 0.73806   |
| AVERAGE MOLECULAR WEIGHT .....                                          | 60.965    |
| AVERAGE MOLECULAR WEIGHT OF DECANES+ (C10+) FRACTION, calculated .....  | 147.472   |
| TRUE VAPOR PRESSURE AT 100 F, PSIA, calculated .....                    | 66.783    |
| AVERAGE BOILING POINT, F, calculated .....                              | 33.094    |
| CUBIC FEET OF GAS / GALLON OF LIQUID, as Ideal Gas, calculated .....    | 31.745    |
| BTU / GALLON OF LIQUID AT 14.73 PSIA, calculated .....                  | 98,901.14 |
| LBS / GALLON OF LIQUID, calculated .....                                | 5.100     |

NOTATION: ALL CALCULATIONS PERFORMED USING PHYSICAL CONSTANTS FROM GPA 2145-09, THE TABLES  
OF PHYSICAL CONSTANTS FOR HYDROCARBONS AND OTHER COMPOUNDS OF INTEREST  
TO THE NATURAL GAS INDUSTRY.

---

**James A. Kane, President**  
**American Mobile Research, Inc.**



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## CERTIFICATE OF ANALYSIS

### EXTENDED SULFUR ANALYSIS OF HYDROCARBON LIQUIDS

COMPANY..... MONELL CO2, LLC.

LAB NUMBER..... CR-16699

DATE SAMPLED..... 8-31-2016

STUDY NUMBER..... CR-3B

DATE TESTED..... 9-2-2016

SAMPLE IDENTIFICATION..... TOTAL LIQUIDS

SAMPLE LOCATION..... MONELL, WYOMING.

SAMPLE PRESSURE..... 619 PSIG

TEST METHOD..... ASTM D-5623

METHOD OF ANALYSIS..... SCD CHROMATOGRAPHY

INSTRUMENT..... SIEVERS 355 SULFUR CHEMILUMINESCENCE CHROMATOGRAPHY

COUNTY..... SWEETWATER

SAMPLE TEMP..... 84 F

SAMPLE METHOD..... SPOT

CONTAINER..... AMR 127

| <u>LIGHT END COMPONENTS</u>           | <u>RESULTS, mg/L</u> | <u>RESULTS, PPMW</u> |
|---------------------------------------|----------------------|----------------------|
| CARBONYL SULFIDE (COS).....           | 20.542 mg/L          | 20.244 PPMW          |
| HYDROGEN SULFIDE (H2S).....           | 27.940 mg/L          | 15.619 PPMW          |
| CARBON DISULFIDE (CS2).....           | 0.146 mg/L           | 0.182 PPMW           |
| DIMETHYL SULFIDE (CH3)2S.....         | 0.288 mg/L           | 0.294 PPMW           |
| DIMETHYL DISULFIDE (CH3)2S2.....      | 0.359 mg/L           | 0.555 PPMW           |
| DIETHYL DISULFIDE (C2H5)2S2.....      | < 0.010 mg/L         | < 0.027 PPMW         |
| SULFUR DIOXIDE (SO2).....             | < 0.010 mg/L         | < 0.009 PPMW         |
| TOTAL LIGHT END COMPONENTS, mg/L..... | 49.275 mg/L          | 36.893 PPMW          |

#### MERCAPTANS & THIOPHENES

|                              |             |             |
|------------------------------|-------------|-------------|
| METHYL MERCAPTAN.....        | 29.505 mg/L | 23.284 PPMW |
| ETHYL MERCAPTAN.....         | 18.425 mg/L | 18.778 PPMW |
| iso-PROPYL MERCAPTAN.....    | 12.469 mg/L | 15.577 PPMW |
| normal-PROPYL MERCAPTAN..... | 1.782 mg/L  | 2.226 PPMW  |
| ETHYL METHYL SULFIDE.....    | 0.306 mg/L  | 0.382 PPMW  |

|                                         |              |              |
|-----------------------------------------|--------------|--------------|
| iso-BUTYL MERCAPTAN.....                | 0.487 mg/L   | 0.720 PPMW   |
| normal-BUTYL MERCAPTAN.....             | 0.529 mg/L   | 0.783 PPMW   |
| DIETHYL SULFIDE.....                    | < 0.010 mg/L | < 0.020 PPMW |
| sec-BUTYL MERCAPTAN.....                | < 0.010 mg/L | < 0.020 PPMW |
| tert-BUTYL MERCAPTAN.....               | 0.380 mg/L   | 0.400 PPMW   |
| PENTYL AND HEAVIER MERCAPTANS.....      | < 0.010 mg/L | < 0.023 PPMW |
| 2-METHYLTHIOPHENE.....                  | 0.296 mg/L   | 0.477 PPMW   |
| 3-METHYLTHIOPHENE.....                  | 0.547 mg/L   | 0.881 PPMW   |
| THIOPHENE.....                          | 1.239 mg/L   | 1.710 PPMW   |
| ETHYL PROPYL SULFIDE.....               | < 0.010 mg/L | < 0.023 PPMW |
| ETHYL METHYL DISULFIDE.....             | < 0.010 mg/L | < 0.024 PPMW |
| BENZOTHIOPHENE.....                     | 1.190 mg/L   | 2.620 PPMW   |
| METHYL BENZOTHIOPHENES AND HEAVIER..... | < 0.010 mg/L | < 0.032 PPMW |
| <hr/>                                   |              |              |
| TOTAL MERCAPTANS AND THIOPHENES.....    | 67.155 mg/L  | 67.837 PPMW  |
| TOTAL ALL SULFURS.....                  | 116.430 mg/L | 104.730 PPMW |

|                                                                   |
|-------------------------------------------------------------------|
| AVERAGE MOLECULAR WEIGHT USED TO CONVERT PPMV TO PPMW..... 60.965 |
|-------------------------------------------------------------------|

LOWER DETECTION LIMIT - 0.01 mg/L (PPM)

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James A. Kane, President  
American Mobile Research, Inc.



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### EXTENDED HYDROCARBON (GLYCALC) LIQUID STUDY CERTIFICATE OF ANALYSIS

Company ..... **MONELL CO2, LLC.**

Lab Number ..... CR-16699

Date Sampled ..... 8-31-2016

Study Number ..... CR-4

Date Tested ..... 9-2-2016

Sample Identification ..... **Y-GRADE PRODUCT**

Sample Location ..... MONELL GAS PLANT, MONELL, WYOMING.

Sample Pressure ..... 471 PSIG

Type Sample ..... SPOT

Test Method ..... GPA 2186

Sample Temperature ..... N/A

County ..... SWEETWATER

Sampling Method ..... GPA-2174

| Components             | Mole % | Weight % | Liq. Vol. % |
|------------------------|--------|----------|-------------|
| Hydrogen Sulfide ..... | 0.000  | 0.000    | 0.000       |
| Oxygen .....           | 0.000  | 0.000    | 0.000       |
| Carbon Dioxide .....   | 0.005  | 0.004    | 0.003       |
| Nitrogen .....         | 0.001  | 0.001    | 0.000       |
| Methane .....          | 0.001  | 0.000    | 0.001       |
| Ethane .....           | 0.030  | 0.018    | 0.027       |
| Propane .....          | 53.676 | 46.493   | 49.656      |
| iso-Butane .....       | 23.330 | 26.636   | 25.635      |
| n-Butane .....         | 20.902 | 23.864   | 22.127      |
| iso-Pentane .....      | 1.263  | 1.790    | 1.551       |
| n-Pentane .....        | 0.618  | 0.876    | 0.752       |
| Hexanes .....          | 0.052  | 0.088    | 0.072       |
| Heptanes .....         | 0.047  | 0.093    | 0.073       |

|                            |         |         |         |
|----------------------------|---------|---------|---------|
| Octanes .....              | 0.006   | 0.013   | 0.010   |
| Nonanes .....              | 0.003   | 0.008   | 0.006   |
| Decanes+ .....             | 0.002   | 0.006   | 0.004   |
| Benzene .....              | 0.011   | 0.017   | 0.010   |
| Toluene .....              | 0.005   | 0.009   | 0.006   |
| Ethylbenzene .....         | 0.001   | 0.002   | 0.001   |
| Xylenes .....              | 0.004   | 0.008   | 0.005   |
| n-Hexane .....             | 0.038   | 0.064   | 0.052   |
| 2,2,4-Trimethylpentane ... | 0.005   | 0.011   | 0.009   |
| Totals .....               | 100.000 | 100.000 | 100.000 |

#### **ADDITIONAL BETX DATA**

| <b>Components</b>      | <b>Mole %</b> | <b>Weight %</b> | <b>Liq. Vol. %</b> |
|------------------------|---------------|-----------------|--------------------|
| 2-Methylpentane        | 0.037         | 0.063           | 0.051              |
| 3-Methylpentane        | 0.015         | 0.025           | 0.020              |
| n-Hexane               | 0.038         | 0.064           | 0.052              |
| 2,2,4-Trimethylpentane | 0.005         | 0.011           | 0.009              |
| Benzene                | 0.011         | 0.017           | 0.010              |
| Toluene                | 0.005         | 0.009           | 0.006              |
| Ethylbenzene           | 0.001         | 0.002           | 0.001              |
| m-Xylene               | 0.000         | 0.001           | 0.001              |
| p-Xylene               | 0.003         | 0.006           | 0.004              |
| o-Xylene               | 0.001         | 0.001           | 0.001              |

|                                                                         |           |
|-------------------------------------------------------------------------|-----------|
| API GRAVITY AT 60/60 F, calculated .....                                | 129.7     |
| SPECIFIC GRAVITY AT 60/60 F, calculated .....                           | 0.54169   |
| RELATIVE SPECIFIC GRAVITY OF DECANES+ (C10+) FRACTION, calculated ..... | 0.73509   |
| AVERAGE MOLECULAR WEIGHT .....                                          | 50.909    |
| AVERAGE MOLECULAR WEIGHT OF DECANES+ (C10+) FRACTION, calculated .....  | 142.983   |
| TRUE VAPOR PRESSURE AT 100 F, PSIA, calculated .....                    | 129.621   |
| AVERAGE BOILING POINT, F, calculated .....                              | -12.686   |
| CUBIC FEET OF GAS / GALLON OF LIQUID, as Ideal Gas, calculated .....    | 33.665    |
| BTU / GALLON OF LIQUID AT 14.73 PSIA, calculated .....                  | 97,031.86 |
| LBS / GALLON OF LIQUID, calculated .....                                | 4.516     |

NOTATION: ALL CALCULATIONS PERFORMED USING PHYSICAL CONSTANTS FROM GPA 2145-09, THE TABLES  
OF PHYSICAL CONSTANTS FOR HYDROCARBONS AND OTHER COMPOUNDS OF INTEREST  
TO THE NATURAL GAS INDUSTRY.

---

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## CERTIFICATE OF ANALYSIS

### EXTENDED SULFUR ANALYSIS OF HYDROCARBON LIQUIDS

COMPANY..... MONELL CO2, LLC.

LAB NUMBER..... CR-16699

DATE SAMPLED..... 8-31-2016

STUDY NUMBER..... CR-4B

DATE TESTED..... 9-2-2016

SAMPLE IDENTIFICATION..... Y-GRADE PRODUCT

SAMPLE LOCATION..... MONELL, WYOMING.

SAMPLE PRESSURE..... 471 PSIG

TEST METHOD..... ASTM D-5623

METHOD OF ANALYSIS..... SCD CHROMATOGRAPHY

INSTRUMENT..... SIEVERS 355 SULFUR CHEMILUMINESCENCE CHROMATOGRAPHY

COUNTY..... SWEETWATER

SAMPLE TEMP..... N/A

SAMPLE METHOD..... SPOT

CONTAINER..... AMR 160

| <b>LIGHT END COMPONENTS</b>                                                          | <b>RESULTS, mg/L</b> | <b>RESULTS, PPMW</b> |
|--------------------------------------------------------------------------------------|----------------------|----------------------|
| CARBONYL SULFIDE (COS).....                                                          | 0.496 mg/L           | 0.585 PPMW           |
| HYDROGEN SULFIDE (H <sub>2</sub> S).....                                             | 0.968 mg/L           | 0.648 PPMW           |
| CARBON DISULFIDE (CS <sub>2</sub> ).....                                             | 0.142 mg/L           | 0.212 PPMW           |
| DIMETHYL SULFIDE (CH <sub>3</sub> ) <sub>2</sub> S.....                              | 0.267 mg/L           | 0.326 PPMW           |
| DIMETHYL DISULFIDE (CH <sub>3</sub> ) <sub>2</sub> S <sub>2</sub> .....              | 0.183 mg/L           | 0.339 PPMW           |
| DIETHYL DISULFIDE (C <sub>2</sub> H <sub>5</sub> ) <sub>2</sub> S <sub>2</sub> ..... | < 0.010 mg/L         | < 0.027 PPMW         |
| SULFUR DIOXIDE (SO <sub>2</sub> ).....                                               | < 0.010 mg/L         | < 0.009 PPMW         |
| TOTAL LIGHT END COMPONENTS, mg/L.....                                                | 2.056 mg/L           | 2.110 PPMW           |

### **MERCAPTANS & THIOPHENES**

|                              |             |              |
|------------------------------|-------------|--------------|
| METHYL MERCAPTAN.....        | 12.213 mg/L | 11.542 PPMW  |
| ETHYL MERCAPTAN.....         | 39.604 mg/L | 48.336 PPMW  |
| iso-PROPYL MERCAPTAN.....    | 10.678 mg/L | 15.974 PPMW  |
| normal-PROPYL MERCAPTAN..... | 2.932 mg/L  | 4.386 PPMW   |
| ETHYL METHYL SULFIDE.....    | 0.508 mg/L  | < 0.017 PPMW |

|                                         |              |              |
|-----------------------------------------|--------------|--------------|
| iso-BUTYL MERCAPTAN.....                | 0.170 mg/L   | 0.301 PPMW   |
| normal-BUTYL MERCAPTAN.....             | 0.242 mg/L   | 0.429 PPMW   |
| DIETHYL SULFIDE.....                    | < 0.010 mg/L | < 0.020 PPMW |
| sec-BUTYL MERCAPTAN.....                | < 0.010 mg/L | < 0.020 PPMW |
| tert-BUTYL MERCAPTAN.....               | 0.158 mg/L   | 0.199 PPMW   |
| PENTYL AND HEAVIER MERCAPTANS.....      | < 0.010 mg/L | < 0.023 PPMW |
| 2-METHYLTHIOPHENE.....                  | 0.105 mg/L   | 0.202 PPMW   |
| 3-METHYLTHIOPHENE.....                  | 0.074 mg/L   | 0.143 PPMW   |
| THIOPHENE.....                          | 0.329 mg/L   | 0.544 PPMW   |
| ETHYL PROPYL SULFIDE.....               | < 0.010 mg/L | < 0.023 PPMW |
| ETHYL METHYL DISULFIDE.....             | < 0.010 mg/L | < 0.024 PPMW |
| BENZOTHIOPHENE.....                     | 0.610 mg/L   | 1.608 PPMW   |
| METHYL BENZOTHIOPHENES AND HEAVIER..... | < 0.010 mg/L | < 0.032 PPMW |
| <hr/>                                   |              |              |
| TOTAL MERCAPTANS AND THIOPHENES.....    | 67.623 mg/L  | 83.665 PPMW  |
| TOTAL ALL SULFURS.....                  | 69.679 mg/L  | 85.775 PPMW  |

|                                                                   |
|-------------------------------------------------------------------|
| AVERAGE MOLECULAR WEIGHT USED TO CONVERT PPMV TO PPMW..... 50.909 |
|-------------------------------------------------------------------|

LOWER DETECTION LIMIT - 0.01 mg/L (PPM)

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James A. Kane, President  
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### EXTENDED HYDROCARBON (GLYCALC) LIQUID STUDY CERTIFICATE OF ANALYSIS

Company ..... **MONELL CO2, LLC.**

Lab Number ..... CR-16699

Date Sampled ..... 8-31-2016

Study Number ..... CR-5

Date Tested ..... 9-2-2016

Sample Identification ..... **CRUDE BLEND**

Sample Location ..... MONELL GAS PLANT, MONELL, WYOMING.

Sample Pressure ..... 120 PSIG

Type Sample ..... SPOT

Test Method ..... GPA 2186

Sample Temperature ..... 102 F

County ..... SWEETWATER

Sampling Method ..... GPA-2174

| Components             | Mole % | Weight % | Liq. Vol. % |
|------------------------|--------|----------|-------------|
| Hydrogen Sulfide ..... | 0.000  | 0.000    | 0.000       |
| Oxygen .....           | 0.000  | 0.000    | 0.000       |
| Carbon Dioxide .....   | 0.000  | 0.000    | 0.000       |
| Nitrogen .....         | 0.000  | 0.000    | 0.000       |
| Methane .....          | 0.000  | 0.000    | 0.000       |
| Ethane .....           | 0.000  | 0.000    | 0.000       |
| Propane .....          | 1.517  | 0.814    | 1.059       |
| iso-Butane .....       | 6.920  | 4.891    | 5.740       |
| n-Butane .....         | 18.766 | 13.265   | 14.998      |
| iso-Pentane .....      | 12.643 | 11.093   | 11.721      |
| n-Pentane .....        | 10.574 | 9.278    | 9.716       |
| Hexanes .....          | 8.006  | 8.390    | 8.346       |
| Heptanes .....         | 19.989 | 24.358   | 23.378      |

|                           |         |         |         |
|---------------------------|---------|---------|---------|
| Octanes .....             | 10.795  | 14.996  | 14.019  |
| Nonanes .....             | 0.887   | 1.383   | 1.265   |
| Decanes+ .....            | 0.216   | 0.400   | 0.356   |
| Benzene .....             | 1.140   | 1.083   | 0.808   |
| Toluene .....             | 1.839   | 2.061   | 1.560   |
| Ethylbenzene .....        | 0.541   | 0.699   | 0.529   |
| Xylenes .....             | 2.329   | 3.007   | 2.293   |
| n-Hexane .....            | 3.075   | 3.223   | 3.205   |
| 2,2,4-Trimethylpentane .. | 0.763   | 1.060   | 1.005   |
| Totals .....              | 100.000 | 100.000 | 100.000 |

#### **ADDITIONAL BETX DATA**

| <b>Components</b>      | <b>Mole %</b> | <b>Weight %</b> | <b>Liq. Vol. %</b> |
|------------------------|---------------|-----------------|--------------------|
| 2-Methylpentane        | 5.724         | 5.999           | 5.967              |
| 3-Methylpentane        | 2.282         | 2.391           | 2.379              |
| n-Hexane               | 3.075         | 3.223           | 3.205              |
| 2,2,4-Trimethylpentane | 0.763         | 1.060           | 1.005              |
| Benzene                | 1.140         | 1.083           | 0.808              |
| Toluene                | 1.839         | 2.061           | 1.560              |
| Ethylbenzene           | 0.541         | 0.699           | 0.529              |
| m-Xylene               | 0.268         | 0.346           | 0.264              |
| p-Xylene               | 1.665         | 2.150           | 1.640              |
| o-Xylene               | 0.396         | 0.511           | 0.390              |

|                                                                         |            |
|-------------------------------------------------------------------------|------------|
| API GRAVITY AT 60/60 F, calculated .....                                | 82.7       |
| SPECIFIC GRAVITY AT 60/60 F, calculated .....                           | 0.66053    |
| RELATIVE SPECIFIC GRAVITY OF DECANES+ (C10+) FRACTION, calculated ..... | 0.74107    |
| AVERAGE MOLECULAR WEIGHT .....                                          | 82.228     |
| AVERAGE MOLECULAR WEIGHT OF DECANES+ (C10+) FRACTION, calculated .....  | 152.102    |
| TRUE VAPOR PRESSURE AT 100 F, PSIA, calculated .....                    | 22.811     |
| AVERAGE BOILING POINT, F, calculated .....                              | 134.218    |
| CUBIC FEET OF GAS / GALLON OF LIQUID, as Ideal Gas, calculated .....    | 25.418     |
| BTU / GALLON OF LIQUID AT 14.73 PSIA, calculated .....                  | 114,729.57 |
| LBS / GALLON OF LIQUID, calculated .....                                | 5.507      |

NOTATION: ALL CALCULATIONS PERFORMED USING PHYSICAL CONSTANTS FROM GPA 2145-09, THE TABLES  
OF PHYSICAL CONSTANTS FOR HYDROCARBONS AND OTHER COMPOUNDS OF INTEREST  
TO THE NATURAL GAS INDUSTRY.

---

**James A. Kane, President**  
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## CERTIFICATE OF ANALYSIS

### EXTENDED SULFUR ANALYSIS OF HYDROCARBON LIQUIDS

COMPANY..... MONELL CO2, LLC.

LAB NUMBER..... CR-16699

DATE SAMPLED..... 8-31-2016

STUDY NUMBER..... CR-5B

DATE TESTED..... 9-2-2016

SAMPLE IDENTIFICATION..... CRUDE BLEND

SAMPLE LOCATION..... MONELL, WYOMING.

SAMPLE PRESSURE..... 120 PSIG

TEST METHOD..... ASTM D-5623

METHOD OF ANALYSIS..... SCD CHROMATOGRAPHY

INSTRUMENT..... SIEVERS 355 SULFUR CHEMILUMINESCENCE CHROMATOGRAPHY

COUNTY..... SWEETWATER

SAMPLE TEMP..... 102 F

SAMPLE METHOD..... SPOT

CONTAINER..... AMR 152

| <b>LIGHT END COMPONENTS</b>           | <b>RESULTS, mg/L</b> | <b>RESULTS, PPMW</b> |
|---------------------------------------|----------------------|----------------------|
| CARBONYL SULFIDE (COS).....           | 0.034 mg/L           | 0.025 PPMW           |
| HYDROGEN SULFIDE (H2S).....           | < 0.010 mg/L         | < 0.004 PPMW         |
| CARBON DISULFIDE (CS2).....           | 0.137 mg/L           | 0.127 PPMW           |
| DIMETHYL SULFIDE (CH3)2S.....         | 0.260 mg/L           | 0.196 PPMW           |
| DIMETHYL DISULFIDE (CH3)2S2.....      | 0.452 mg/L           | 0.518 PPMW           |
| DIETHYL DISULFIDE (C2H5)2S2.....      | < 0.010 mg/L         | < 0.027 PPMW         |
| SULFUR DIOXIDE (SO2).....             | < 0.010 mg/L         | < 0.009 PPMW         |
| TOTAL LIGHT END COMPONENTS, mg/L..... | 0.883 mg/L           | 0.866 PPMW           |

### **MERCAPTANS & THIOPHENES**

|                              |             |             |
|------------------------------|-------------|-------------|
| METHYL MERCAPTAN.....        | 1.098 mg/L  | 0.642 PPMW  |
| ETHYL MERCAPTAN.....         | 27.081 mg/L | 20.463 PPMW |
| iso-PROPYL MERCAPTAN.....    | 42.592 mg/L | 39.449 PPMW |
| normal-PROPYL MERCAPTAN..... | 7.113 mg/L  | 6.588 PPMW  |
| ETHYL METHYL SULFIDE.....    | 0.482 mg/L  | 0.446 PPMW  |

|                                         |              |              |
|-----------------------------------------|--------------|--------------|
| iso-BUTYL MERCAPTAN.....                | 0.455 mg/L   | 0.499 PPMW   |
| normal-BUTYL MERCAPTAN.....             | 0.198 mg/L   | 0.217 PPMW   |
| DIETHYL SULFIDE.....                    | < 0.010 mg/L | < 0.020 PPMW |
| sec-BUTYL MERCAPTAN.....                | < 0.010 mg/L | < 0.020 PPMW |
| tert-BUTYL MERCAPTAN.....               | 0.456 mg/L   | 0.356 PPMW   |
| PENTYL AND HEAVIER MERCAPTANS.....      | < 0.010 mg/L | < 0.023 PPMW |
| 2-METHYLTHIOPHENE.....                  | 0.287 mg/L   | 0.343 PPMW   |
| 3-METHYLTHIOPHENE.....                  | 0.522 mg/L   | 0.623 PPMW   |
| THIOPHENE.....                          | 1.675 mg/L   | 1.714 PPMW   |
| ETHYL PROPYL SULFIDE.....               | < 0.010 mg/L | < 0.023 PPMW |
| ETHYL METHYL DISULFIDE.....             | < 0.010 mg/L | < 0.024 PPMW |
| BENZOTHIOPHENE.....                     | 0.940 mg/L   | 1.534 PPMW   |
| METHYL BENZOTHIOPHENES AND HEAVIER..... | < 0.010 mg/L | < 0.032 PPMW |
| <hr/>                                   |              |              |
| TOTAL MERCAPTANS AND THIOPHENES.....    | 82.899 mg/L  | 72.875 PPMW  |
| TOTAL ALL SULFURS.....                  | 83.782 mg/L  | 73.741 PPMW  |

|                                                                   |
|-------------------------------------------------------------------|
| AVERAGE MOLECULAR WEIGHT USED TO CONVERT PPMV TO PPMW..... 82.228 |
|-------------------------------------------------------------------|

LOWER DETECTION LIMIT - 0.01 mg/L (PPM)

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### EXTENDED HYDROCARBON LIQUID STUDIES

### CERTIFICATE OF ANALYSIS

Company..... MONELL CO2, LLC.

Lab Number..... CR-16699

Study Number..... CR-6

Date Sampled..... 8-31-2016

Date Tested..... 9-1-2016

Sample Identification..... **CRUDE**

Sample Location..... MONELL CO2 GAS PLANT, MONELL, WYOMING.

Sample Pressure..... N/A

Sample Temperature...N/A

Flowrate..... N/A

County..... SWEETWATER

Test Method..... VARIOUS

Sample Container..... 500 ml PPE

#### **TEST PERFORMED**

#### **RESULTS**

|                                                                 |        |
|-----------------------------------------------------------------|--------|
| API GRAVITY AT 60/60 F (ASTM D-287), observed .....             | 43.2   |
| SPECIFIC GRAVITY AT 60/60 F (ASTM D-1657), calculated .....     | 0.8100 |
| REID VAPOR PRESSURE (ASTM D-323), PSIG AT 100 F, observed ..... | 4.2    |
| TOTAL SULFUR CONTENT (ASTM D-5453), PPMW .....                  | N/A    |
| TRUE VAPOR PRESSURE (ASTM 2889), PSIA AT 100 F, observed .....  | N/A    |
| BASIC SEDIMENT AND WATER CONTENT (BSW), % BY VOLUME .....       | N/A    |

COPPER STRIP CORROSION (ASTM D-130), 1 HOUR AT 100 F, observed .... N/A

FREE WATER, observed ..... N/A

NOTATION : ALL TESTING PROVIDED ABOVE WAS PERFORMED IN ACCORDANCE TO METHODOLOGY  
OUTLINED BY THE AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM).

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James A. Kane, President  
American Mobile Research, Inc.



## AMERICAN MOBILE RESEARCH, INC.

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(307) 235-4590 PHONE  
(307) 265-4489 FAX

### CERTIFICATE OF ANALYSIS ASTM D-86 ENGLER DISTILLATION

COMPANY..... MONELL CO2, LLC.

LAB NUMBER..... CR-16699  
DATE SAMPLED..... 8-31-2016

STUDY NUMBER..... CR-6B  
DATE TESTED..... 9-13-2016

SAMPLE IDENTIFICATION..... CRUDE

SAMPLE LOCATION.. MONELL CO2 GAS PLANT, MONELL, WYOMING.

SAMPLE VOLUME..... 100 mls

SAMPLE MATRIX..... CRUDE OIL

| <u>DISTILLATION RECOVERY %</u>  | <u>RESULT, F</u> |   |
|---------------------------------|------------------|---|
| INITIAL BOLING POINT (IBP)..... | 122              | F |
| 5 % RECOVERY.....               | 186              | F |
| 10 % RECOVERY.....              | 226              | F |
| 20 % RECOVERY.....              | 266              | F |
| 30 % RECOVERY.....              | 310              | F |
| 40 % RECOVERY.....              | 369              | F |
| 50 % RECOVERY.....              | 432              | F |
| 60 % RECOVERY.....              | 486              | F |

|                                       |              |          |
|---------------------------------------|--------------|----------|
| <b>70 % RECOVERY.....</b>             | <b>524</b>   | <b>F</b> |
| <b>80 % RECOVERY.....</b>             | <b>552</b>   | <b>F</b> |
| <b>90 % RECOVERY.....</b>             | <b>576</b>   | <b>F</b> |
| <b>95 % RECOVERY.....</b>             | <b>582</b>   | <b>F</b> |
| <b>END POINT (EP).....</b>            | <b>613</b>   | <b>F</b> |
| <b>PERCENTAGE RECOVERED.....</b>      | <b>75.0%</b> |          |
| <b>PERCENTAGE RESIDUE.....</b>        | <b>21.0%</b> |          |
| <b>PERCENTAGE LOSS.....</b>           | <b>4.0%</b>  |          |
| <b>BAROMETERIC PRESSURE, mm .....</b> | <b>30.12</b> |          |

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### EXTENDED HYDROCARBON LIQUID STUDIES

### CERTIFICATE OF ANALYSIS

Company..... MONELL CO2, LLC.

Lab Number..... CR-16699

Study Number..... CR-7

Date Sampled..... 8-31-2016

Date Tested..... 9-1-2016

Sample Identification..... **CRUDE BLEND**

Sample Location..... FDL MONELL GAS PLANT, MONELL, WYOMING.

Sample Pressure..... N/A

Sample Temperature...N/A

Flowrate..... N/A

County..... NATRONA

Test Method..... VARIOUS

Sample Container..... 500 ml PPE BOTTLE

#### **TEST PERFORMED**

#### **RESULTS**

|                                                                 |        |
|-----------------------------------------------------------------|--------|
| API GRAVITY AT 60/60 F (ASTM D-287), observed .....             | 80.1   |
| SPECIFIC GRAVITY AT 60/60 F (ASTM D-1657), calculated .....     | 0.6687 |
| REID VAPOR PRESSURE (ASTM D-323), PSIG AT 100 F, observed ..... | 21.8   |
| TOTAL SULFUR CONTENT (ASTM D-5453), PPMW .....                  | N/A    |
| TRUE VAPOR PRESSURE (ASTM 2889), PSIA AT 100 F, observed .....  | N/A    |
| BASIC SEDIMENT AND WATER CONTENT (BSW), % BY VOLUME .....       | N/A    |

COPPER STRIP CORROSION (ASTM D-130), 1 HOUR AT 100 F, observed .... N/A

FREE WATER, observed ..... N/A

NOTATION : ALL TESTING PROVIDED ABOVE WAS PERFORMED IN ACCORDANCE TO METHODOLOGY  
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### CERTIFICATE OF ANALYSIS ASTM D-86 ENGLER DISTILLATION

COMPANY..... MONELL CO2, LLC.

LAB NUMBER..... CR-16699  
DATE SAMPLED..... 8-31-2016

STUDY NUMBER..... CR-7B  
DATE TESTED..... 9-13-2016

SAMPLE IDENTIFICATION..... **CRUDE BLEND**

SAMPLE LOCATION.. FDL-MONELL GAS PLANT, MONELL, WYOMING.

SAMPLE VOLUME..... 100 mls

SAMPLE MATRIX..... CRUDE OIL

| <u>DISTILLATION RECOVERY %</u>  | <u>RESULT, F</u> |   |
|---------------------------------|------------------|---|
| INITIAL BOLING POINT (IBP)..... | 82               | F |
| 5 % RECOVERY.....               | 110              | F |
| 10 % RECOVERY.....              | 122              | F |
| 20 % RECOVERY.....              | 132              | F |
| 30 % RECOVERY.....              | 142              | F |
| 40 % RECOVERY.....              | 156              | F |
| 50 % RECOVERY.....              | 168              | F |
| 60 % RECOVERY.....              | 182              | F |

|                                       |              |          |
|---------------------------------------|--------------|----------|
| <b>70 % RECOVERY</b> .....            | <b>202</b>   | <b>F</b> |
| <b>80 % RECOVERY</b> .....            | <b>214</b>   | <b>F</b> |
| <b>90 % RECOVERY</b> .....            | <b>222</b>   | <b>F</b> |
| <b>95 % RECOVERY</b> .....            | <b>246</b>   | <b>F</b> |
| <b>END POINT (EP)</b> .....           | <b>278</b>   | <b>F</b> |
| <b>PERCENTAGE RECOVERED</b> .....     | <b>97.0%</b> |          |
| <b>PERCENTAGE RESIDUE</b> .....       | <b>0.0%</b>  |          |
| <b>PERCENTAGE LOSS</b> .....          | <b>3.0%</b>  |          |
| <b>BAROMETERIC PRESSURE, mm</b> ..... | <b>30.20</b> |          |

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### EXTENDED HYDROCARBON LIQUID STUDIES

### CERTIFICATE OF ANALYSIS

Company..... MONELL CO2, LLC.

Lab Number..... CR-16699

Study Number..... CR-8

Date Sampled..... 8-31-2016

Date Tested..... 9-1-2016

Sample Identification..... BLEND

Sample Location..... FDL MONELL GAS PLANT, MONELL, WYOMING.

Sample Pressure..... N/A

Sample Temperature...N/A

Flowrate..... N/A

County..... NATRONA

Test Method..... VARIOUS

Sample Container..... 500 ml PPE BOTTLE

#### TEST PERFORMED

#### RESULTS

|                                                                 |        |
|-----------------------------------------------------------------|--------|
| API GRAVITY AT 60/60 F (ASTM D-287), observed .....             | 46.2   |
| SPECIFIC GRAVITY AT 60/60 F (ASTM D-1657), calculated .....     | 0.7963 |
| REID VAPOR PRESSURE (ASTM D-323), PSIG AT 100 F, observed ..... | 7.8    |
| TOTAL SULFUR CONTENT (ASTM D-5453), PPMW .....                  | N/A    |
| TRUE VAPOR PRESSURE (ASTM 2889), PSIA AT 100 F, observed .....  | N/A    |
| BASIC SEDIMENT AND WATER CONTENT (BSW), % BY VOLUME .....       | N/A    |

COPPER STRIP CORROSION (ASTM D-130), 1 HOUR AT 100 F, observed .... N/A

FREE WATER, observed ..... N/A

NOTATION : ALL TESTING PROVIDED ABOVE WAS PERFORMED IN ACCORDANCE TO METHODOLOGY  
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### CERTIFICATE OF ANALYSIS ASTM D-86 ENGLER DISTILLATION

COMPANY..... MONELL CO2, LLC.

LAB NUMBER..... CR-16699  
DATE SAMPLED..... 8-31-2016

STUDY NUMBER..... CR-8B  
DATE TESTED..... 9-13-2016

SAMPLE IDENTIFICATION..... BLEND

SAMPLE LOCATION.. MONELL CO2 GAS PLANT, MONELL, WYOMING.

SAMPLE VOLUME..... 100 mls

SAMPLE MATRIX..... CRUDE OIL

| <u>DISTILLATION RECOVERY %</u>  | <u>RESULT, F</u> |   |
|---------------------------------|------------------|---|
| INITIAL BOLING POINT (IBP)..... | 94               | F |
| 5 % RECOVERY.....               | 162              | F |
| 10 % RECOVERY.....              | 232              | F |
| 20 % RECOVERY.....              | 252              | F |
| 30 % RECOVERY.....              | 298              | F |
| 40 % RECOVERY.....              | 354              | F |
| 50 % RECOVERY.....              | 436              | F |
| 60 % RECOVERY.....              | 490              | F |

|                                       |              |          |
|---------------------------------------|--------------|----------|
| <b>70 % RECOVERY.....</b>             | <b>543</b>   | <b>F</b> |
| <b>80 % RECOVERY.....</b>             | <b>588</b>   | <b>F</b> |
| <b>90 % RECOVERY.....</b>             | <b>604</b>   | <b>F</b> |
| <b>95 % RECOVERY.....</b>             | <b>626</b>   | <b>F</b> |
| <b>END POINT (EP).....</b>            | <b>672</b>   | <b>F</b> |
| <b>PERCENTAGE RECOVERED.....</b>      | <b>80.0%</b> |          |
| <b>PERCENTAGE RESIDUE.....</b>        | <b>18.0%</b> |          |
| <b>PERCENTAGE LOSS.....</b>           | <b>2.0%</b>  |          |
| <b>BAROMETERIC PRESSURE, mm .....</b> | <b>30.20</b> |          |

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