

## EXTENDED CRUDE OIL FRACTIONAL ANALYSIS

| SAMPLE ID     |                    |
|---------------|--------------------|
| Customer      | Pilot Ceritas, LLC |
| Operator      | Pilot Ceritas, LLC |
| Plant         | Wellman            |
| Sample Point  | N/A                |
| Sample Of     | Crude Mix          |
| Pressure      | 120 psig           |
| Temperature   | 53 F               |
| Atm. Temp     | 47 F               |
| Sample Date   | 1/4/17             |
| Sample Time   | 3:20:00 PM         |
| Sampled By    | Pantechs-CCS       |
| Analysis Date | 01/09/17           |
| Sample Cyl No | PL2429             |

| COMPONENT      | SYM  | MOL %   | VOL %   | WT%     |
|----------------|------|---------|---------|---------|
| Nitrogen       | N2   | 0.0088  | 0.0025  | 0.0029  |
| Carbon Dioxide | CO2  | 0.0000  | 0.0000  | 0.0000  |
| Lab Hyd. Sulf. | H2S  | 0.0000  | 0.0000  | 0.0000  |
| Oxygen         | O2   | -----   | -----   | -----   |
| Helium         | He   | -----   | -----   | -----   |
| Hydrogen       | H2   | -----   | -----   | -----   |
| Argon          | Ar   | -----   | -----   | -----   |
| Methane        | C1   | 0.0000  | 0.0000  | 0.0000  |
| Ethane         | C2   | 0.0034  | 0.0023  | 0.0012  |
| Propane        | C3   | 0.0135  | 0.0095  | 0.0072  |
| i-Butane       | iC4  | 0.2410  | 0.2008  | 0.1655  |
| n-Butane       | nC4  | 3.5388  | 2.8413  | 2.4324  |
| neo-Pentane    | DMC3 | 0.0080  | 0.0078  | 0.0068  |
| i-Pentane      | iC5  | 15.1015 | 14.0655 | 12.8853 |
| n-Pentane      | nC5  | 20.0118 | 18.4746 | 17.0751 |
| *Hexanes+      | C6+  | 61.0732 | 64.3957 | 67.4236 |

Totals: 100.0000 100.0000 100.0000

### DISTRIBUTION

|                             |
|-----------------------------|
| Pilot Ceritas, LLC          |
| • Coy Gregg; Brownfield, TX |

### GRAVITY

|                         | MEAS   | CALC   |
|-------------------------|--------|--------|
| Relative Density, 60/60 | 0.6859 | 0.6824 |
| Degrees API, 60F        | 75.86  | 74.80  |

### MOLECULAR WEIGHT

|            |        |
|------------|--------|
| Molar Mass | 84.559 |
|------------|--------|

### VAPOR PRESSURE

|                                   |      |
|-----------------------------------|------|
| Calculated Absolute at 100F, psia | 11.1 |
| Equivalent Reid, psi              | 10.1 |
| Measured Reid, psi                | 11.3 |

### CALCULATIONS / METHODS

|                     |                  |
|---------------------|------------------|
| Pressure Base, PSIA | 14.65            |
| Temp Base, DEG F    | 60               |
| Ideal/Real Gas      | Real             |
| Method              | ASTM D8003, D323 |

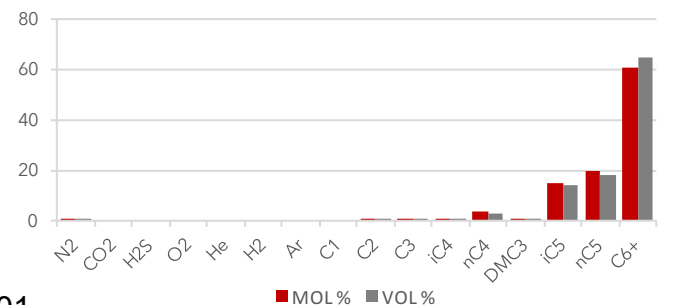
APPLICABLE CURRENT GPA & ASTM METHODS, PROCEDURES, AND CONSTANTS ARE USED

### REMARKS / COMMENTS / OTHER

\* Hexanes Plus fraction on pages 2-3

1. Direct Injection of pressurized sample; sample never exposed to atmosphere except during ASTM D323 Reid Vapor Test.

### RELATIVE CONCENTRATION



# HEXANES PLUS EXTENDED FRACTIONAL ANALYSIS

## SAMPLE ID

|               |                    |
|---------------|--------------------|
| Customer      | Pilot Ceritas, LLC |
| Operator      | Pilot Ceritas, LLC |
| Plant         | Wellman            |
| Sample Point  | N/A                |
| Sample Of     | Crude Mix          |
| Sample Date   | 1/4/17             |
| Sample Cyl No | PL2429             |

## HEXANES PLUS PHYSICAL PROPERTIES

|                              |         |
|------------------------------|---------|
| Molecular Weight             | 93.3513 |
| Relative Density, 60F/60F    | 0.7145  |
| Vapor Pressure, psia at 100F | 3.8589  |

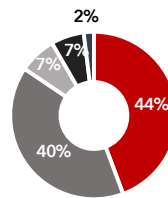
## HEXANES PLUS SUMMARY

| GRP     | MOL %     | VOL %     | Crude Oil | RELATIVE MOL% |
|---------|-----------|-----------|-----------|---------------|
| C6      | 35.423547 | 35.128261 | 35.750748 |               |
| C7      | 16.392853 | 17.425531 | 19.052022 |               |
| C8      | 8.255364  | 10.428132 | 11.078423 |               |
| C9      | 0.888211  | 1.228108  | 1.340185  |               |
| C10     | 0.056486  | 0.087723  | 0.094995  |               |
| C11     | 0.047776  | 0.080957  | 0.088318  |               |
| C12     | 0.006088  | 0.011107  | 0.012334  |               |
| C13     | 0.001353  | 0.002648  | 0.002984  |               |
| C14     | 0.001099  | 0.002294  | 0.002501  |               |
| C15     | 0.000423  | 0.000939  | 0.001090  |               |
| C16     | 0.000000  | 0.000000  | 0.000000  |               |
| C17     | 0.000000  | 0.000000  | 0.000000  |               |
| C18     | 0.000000  | 0.000000  | 0.000000  |               |
| C19     | 0.000000  | 0.000000  | 0.000000  |               |
| C20     | 0.000000  | 0.000000  | 0.000000  |               |
| C21     | 0.000000  | 0.000000  | 0.000000  |               |
| C22     | 0.000000  | 0.000000  | 0.000000  |               |
| C23     | 0.000000  | 0.000000  | 0.000000  |               |
| C24     | 0.000000  | 0.000000  | 0.000000  |               |
| C24+    | 0.000000  | 0.000000  | 0.000000  |               |
| Totals: | 61.073200 | 64.395700 | 67.423600 |               |

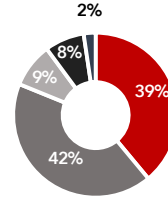
## BTEX GROUP SUMMARY

| COMPOUND          | MOL %    | VOL %    | WT %     |
|-------------------|----------|----------|----------|
| Benzene           | 0.923220 | 0.658003 | 0.852843 |
| Toluene           | 0.835193 | 0.712316 | 0.910018 |
| Ethylbenzene      | 0.150177 | 0.147614 | 0.188594 |
| m-Xylene+p-Xylene | 0.133096 | 0.131245 | 0.167051 |
| o-Xylene          | 0.040842 | 0.039546 | 0.051229 |
| Totals:           | 2.082528 | 1.688724 | 2.169735 |

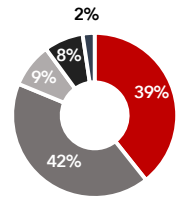
Relative Mol%



Relative Vol%



Relative Wt%



## HEXANES PLUS DETAIL

| ID             | COMPONENT                                | MOL %     | VOL %     | WT %      | RELATIVE MOL% |
|----------------|------------------------------------------|-----------|-----------|-----------|---------------|
| 6-1            | 2,2-Dimethylbutane                       | 0.067394  | 0.071662  | 0.068644  |               |
| 6-2            | 2,3-Dimethylbutane+Cyclopentane          | 2.521561  | 2.633086  | 2.569770  |               |
| 6-3            | 2-Methylpentane                          | 7.982999  | 8.439215  | 8.135553  |               |
| 6-4            | 3-Methylpentane                          | 6.382797  | 6.633748  | 6.504817  |               |
| 6-5            | n-Hexane <small>ASTM D8003, D323</small> | 6.566122  | 6.876411  | 6.691634  |               |
| 6-6            | Methylcyclopentane                       | 8.704045  | 7.843956  | 8.662819  |               |
| 6-7            | Benzene                                  | 0.923220  | 0.658003  | 0.852843  |               |
| 6-8            | Cyclohexane                              | 2.275409  | 1.972180  | 2.264668  |               |
| Total C6 Group |                                          | 35.423547 | 35.128261 | 35.750748 |               |

|                |                                                    |           |           |           |  |
|----------------|----------------------------------------------------|-----------|-----------|-----------|--|
| 7-1            | 2,2-Dimethylpentaneopentane                        | 0.065787  | 0.078421  | 0.077987  |  |
| 7-2            | 2,4-Dimethylpentane                                | 0.076103  | 0.090867  | 0.090207  |  |
| 7-3            | 3,3-Dimethylpentane                                | 0.023592  | 0.027319  | 0.027921  |  |
| 7-4            | 2,3-Dimethylpentane                                | 0.150177  | 0.173633  | 0.177980  |  |
| 7-5            | 2-Methylhexane                                     | 1.082952  | 1.281678  | 1.283284  |  |
| 7-6            | 1,1-Dimethylcyclopentane+3-Methylhexane            | 2.047014  | 2.136448  | 2.376928  |  |
| 7-7            | 1,t3-Dimethylcyclopentane                          | 2.559021  | 2.691142  | 2.971392  |  |
| 7-8            | 1,c3-Dimethylcyclopentane+3-Ethylpentane           | 2.456366  | 2.596904  | 2.852201  |  |
| 7-9            | 1,t2-Dimethylcyclopentane+1,c2-Dimethylcyclopentan | 4.583035  | 4.803003  | 5.321541  |  |
| 7-10           | n-Heptane                                          | 1.839590  | 2.161442  | 2.179886  |  |
| 7-11           | Methylcyclohexane+1,1,3-Trimethylpentane           | 0.337815  | 0.345824  | 0.392281  |  |
| 7-12           | Toluene                                            | 0.835193  | 0.712316  | 0.910018  |  |
| 7-13           | Cycloheptane                                       | 0.336208  | 0.326534  | 0.390396  |  |
| Total C7 Group |                                                    | 16.392853 | 17.425531 | 19.052022 |  |

| ID             | COMPONENT                                       | MOL %    | VOL %     | WT %      | RELATIVE MOL% |
|----------------|-------------------------------------------------|----------|-----------|-----------|---------------|
| 8-1            | 2,5-Dimethylhexane                              | 0.082615 | 0.109059  | 0.111625  |               |
| 8-2            | 2,4-Dimethylhexane+Ethylcyclopentane            | 0.450025 | 0.589561  | 0.607930  |               |
| 8-3            | 2,2-Dimethylhexane                              | 0.638593 | 0.841323  | 0.862646  |               |
| 8-4            | 1,t2,c3-Trimethylcyclopentane                   | 0.808134 | 0.965129  | 1.072458  |               |
| 8-5            | 1,c2,t4-Trimethylcyclopentane                   | 0.069592 | 0.082067  | 0.092332  |               |
| 8-6            | 2-Methylheptane+3-Methylheptane+4-Methylheptane | 1.179857 | 1.549417  | 1.593838  |               |
| 8-7            | 1,t2-Dimethylcyclohexane                        | 0.049975 | 0.057437  | 0.066321  |               |
| 8-8            | 3,4-Dimethylhexane                              | 0.212075 | 0.270326  | 0.286528  |               |
| 8-9            | 2,2,3-Trimethylpentane                          | 0.089126 | 0.114122  | 0.120420  |               |
| 8-10           | 1,c2-Dimethylcyclohexane                        | 0.564349 | 0.638102  | 0.748925  |               |
| 8-11           | 2,2,4-Trimethylpentane                          | 0.138677 | 0.183588  | 0.187356  |               |
| 8-12           | n-Octane                                        | 0.530948 | 0.692717  | 0.717268  |               |
| 8-13           | 1,t3-Dimethylcyclohexane                        | 0.031541 | 0.036251  | 0.041854  |               |
| 8-14           | 1,c3-Dimethylcyclohexane                        | 0.026890 | 0.031580  | 0.035640  |               |
| 8-15           | Ethylcyclohexane                                | 0.192288 | 0.219682  | 0.255173  |               |
| 8-16           | Ethylbenzene                                    | 0.150177 | 0.147614  | 0.188594  |               |
| 8-17           | m-Xylene+p-Xylene                               | 0.133096 | 0.131245  | 0.167051  |               |
| 8-18           | o-Xylene                                        | 0.040842 | 0.039546  | 0.051229  |               |
| 8-19           | Cyclooctane                                     | 0.046508 | 0.050095  | 0.061749  |               |
| 8-20           | Unidentified C8's                               | 2.820056 | 3.679271  | 3.809486  |               |
| Total C8 Group |                                                 | 8.255364 | 10.428132 | 11.078423 |               |

|                |                                          |          |          |          |
|----------------|------------------------------------------|----------|----------|----------|
| 9-1            | 2,2,4,4-Tetramethylpentane               | 0.056232 | 0.080424 | 0.085303 |
| 9-2            | 2,4,4-Trimethylhexane                    | 0.009893 | 0.014067 | 0.015049 |
| 9-3            | 2,2-Dimethylheptane                      | 0.026383 | 0.038209 | 0.039997 |
| 9-4            | 2,2,3-Trimethylhexane                    | 0.130475 | 0.183493 | 0.197885 |
| 9-5            | Dimethylheptane                          | 0.036530 | 0.052462 | 0.055344 |
| 9-6            | 2,2,3,3-Tetramethylpentane               | 0.025283 | 0.034403 | 0.038398 |
| 9-7            | 2,3,4-Trimethylhexane                    | 0.055048 | 0.076749 | 0.083472 |
| 9-8            | 3,4-Dimethylheptane                      | 0.066210 | 0.093158 | 0.100470 |
| 9-9            | Methyloctane                             | 0.009302 | 0.013422 | 0.014155 |
| 9-10           | 1,t2,c3-Trimethylcyclohexane             | 0.023085 | 0.029719 | 0.034526 |
| 9-11           | 1,t2,c4-Trimethylcyclohexane             | 0.043886 | 0.056590 | 0.065476 |
| 9-12           | 1,1,2-Trimethylcyclohexane               | 0.020379 | 0.025860 | 0.030404 |
| 9-13           | n-Nonane                                 | 0.059783 | 0.085677 | 0.090639 |
| 9-14           | 1,c2,t3-Trimethylcyclohexane             | 0.021224 | 0.026798 | 0.031686 |
| 9-15           | 1,c2,c3-Trimethylcyclohexane             | 0.010654 | 0.013452 | 0.015905 |
| 9-16           | i-Propylbenzene                          | 0.003044 | 0.003407 | 0.004354 |
| 9-17           | n-Propylcyclohexane                      | 0.037883 | 0.048357 | 0.056549 |
| 9-18           | n-Propylbenzene                          | 0.002283 | 0.002555 | 0.003239 |
| 9-19           | Ethyltoluene                             | 0.005581 | 0.006251 | 0.007886 |
| 9-20           | 1,3,5-Trimethylbenzene                   | 0.010654 | 0.011884 | 0.015117 |
| 9-21           | 1,2,4-Trimethylbenzene+tert-Butylbenzene | 0.012346 | 0.013603 | 0.017554 |
| 9-22           | Methylcyclooctane                        | 0.003044 | 0.003701 | 0.004564 |
| 9-23           | Unidentified C9's                        | 0.219009 | 0.313867 | 0.332213 |
| Total C9 Group |                                          | 0.888211 | 1.228108 | 1.340185 |

| ID              | COMPONENT             | MOL %    | VOL %    | WT %     | RELATIVE MOL% |
|-----------------|-----------------------|----------|----------|----------|---------------|
| 10-1            | 4-Methylnonane        | 0.006427 | 0.010024 | 0.010802 |               |
| 10-2            | 2-Methylnonane        | 0.002621 | 0.004120 | 0.004409 |               |
| 10-3            | 3-Ethyloctane         | 0.006342 | 0.009555 | 0.010738 |               |
| 10-4            | 3-Methylnonane        | 0.003298 | 0.005137 | 0.005620 |               |
| 10-5            | tert-Butylcyclohexane | 0.001099 | 0.001523 | 0.001760 |               |
| 10-6            | n-Decane              | 0.005412 | 0.008459 | 0.009045 |               |
| 10-7            | Unidentified C10's    | 0.031287 | 0.048905 | 0.052621 |               |
| Total C10 Group |                       | 0.056486 | 0.087723 | 0.094995 |               |