

CRUDE ASSAY TEST SUMMARY

Client : World Energy Resources Inc.
 Sample Description : Crude Blend

File Ref. E79087
 Date Reported : 27/04/2007

Distillation Fraction

| Sample Number | E79087 | E79089 | E79090 | E79091 | E79092 | E79093 |
|----------------------------|--------------|------------|--------------|---------------|---------------|----------------|
| Description | Whole Sample | Naphtha | Light Diesel | Heavy Diesel | VGO | Residue |
| TBP Range, °C | --- | IBP - 190 | 190 - 270 | 270 - 343 | 343 - 524 | 524+ |
| TBP Range, °F | --- | IBP - 374 | 374 - 518 | 518 - 649 | 649 - 975 | 975+ |
| Yield, mass% | | 5,48 | 7,29 | 8,12 | 20,57 | 58,54 |
| Yield, volume% | | 7,02 | 8,59 | 8,86 | 21,15 | 54,38 |
| Position in Crude, mass% | | IBP - 5,48 | 5,48 - 12,77 | 12,77 - 20,89 | 20,89 - 41,46 | 41,46 - 100,00 |
| Position in Crude, volume% | | IBP - 7,02 | 7,02 - 15,61 | 15,61 - 24,47 | 24,47 - 45,62 | 45,62 - 100,00 |
| Mid mass% | | 2,74 | 9,13 | 16,83 | 31,18 | 70,73 |
| Mid volume% | | 3,51 | 11,32 | 20,04 | 35,05 | 72,81 |

Properties

| | | | | | | |
|---|--------|--------|--------------|--------------|--------------|--------|
| API Gravity, °API | 10,43 | 52,10 | 37,35 | 24,85 | 15,74 | 1,55 |
| Relative Density @ 15°C | 0,9970 | 0,7707 | 0,8380 | 0,9050 | 0,9610 | 1,0635 |
| Absolute Density @ 15°C, kg/m ³ | 996,1 | 770,0 | 837,3 | 904,2 | 960,2 | 1062,6 |
| Acid Number, Total, mg KOH/g | 0,54 | 0,04 | 0,41 | 0,61 | 1,04 | 0,42 |
| Aniline Point, °C/°F | --- | --- | 43.8 / 110.8 | 43.8 / 110.8 | 51.4 / 124.5 | --- |
| Ash Content, mass% | --- | --- | --- | --- | --- | 0,257 |
| Asphaltene, C ₇ Insolubles, mass % | 17,35 | --- | --- | --- | 0,05 | 33,50 |

Asphalt Testing

| | | | | | | |
|--------------------------------|-------|--------------|-------------|---------------|-----------------------|--------------|
| Penetration @ 25°C, mm | --- | --- | --- | --- | --- | 0,5 |
| Softening Point, °C/°F | --- | --- | --- | --- | --- | 70.0 / 158.0 |
| Carbon Residue, Micro, mass % | 13,02 | --- | --- | --- | 0,12 | 21,63 |
| Cetane Index - US Calc. (D976) | --- | --- | 36,5 | --- | --- | --- |
| Cloud Point, °C/°F | --- | <-75 / <-103 | <-60 / <-76 | -29.0 / -20.2 | N/A ^{Note 1} | --- |

Distillation, Atmospheric D86 (°C/°F)

| | | | | | | |
|-----------------------|-----|-----|---------------|-----|-----|-----|
| Volume % Recovered | --- | --- | 97,7 | --- | --- | --- |
| Initial Boiling Point | --- | --- | 107.2 / 225.0 | --- | --- | --- |
| 5% | --- | --- | 160.2 / 320.4 | --- | --- | --- |
| 10% | --- | --- | 170.0 / 338.0 | --- | --- | --- |
| 15% | --- | --- | 175.2 / 347.4 | --- | --- | --- |
| 20% | --- | --- | 181.6 / 358.9 | --- | --- | --- |
| 25% | --- | --- | 186.8 / 368.2 | --- | --- | --- |
| 30% | --- | --- | 194.2 / 381.6 | --- | --- | --- |
| 40% | --- | --- | 204.9 / 400.8 | --- | --- | --- |
| 50% | --- | --- | 214.9 / 418.8 | --- | --- | --- |
| 60% | --- | --- | 224.1 / 435.4 | --- | --- | --- |
| 70% | --- | --- | 234.6 / 454.3 | --- | --- | --- |
| 80% | --- | --- | 246.2 / 475.2 | --- | --- | --- |
| 90% | --- | --- | 263.4 / 506.1 | --- | --- | --- |
| 95% | --- | --- | 282.9 / 541.2 | --- | --- | --- |
| Final Boiling Point | --- | --- | 284.3 / 543.7 | --- | --- | --- |
| Residue, volume% | --- | --- | 0,3 | --- | --- | --- |
| Loss, volume% | --- | --- | 2,0 | --- | --- | --- |

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| TBP Range, °C | IBP - 190 | 190 - 270 | 270 - 343 | 343 - 524 | 524+ |
| TBP Range, °F | IBP - 374 | 374 - 518 | 518 - 649 | 649 - 975 | 975+ |
| Yield, mass% | 5,48 | 7,29 | 8,12 | 20,57 | 58,54 |
| Yield, volume% | 7,02 | 8,59 | 8,86 | 21,15 | 54,38 |
| Position in Crude, mass% | IBP - 5,48 | 5,48 - 12,77 | 12,77 - 20,89 | 20,89 - 41,46 | 41,46 - 100,00 |
| Position in Crude, volume% | IBP - 7,02 | 7,02 - 15,61 | 15,61 - 24,47 | 24,47 - 45,62 | 45,62 - 100,00 |
| Mid mass% | 2,74 | 9,13 | 16,83 | 31,18 | 70,73 |
| Mid volume% | 3,51 | 11,32 | 20,04 | 35,05 | 72,81 |

Properties

Distillation, Simulated (°C/°F)

Mass % Recovered
 Initial Boiling Point
 5%
 10%
 15%
 20%
 25%
 30%
 40%
 50%
 60%
 70%
 80%
 90%
 95%
 Final Boiling Point
 Residue, mass%
 Flash Point, PMCC, °C/°F
 Hydrogen Sulphide, ppm wt
 K-Factor, Watson UOP
 Mercaptans, ppm wt

| D7169 | --- | --- | --- | --- | --- |
|--------------------------|--------|-------------|-------------|-------------|-----------|
| 80,94 | --- | --- | --- | --- | --- |
| 39.0 / 102.2 | --- | --- | --- | --- | --- |
| 139.2 / 282.6 | --- | --- | --- | --- | --- |
| 206.3 / 403.3 | --- | --- | --- | --- | --- |
| 260.2 / 500.4 | --- | --- | --- | --- | --- |
| 307.3 / 585.1 | --- | --- | --- | --- | --- |
| 352.6 / 666.7 | --- | --- | --- | --- | --- |
| 397.5 / 747.5 | --- | --- | --- | --- | --- |
| 476.5 / 889.7 | --- | --- | --- | --- | --- |
| 558.3 / 1036.9 | --- | --- | --- | --- | --- |
| 627.6 / 1161.7 | --- | --- | --- | --- | --- |
| 671.4 / 1240.5 | --- | --- | --- | --- | --- |
| 715.7 / 1320.3 | --- | --- | --- | --- | --- |
| --- | --- | --- | --- | --- | --- |
| --- | --- | --- | --- | --- | --- |
| 720.0 / 1328.0 | --- | --- | --- | --- | --- |
| 19,06 | --- | --- | --- | --- | --- |
| 37.0 / 98.6 | --- | --- | --- | --- | --- |
| --- | <0.001 | 0,004 | <0.001 | <0.001 | --- |
| --- | 11,9 | 11,3 | 10,9 | 11,1 | --- |
| --- | 0,135 | 0,205 | 0,216 | 0,141 | --- |
| --- | --- | --- | --- | --- | --- |
| Arsenic, ppm wt | <1 | --- | --- | --- | --- |
| Iron, ppm wt | 10,3 | --- | --- | <1 | 10,5 |
| Nickel, ppm wt | 41,8 | --- | --- | <1 | 60,4 |
| Vanadium, ppm wt | 71,6 | --- | --- | <1 | 100,8 |
| Naphthalenes, volume % | --- | 2,91 | 1,33 | --- | --- |
| Nitrogen, Basic, ppm wt | 831,0 | <1 | 1,5 | 128,0 | 359,0 |
| Nitrogen, Total, ppm wt | 1676,4 | <1 | 12,1 | 143,7 | 750,1 |
| --- | --- | --- | --- | --- | --- |
| Paraffins | --- | 49,0 | 24,1 | 17,6 | 13,5 |
| Naphthenes | --- | 40,1 | 37,7 | 37,3 | 23,3 |
| Aromatics | --- | 10,9 | 38,2 | 45,1 | 63,2 |
| Pour Point, °C/°F | --- | <-70 / <-94 | <-70 / <-94 | -57 / -70.6 | -9 / 15.8 |
| Refractive Index @ 70x°C | --- | 1,4032 | 1,4412 | 1,4789 | 1,5113 |
| Salt in Crude, lbs/kbbl | 281,8 | --- | --- | --- | --- |

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Properties

| | | | | | | |
|-----------------------------------|-------|--------|--------|--------|-------|--------|
| SAPA, Detailed, mass % | --- | --- | --- | --- | --- | --- |
| Saturates, mass % | --- | --- | --- | --- | --- | 1,5 |
| Mono-aromatics, mass % | --- | --- | --- | --- | --- | 3,5 |
| Di-aromatics, mass % | --- | --- | --- | --- | --- | 4,9 |
| Poly-aromatics, mass % | --- | --- | --- | --- | --- | 5,3 |
| Polars, mass % | --- | --- | --- | --- | --- | 52,5 |
| Asphaltenes, mass % | --- | --- | --- | --- | --- | 32,3 |
| Sediment in Crude, ppm wt | 823,4 | --- | --- | --- | --- | --- |
| Smoke Point, mm | --- | 23,1 | 11,4 | --- | --- | --- |
| Sulphur, Total (> 100 ppm), mass% | 7,714 | 0,904 | 2,354 | 4,023 | 5,491 | 9,921 |
| Viscosity, Kinematic | --- | --- | --- | --- | --- | --- |
| cSt @ 30°C / 86°F | --- | 0,8203 | 1,6871 | --- | --- | --- |
| cSt @ 50°C / 122°F | 1766 | 0,6897 | 1,2314 | 3,5204 | 42,59 | --- |
| cSt @ 60°C / 140°F | 822,5 | --- | --- | --- | --- | --- |
| cSt @ 70°C / 158°F | --- | --- | --- | 2,3894 | 18,86 | --- |
| cSt @ 80°C / 176°F | --- | --- | --- | --- | --- | 886131 |
| cSt @ 90°C / 194°F | --- | --- | --- | --- | --- | 279074 |
| cSt @ 100°C / 212°F | --- | --- | --- | --- | --- | 98834 |
| cSt @ 135°C / 275°F | --- | --- | --- | --- | --- | 5838 |
| Wax Content, Standard, mass% | --- | --- | --- | --- | 0,74 | --- |

ASTM D5236 Distillation method is a 1 to 2 theoretical plate distillation

Notes:

1) Sample too dark for Cloud Point determination.