# SPR CRUDE OIL COMPREHENSIVE ANALYSIS

Sample ID: West Hackberry, Sweet  Sample No.:

Laboratory No.: none  Date collected:  Date reported: 4/21/2010

Sediment by Extraction, mass %: 0.02  **Crude**  Water, mass %: 0.04  Salt, mass %: 0.0098

| | | | | | |
|---|---|---|---|---|---|
| Relative Density, 60/60° F | 0.8400 | Ni, ppm | 3.77 | RVP, psi @ 100° F | 5.40 |
| API Gravity | 37.0 | V, ppm | 4.52 | Acid number, mg KOH/g | 0.20 |
| Sulfur, mass % | 0.325 | Fe, ppm | 2.0 | Mercaptan Sulfur, ppm | 13 |
| Nitrogen, mass % | 0.104 | Cu, ppm | 1.0 | $H_2S$ Sulfur, ppm | 3 |
| Micro Car. Res., mass % | 1.8 | Org. Cl, ppm | 0.3 | Viscosity: 77° F | 5.661 cSt |
| Pour Point, °C | -2 | UOP "K" Factor | 11.9 | 100° F | 3.902 cSt |
| Wax, mass % | 0.90 | Asphaltenes, mass % | 0.30 | | |

| Fraction | Gas | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Residuum | Residuum |
|---|---|---|---|---|---|---|---|---|---|---|
| Cut Temp. | $C_2$ - $C_4$ | C5 - 175° F | 175° - 250° F | 250° - 375° F | 375° - 530° F | 530° - 650° F | 650° - 850° F | 850° - 1050° F | 650° F+ | 1050° F+ |
| Vol. % | 3.8 | 7.5 | 9.1 | 13.2 | 16.7 | 11.6 | 15.9 | 12.4 | 38.1 | 9.8 |
| Vol. Sum % | 3.8 | 11.2 | 20.3 | 33.5 | 50.3 | 61.9 | 77.8 | 90.2 | 100.0 | 100.0 |
| mass % | 2.6 | 6.0 | 8.0 | 12.4 | 16.6 | 12.0 | 17.0 | 13.8 | 42.5 | 11.8 |
| mass Sum % | 2.6 | 8.6 | 16.6 | 28.9 | 45.5 | 57.5 | 74.4 | 88.3 | 100.0 | 100.0 |
| Relative Density, 60/60° F | | 0.6694 | 0.7393 | 0.7828 | 0.8291 | 0.8599 | 0.8938 | 0.9367 | 0.9359 | 1.003 |
| API Gravity | | 79.9 | 59.9 | 49.3 | 39.2 | 33.1 | 26.8 | 19.6 | 19.7 | 9.5 |
| Sulfur, mass % | | 0.0016 | 0.0016 | 0.0101 | 0.0883 | 0.266 | 0.428 | 0.651 | 0.668 | 1.04 |
| Mercaptan Sulfur, ppm | | 6 | 8 | 11 | 6 | | | | | |
| $H_2S$ Sulfur, ppm | | 0 | 2 | 3 | 1 | | | | | |
| Organic Cl, ppm | | 1.7 | 0.7 | 0.8 | 2.1 | | | | | |
| Research Octane Number | | 68.2 | 61.3 | 38.7 | | | | | | |
| Motor Octane Number | | 65.5 | 58.6 | 39.1 | | | | | | |
| Acid Number, mg KOH/g | | | | | 0.07 | 0.14 | 0.25 | 0.23 | 0.23 | 0.09 |
| Cetane Index | | | | | 44.4 | 55.5 | 61.3 | | | |
| Aromatics, Vol. % | | | | | 23.5 | | | | | |
| Naphthalenes, Vol. % | | | | 0.02 | 4.73 | 9.23 | | | | |
| Wax, mass % | | | | | | | 5.39 | 7.08 | | |
| UOP "K" Factor | | | | | 11.7 | 11.8 | 11.9 | 11.9 | | 11.8 |
| Hydrogen, mass % | | | | 14.2 | 13.6 | 13.4 | 13.0 | 12.6 | 12.4 | 11.0 |
| Carbon, mass % | | | | 85.6 | 86.3 | 86.5 | 86.7 | 86.7 | 87.0 | 86.9 |
| Nitrogen, mass % | | | | | 0.0011 | 0.0102 | 0.0597 | 0.192 | 0.238 | 0.548 |
| Refractive Index, 60° C | | | | | | | 1.4858 | 1.5101 | | |
| Viscosity, cSt 77° F | | | | | 2.485 | | | | | |
| 100° F | | | | | 1.966 | 5.189 | | | | |
| 130° F | | | | | | 3.525 | 12.75 | 77.90 | 95.76 | |
| 180° F | | | | | | | 6.086 | 25.90 | 28.77 | 2958 |
| 210° F | | | | | | | | | | 938.6 |
| 275° F | | | | | | | | | | |
| Aniline Point, ° C | | | | 48.9 | 61.7 | 73.3 | 84.4 | 96.1 | | |
| Smoke point, mm | | | | 25.4 | 19.6 | 15.3 | | | | |
| Freezing Point, °C | | | | | -34 | | | | | |
| Cloud Point, °C | | | | | -38 | -3 | 29 | 59 | | |
| Pour Point, °C | | | | | -42 | -8 | 28 | 53 | 31 | |
| Ni, ppm | | | | | | | | 0.34 | 8.73 | 30.1 |
| V, ppm | | | | | | | | 0.06 | 10.5 | 37.3 |
| Fe, ppm | | | | | | | | | 4.8 | 19.0 |
| Cu, ppm | | | | | | | | | 1.5 | 5.3 |
| Micro Car. Res., mass % | | | | | | | <0.01 | 0.54 | 4.21 | 10.0 |
| Asphaltenes, mass % | | | | | | | | | 0.81 | 3.98 |