

# KILGORE TX RESERVES REPORT

## EXECUTIVE SUMMARY

The Kilgore area in Rusk County, Texas is being evaluated for hydrocarbon potential. The Kilgore area leases include; Sherow C and Jeff Reddic leases.

The East Texas Oil Field (ETOF), is located on the west flank of the Sabine Uplift in Rusk, Upshur, Smith, and Cherokee Counties, Texas. The ETOF, the second most productive oil field in the United States after the Prudhoe Bay Oil Field Alaska. This is based on cumulative production, has produced 5.43 billion stock tank barrels (BSTB) with 7.0 (BSTB) Original Oil In Place (OOIP), from lower Woodbine sandstones since 1930. The early history of the ETOF is one of rapid development. In 1931, there were 3,612 wells drilled, and 9,372 wells completed by the end 1932. The number of producing wells reached 25,829 in 1939. With the majority of vintage wells drilled, evaluated, completed, and produced with old technologies, and methods. New technologies show potential to un-lock the Woodbine sandstone reservoir ultimate hydrocarbon recovery.

### Reserves

Sherow C and Jeff Reddic leases in Rusk County Texas, total PDP remaining ultimate recoverable reserves potential is 3,443 MSTB. This is based on water-flooding recovery factor of 80%. Further enhanced oil recovery factors have been increased with CO2 and Polymer flooding.

| KILGORE RESERVES   | Net Pay (ft) | PDP         |                              |                          |                          |               | PRODUCED OIL (MSTB) | REMAINING OIL H2O RF 80% |
|--------------------|--------------|-------------|------------------------------|--------------------------|--------------------------|---------------|---------------------|--------------------------|
|                    |              | OOIP (MSTB) | STOOIP (MSTB) Primary RF 25% | STOOIP (MSTB) H2O RF 80% | STOOIP (MSTB) CO2 RF 90% | STOOIP (MSTB) |                     |                          |
| Rusk County Leases | 19.98        | 4502.916    | 1125.235                     | 3605.931                 | 4056.678                 | 162.298       | 3443.633            |                          |

The ETOF current daily production rate is ~10,084 barrels of oil per day (bbl/d) from 3,886 wells. Peak production was 207 MMSTB in 1933, declining to 40 MMSTB in 1964, increased again to 77 MMSTB in 1972, and then declined to 8.7 MMSTB in 2000, when the water cut exceeded 99%. Production gradually declined to 4.5 MMSTB in 2012. The initial period of decline from 1933 to 1964 was caused by a decrease in reservoir pressure, number of producing wells, and number of monthly production days. The second increase in production from 1965 to 1972 resulted from an increase in the number of monthly production days from 8 to 26. In 1953 the OOIP was assessed at 6.84 BSTB and estimated ultimate recovery (EUR) at 5.42 BSTB (RF 79%). In 1994 the assessed OOIP 7.03 BSTB and EUR of 5.64 BSTB, respectively (RF 80%). The Woodbine reservoir quality has 25% average porosity and more than 2,000 md permeability. The high recovery efficiency of the main Woodbine sandstone has been attributed to (1) high reservoir quality and continuity; (2) favorable wedge geometry, thickness, and stratigraphic dip, (3) effective water drive, (4) good crude quality, (5) low residual oil saturation, (6) high sweep efficiency, and (7) successful production management, including conservation, plugback, down dip water injection, well deepening, water-flooding, and mini water-flooding, but not to the underlying stringer sandstones. The Woodbine reservoir has proven potential to un-lock new recoverable reserves and residual oil with secondary, and enhanced oil recovery methods.

### Geological Summary

The Kilgore area, Sherow C and Jeff Reddic in Rusk County Texas are flanking the Sabine Uplift in East Texas Oil Field of the East Texas Basin. The Cretaceous Woodbine formation geological model is a fluvial-deltaic sandstone. The Woodbine formation has been assessed as a commercially hydrocarbon play that is under-valued, under-exploited oil play.

Regionally the ETOF Woodbine formation strike trend is north-northeast. Structural dip is from east to west flanking the Sabine Uplift. The trap is both structural and stratigraphic. The Woodbine formation main channel Net Sand is thickest trending through Rusk County Texas. The maximum Net Sand thickness is 120 ft. Porosity equals 25.2% with Permeability of 0 - 2098 mD.

In the Kilgore area, the Woodbine formation is sub-divided into a fair quality basal sandstone oil zone. Overlain by a fair quality middle sandstone. Overlain by an excellent quality upper main channel sandstone reservoir.

