Neoproterozoic Petroluem System of the Taoudenni Basin, Mauritania

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The underexplored Taoudenni Basin (Mauritania, Mali and Algeria) is part of the Eastern African Craton which contains over 6,000 meters of Neoproterozoic to Paleozoic section, with a thin Jurassic and Holocene sediment cover. The Abolag-1 (Mauritanian) and Yarba-1 (Mali) wells found gas accumulations in the stromatolitic Neoproterozoic Hank Gr. These hydrocarbon accumulations are sourced from a time equivalent black shales section. Outcrop samples from this black shale indicate the high hydrocarbon potential and early mature conditions (23.3% TOC, HI=530, Tmax 435ºC, type I). Equivalent age and facies constitute a proliferous source rock worldwide (i.e. Oman, Siberia).

The performed multi-dimensional basin modeling produced from seismic based structural maps indicates that the maximum burial of the Hank Group was achieved previous to the Hercinian orogeny with a minor impact of this erosional event in the resulting source rock maturity. The SR reached the gas window in Late Cambrian-Devonian times with higher maturity reached in the eastern and western depocenters. Oil generation and expulsion took place mainly during the Late Proterozoic and the gas extended until the Carboniferous. The earliest oil accumulations in Neoproterozoic reservoirs were produced during the Upper Proterozoic and were replaced by gas from the Cambrian until the Silurian- Ordovician.

Fission Track analyses indicates that the latest thermal event took place in pre-Devonian times reducing the influence of the Late Triassic-Jurassic doleritic dikes and sills on the hydrocarbon generation and expulsion.