Geology and Petroleum Prospects of the Bida Basin, Nigeria

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The sedementary succession in the eastern Bida Basin comprises from top to bottom the Agbaja Ironstone, Patti Formation and Lokoja Sandstone. The petroleum prospects of this succession have been evaluated from remote sensing, aeromagnetic, field outcrop, and geochemical studies.

Geochemical studies of some carbonaceous shales of the Patti Formation outcropping in the area indicate that the organic matter present is predominantly from terrigenous sources with a minor contribution from marine sources. With an average total organic carbon (TOC) content of 1.6%, these shales can be classified as rich in organic matter. However, other parameters including pollen and spore colouration, ratio of soluble organic matter to total organic carbon (SOM/TOC), ratio of saturated hydrocarbons to total organic carbon (SHC/TOC), carbon preference index (CPI), and the odd even ratio (OER) have shown that these shales are thermally immature and hence do not constitute source rocks. The possibility of "latent" source rocks may however exist deep in the subsurface given that the sedimentary fill in the area is up to 2,200m thick as revealed from the interpretation of aeromagnetic data.

The Lokoja and Patti Formation sandstones which generally lack much cement and matrix constitute good reservoir rocks. Sealing horizons are however noticeably missing in the Lokoja formation indicating poor entrapment potentials. The Patti Formation shales constitute seals and if these sealing horizons also occur deep in the subsurface, the possibility of stratigraphic and structural traps may exist especially in some parts of the study area where several fractures have been delineated from landsat and radar imagery.