Tiering of International Shale Reservoirs

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In previous exploration and development studies performed in various worldwide basins in the 1960s to early 2000s, most of the targeted sandstone and carbonate formations might not have flowed any gas or oil but the underlying Devonian, Silurian or Cretaceous Shale formations did show or might have indicated potential for hydrocarbon. These Devonian, Silurian or Cretaceous age shale formations are very significant laterally and vertically (huge thickness). In some parts of Africa such formations also had tectonic connection to North America in the past. Confirmation of the actual extents will require additional evaluation; appraisal and pilot production to determine if the hydrocarbon trapped in these shale formations (the source rock) can be developed to produce in commercial quantities. Commercial production already exists from such shale gas in the East Coast of US (Marcellus development is a good example).

The purpose of this paper is two fold: develop criteria to identify the various tiers of shale reservoirs (tier I through tier IV where tier IV basins being the most promising)and the second being the identifications of the basins and resource based on the criteria. Examples are presented that use geological, geochemistry, geophysical and petrophysical data to infer potential of shale hydrocarbon in the various basins under consideration. The reservoir, drilling, production and economic aspects of producing gas from such shale formations are also covered. Case studies from North America (US in particular) are used to illustrate the application of the overall shale gas evaluation, development and economic optimization process for the various continents.