Tectono-Sedimentation Analysis of Rift Sediments of West Godavari Sub-Basin and Its Implications for Hydrocarbon Prospectivity of Krishna Godavari Basin

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Pranhita-Godavari, Krishna- Godavari (PG-KG) basin is situated on east coast of India. Exposure of Eastern Ghat orogenic belt remnants, limit coastal KG basin in N and NW. Towards SE, this basin extends into Bay of Bengal.

Krishna- Godavari is a poly-historic basin with three superposed fossil rift stages to pericratonic stages of development. Basin is divided into several sub-basins by a series of horsts formed during Mesozoic rift phase, which is superposed over Permo-Triassic (NW-SE trending) Gondwana fossil rift superposed over PreCambrian Eastern Ghats. Number of orthogonal cross trends are observed over KG rift, akin to PG orthogonal trend. All observed transverse cross-trends are responsible for shifting general trend of structures and their interactions have played a vital role in basin modifying tectonics and in generating suitable anticipated prospective hydrocarbon corridors.

A regional study was undertaken to asses hydrocarbon prospectivity of Gondwana and Cretaceous sediments in Gudivada and Bhimadolu Grabens of West Godavari sub basin. Study brought out integrated picture of both Gudivada and Bhimadolu grabens with their tectono-sedimentation pattern, stratgraphic units ranging from Permian to Cretaceous age and their lateral and vertical geometrical extent was done.

Jurassic Gajulapdu Shale-Kanukollu Sandstone Petroleum System and the Cretaceous Raghavapuram Petroleum System are active in Gudivada Graben where as Permo-Triassic Gondwanic Kommugudem-Mandapeta Petroleum System along with Cretaceous Raghavapuram Petroleum System are operative within Bhimadolu Graben.

Analysis incorporated 2-D seismic data of about 2,200 LKM and point data from 58 drilled wells. Integration of litho-facies, structural frame-work, sedimentological and source rock studies enabled to identify three distinct petroleum systems as well as prospective areas. Tectonic evolution and associated sedimentation pattern are inferred to be key factors for hydrocarbon entrapment in these identified corridors.