Structural Evolution and Development of Hydrocarbon Accumulations in the Tigris Structures: Tikrit, Samarra, Balad and East Baghdad Fields

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The Tigris structural system forms four major grabens extending southeast along the Tigris River about 250 km from Baiji to Baghdad. Along this trend are the Tikrit, Samarra, Balad and East Baghdad structures.

Each of these grabens consists of three or four northwest trending major normal faults with subordinate transfer faults accompanying relay ramps. Asymmetrical thickness variations took place across these faults within the Turonian-Campanian sequences. The rest of the sedimentary sequences exhibit approximately constant thicknesses across these structures.

The pre-Tertiary stratigraphic sequences within these structures are slightly inverted in asymmetrical grabens. Tertiary and younger strata appear characterised by southeast plunging noses.

Geochemical analysis of source rocks and fluid samples shows that the Late Jurassic and older rocks are presently in the oil generative window, with maturity tending to increase in the south-eastward direction. Drilling data suggest the presence of several reservoir sequences with compartmentalised oil bearing blocks.

Detailed seismic structural analysis and fault-plane mapping show that variations in displacement along the major faults juxtapose permeable against impermeable zones as well as variably permeable zones against each other. This resulted in the formation of compartmentalised fault bounded blocks with oil bearing reservoirs.

Correlation between timing of hydrocarbon formation, migration, and the major fault configurations suggests that the major normal faults acted as migration pathways and conductors for hydrocarbons as well as distributors to the various reservoir intervals encountered within each graben structure.