Point-Derived, Transverse Fan Systems in the Deep-Water GoM: Ideal Settings for 'Best-in-Class' Turbidite Reservoirs

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Abstract

As exploration in the North-Central GOM Deepwater has advanced into subsalt plays whereseismic imaging is typically inadequate for seismic facies and attribute-based work, reservoir prediction efforts have been focused on identifying long-lived, structurally controlled sedimententry points. Entry points are important because they a) serve as focusing mechanisms forconcentrating flow energy from upslope, and b) frequently have very favorable setups fordeposition of stacked reservoirs and high-energy depositional facies immediately downslope. Entry points are frequently associated with relatively constricted openings along salt- or fault-controlled basin margins. While basins on the upper slope tend to have single entry points and relatively unidirectional sediment transport, basins on the middle and lower portions of the slope can have multiple sediment entry points and multi-directional sediment transport patterns. Most basins have a trunk system trending along the basin floor, whose deposits laterally onlap the basin flanks. In well-imaged supra-salt basins, these ‘basin axis trending’systems are very frequently apparent from 3D slices or attribute maps. In less well-imaged subsalt basins, most interpreters will identify them trending along the ‘thicks’ of interval isochores. Seemingly going unnoticed by most interpreters, however, are point-derived, transverse-oriented systems sourced from entry points higher up on basin margins. These are typically steeper-gradient, higher-energy systems, with deposits that are more sand rich and more highly-amalgamated than deposits from the lower gradient, basin-axis trending systems,which tend to be more layered and contain a greater percentage of fines. Exceptional-quality sands from several top-

performing fields in the deep-water GOM, including Auger and Tahiti Fields, as well as high-quality reservoirs encountered in recent Inboard Paleogene discoveries, are recognized as being deposited mainly by transverse, point-derived systems near sediment entry points. The high quality and stacked nature of reservoirs in those fields, backed up by the robust field performance, should provide impetus for to more closely examine basin margins and consider the possibility for additional sediment entry points and related transverse systems.

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