Depositional Setting of Turbidite System Fields (Mio-Plio-Pleistocene) Gulf of Mexico

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Gulf of Mexico exploration for deep-water sands has resulted in more than 75 discoveries with announced reserves of more than 4.7 billion barrels of oil equivalent. The play concept centers on the gravity-flow transport of sands down salt withdrawal valleys into and through intraslope basins, and onward to abyssal basin-floor fans.

Each of the gravity-flow systems consists of confined-flow channel-form elements grading downslope into less confined-flow, lobe-form to sheet-form elements. The depositional systems are confined to slope-valley topography. Each system consists of three architectural elements: (1) upper slope, small-scale channel-form elements converging down slope into, (2) single channel-form and nested channel-form elements with linear to sinuous map patterns, grading further down slope into (3) intraslope-basin lens- to sheet-forms mapped as lobe-form or fan-form elements. Three types of channel-form elements are observed: (1) erosional, (2) erosional-depositional, and (3) depositional. The depositional channel-form elements have geometry strongly suggestive of channel-levee-overbank complexes, indicating that transport must include turbidity-flow processes. Within the fan-form sheets, lateral accretion of depositional elements suggests compensation sedimentation of amalgamated depositional events.

Fields representative of each of the depositional elements include:

- Upper slope channel-form within valley: Green Canyon 18
- Channel-form at valley mouth: Jolliet (Green Canyon 184)
- Levee-to-overbank: Tahoe (Viosca Knoll 783)
- Intraslope basin lobe to fan-form: Auger (Garden Banks 426-471) and Mars (Mississippi Canyon 807)

The distribution of sand within each of the Gulf of Mexico gravity-flow system elements is similar to those recognized in the Amazon Fan, Mississippi Fan, and Niger Delta deep-water depositional systems. This suggests that a generalized field-type template can be used for predicting relative reservoir geometry and connectivity. A brief comparison is made of the distribution of depositional systems of the Pleistocene Mississippi Fan systems is made to the Offshore Texas High Island-East Breaks Plio-Pleistocene gravity-flow system.