Geologic Controls on Austin Chalk Oil and Gas Production: Understanding a Dual Conventional-Continuous Accumulation

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ABSTRACT

The Upper Cretaceous Austin Chalk forms a low-permeability, onshore Gulf of Mexico reservoir that produces oil and gas from major fractures that are oriented parallel to the Lower Cretaceous shelf edge. Horizontal drilling links these fracture systems to create an interconnected network that drains the reservoir.

Field and well locations along the production trend are controlled by fracture networks. Heavily fractured chalk is present along both regional and local fault zones. Fractures are also genetically linked to movement of the underlying Jurassic Louann Salt, with tensile fractures forming downdip of salt-related structures, and creating the most effective reservoirs. Undiscovered accumulations should also be associated with structure-controlled fracture systems, as much of the Lower Cretaceous shelf edge remains unexplored.

The Upper Cretaceous Eagle Ford Shale is the primary source rock for Austin Chalk hydrocarbons. This transgressive marine shale varies in thickness and lithology across the study area, containing both oil- and gas-prone kerogen. The Eagle Ford began generating oil and gas in the early Miocene, and vertical migration through fractures was sufficient to charge the reservoir.

An assessment of the technically recoverable undiscovered resources of the Austin Chalk in the onshore portion and state waters of the Gulf of Mexico is currently being conducted by the U.S. Geological Survey within both conventional and continuous (unconventional) assessment units. Various considerations determine whether a region will be assessed using either the continuous or the conventional methodologies. Assessment units are defined on the basis of geology, trap, seal, migration, cumulative production, estimated ultimate recovery (EUR), and reservoir characteristics, as well as on whether the unit produces oil and gas from conventional or continuous reservoirs.

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