

Quantitative Reservoir Characterization of the Fluvio-Deltaic Dry Hollow Member of the Frontier Formation, Western Green River Basin, Wyoming

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ABSTRACT

The Frontier Formation in the Green River Basin of southwestern Wyoming consists of Late Cretaceous (Cenomanian-Turonian) marine and non-marine sandstones, siltstones, mudstones and coals deposited on the western margin of the Cretaceous Interior Seaway. Tight gas reservoirs exist in fluvio-deltaic sandstones in the upper Frontier Formation (Dry Hollow Member) on the north-south trending Moxa Arch within the basin. These strata outcrop in hogback ridges of the Utah-Idaho- Wyoming Thrust Belt approximately 25 miles west of the Moxa Arch. Detailed, quantitative outcrop descriptions were constructed using emerging photogrammetric techniques along with field observations and measured sections at five key outcrop localities along the thrust belt. Understanding the architectural style of this low net-to- gross fluvial system allows for improved reservoir prediction in this and other comparable basins. The architectural style of the Dry Hollow Member fluvial deposits varies vertically as the result of a relative shoreline transgression during Dry Hollow deposition. Grain size, reservoir thickness and connectivity of fluvial sandstones is generally greatest near the base of this member and decreases upward overall. While most of the sand in the system is not well-connected, amalgamated conglomerates and associated fine to coarse sandstones near the base of the section and much thinner, isolated sands near the top of the Dry Hollow occur in laterally extensive zones that can be identified over tens of miles. These significant lateral zones provide means to relate outcrop and subsurface stratigraphic architecture. Combined with available subsurface data, these techniques facilitate construction of fully-realized 3D static reservoir models for use as analogs in subsurface reservoir characterization.