

Characterization of an Unconventional Resource, Uteland Butte Member, Lower Green River Formation, Uinta Basin, Utah

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Abstract

Horizontal oil production in Utah's Uinta Basin has grown dramatically over the past decade with development activity primarily focused in the prolific Uteland Butte play. The Uteland Butte member (UB) is an informal member of the Eocene Green River Formation and is primarily comprised of organic shales, limestones, and dolostones deposited in Lake Uinta during a freshwater period immediately following the Paleocene/Eocene Thermal Maximum. Estimated Ultimate Recoveries from UB wells range from 50,000 to 1,500,000 barrels of oil. Previous outcrop and subsurface studies have observed discrete depositional belts and associated subplays within the UB based on the relative percentages of carbonate content and intragranular vs. organic-matter (OM)-hosted porosity. The dramatic variation in well EURs is partially attributable to the variation of multiple geologic factors associated with these depositionally-driven subplays including depositional facies, source rock quality, maturity, pore pressure, and fluid mobility. The Uteland Butte Organic subplay (UBO) is the northernmost of the productive subplays and is characterized by the presence of highly-overpressured, organic-rich lacustrine source rocks and secondary carbonate beds. This study presents the results of an integrated petrophysical, core, and geochemical analysis to characterize the UBO. Sedimentological and stratigraphic description of core confirmed the presence of prolific source rocks within the UBO along with significant carbonate and dolostone content. Subsequent laboratory analyses verified the presence of significant volumes of mobile hydrocarbon stored in OM-hosted porosity within mature Type-I kerogen. Wireline logs were calibrated to core analyses and utilized to evaluate depositional facies throughout the UBO and further delineate the extents of organic porosity within the UB. These findings were immediately utilized to refine lateral placement in existing development benches and were also paramount in the decision to test and develop additional resource within the Uinta Basin.

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