

Beyond the Uteland Butte Part I: If it's not Red, is it Even the Wasatch?

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Abstract

Horizontal wells targeting deep-lacustrine deposits have been a primary driver of oil production growth in Utah's Uinta Basin over the past 10 years, with Estimated Ultimate Recoveries (EURs) that rank among the most prolific shale oil basins in the United States. The most well-known development target is the Uteland Butte member (UB) of the Eocene Green River Formation. The UB represents a large-scale transgression of Lake Uinta and exhibits a remarkably similar gamma-ray character from outcrop to basin center, allowing it to be easily mapped over a large area. The UB lacustrine depositional phase is underlain by the Wasatch Formation, interchangeably called the Colton or Castle Peak by previous authors. In outcrop, the Wasatch classically presents as a succession of distinctly red channel sandstones and mudstones which commonly contain pedogenic features, indicating a fluvial-deltaic depositional environment with periodic surface exposure and occasional intervening lacustrine phases. Utilizing public and proprietary whole-rock core, this study documents the multitude of depositional environments that can be identified within Wasatch Formation in the deepest parts of the Uinta Basin. Within the span of 10 miles, the same chronostratigraphic interval of the Wasatch Formation includes; 1) black, organic-rich shales; 2) dark gray micritic limestones; 3) organic-lean gray shales with root structures and pedogenic surfaces; 3) fine-grained salt-and-pepper lithic gray sandstones; and 4) red-beds and medium-grain alluvial sandstones. This collection of lithologies indicates that deep lacustrine depositional systems and proximal alluvial systems existed contemporaneously in different parts of the basin during the time of Wasatch deposition. The depositional period of the Wasatch was clearly a dynamic time and requires detailed study for resource evaluation. This study presents the results of an integrated analysis of core and logs to determine subplays of the Wasatch Formation in the Uinta Basin.