

## **Key Performance Drivers of Oil Production from the Upper Castle Peak Member of the Green River Formation, Uinta Basin, Utah**

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### **Abstract**

Horizontal development programs in the Uinta Basin of Utah have witnessed an increase in the number of laterals targeting the Castle Peak member (CP) of the Green River Formation. Recent CP laterals routinely produce more than 150 thousand barrels of oil in the first year of production, with some CP laterals yielding stronger production results than any other well in their drilling spacing unit. To date, over 80 laterals have targeted the CP with over 30 being drilled in the last 3 years. Improved geologic interpretation, lateral targeting, and completion techniques have transformed the CP into one of the premier horizontal plays in the Uinta Basin. The Castle Peak member in stratigraphic order is comprised of four sub-members, including : 1) the Castle Peak limestone, a micritic limestone with occasional interbedded bivalve packstones; 2) the Castle Peak shale, a series of stacked sandy carbonates and silty shales that marks a regressive surface; 3) the Bar-F sandstone, a series of sand-dominated hyperpycnites that range from very-fine- to fine-grained sandstone interbedded with siltstones and shales ; and 4) the Long Point bed, a dense fossiliferous carbonate that represents a basin-wide flooding event and regional chronostratigraphic surface. The most prolific Castle Peak horizontal producers target the Bar-F sandstone and are located within the Central Basin subregion of the Uinta Basin. More recently, the Long Point bed, a sandy to silty limestone has been recognized as another highly productive horizontal target. The Castle Peak shale and Castle Peak limestone have also recently garnered attention as horizontal drilling targets, however, limited well counts and insufficient production data exist to determine the true productivity of these intervals. Detailed study of the two most common CP drilling targets, the Long Point bed and the Bar-F sandstone, was undertaken to identify key performance indicators for CP laterals. The combination of geologic mapping, horizontal targeting analysis, mud-gas mass spectrometry, cuttings X-Ray Fluorescence, whole oil geochemistry, and production results provide an unparalleled evaluation of the CP that includes the first rock chips from the ground to the last barrel in the tank. Results of this study suggest that the depositional environment of the Castle Peak sub-members are a first-order control on well productivity.