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Analyzing Core from Two Emerging Tight Oil Plays in Utah: The Uteland Butte Member of the Green River Formation in the Uinta Basin and the Cane Creek Shale within the Paradox Formation in the Paradox Basin

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Two emerging tight oil plays in Utah have gained significant traction in the past few years, renewing interest in two historically productive basins. The Utah Geological Survey is conducting a multi-year, U.S. Department of Energy-funded study of these two distinct tight oil plays, utilizing newly acquired core and associated data.

The lacustrine Uteland Butte Member of the Green River Formation records the first major transgression of Eocene Lake Uinta after the deposition of the alluvial Colton Formation in the Uinta Basin. The main horizontal drilling objective, as analyzed in several cores, is a 2- to 7-foot-thick interval of fractured dolomite, with porosities between 14 and 30%, interbedded with organic-rich limestone and shale. TOC values in the adjacent rocks range between 2 and 5%, while Ro values range between 0.7 and 1.1%, indicating the reservoir is most likely self-sourcing.

The Cane Creek shale is a transgressive-regressive marine sequence in the lower portion of the Pennsylvanian Paradox Formation, Paradox Basin. The Cane Creek is tens of feet to nearly 200 feet thick, over- and underlain by beds of salt, and divided into A, B, and C intervals (in descending order). The B interval is the primary hydrocarbon source rock and productive zone, consisting of black organic-rich shale, dolomite, dolomitic siltstone, very fine sandstone, and some anhydrite. Significant porosity (up to 15%) is found in the dolomitic siltstone and sandstone, but permeability is generally low (roughly 0.1 mD); naturally occurring fractures are necessary for economic production. The A and C intervals, mostly dolomite and anhydrite, are the seals for the B interval, helping prevent fracture communication with the adjacent salt beds.

A refined geological and reservoir characterization study of these two tight oil plays, using newly acquired core and geophysical logs, is currently underway to help delineate play boundaries, guide resource estimates, and inform recovery methods.