

LOWSTAND DELTAS OF THE BLAIR FM, ROCK SPRINGS UPLIFT, WYOMING

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ABSTRACT

The Campanian Blair Formation (Fm), which outcrops along the Rock Springs Uplift in WY and produces gas in nearby hydrocarbon fields, has been previously interpreted as an isolated shallow marine sandbody (ISMS), which commonly act as stratigraphic hydrocarbon traps in the WIS. Therefore, a detailed characterization of the Blair facies, facies stacking, and depositional model will improve reservoir models of the Blair. The Blair Fm. contains 14 facies combined into 6 facies associations based on facies stacking patterns, lateral distributions, and geometries. The Blair Fm. contains deposits including: Offshore (FA-1), Prodelta (FA-2), Fluvial-dominated delta front (FA-3), Tidally-influenced delta front (FA-4), Wave-influenced delta front or shore face (FA-5), and Subaqueous channels (FA-6). FA 2-5 represent coarsening and thickening upward distal to proximal delta-front successions with a variable degree of reworking (or lack thereof) by tidal(t) currents or waves(w) indicated by: sigmoids(t), single and double mud drapes(t), mud chips(t), and hummocky cross-stratification(w).

The Blair Fm comprises three parts: (1) a lower Blair comprising tide and fluvial dominated delta lobes, 2) a middle Blair containing predominantly mudstone, and 3) an upper Blair comprising wave dominated delta lobes or shorefaces. Shallow (<1m thick) channels and large (+5m) subaqueous, amalgamated channels that cut deep into the underlying tidal delta-front lobes are common. The lower Blair was likely associated with a highly rugose coastal shoreline that changed significantly along strike and is interpreted as a lowstand delta complex because of its distal, 'basinal' setting in the WIS. The middle Blair is finer grained to the southeast and sandier to the north. The northern, sandier middle Blair contains numerous highly deformed intervals of rippled, rhythmically interbedded sandstones and mudstone interpreted as slumps that occurred along a distal delta front. The middle Blair mudstones and deformed delta lobes are interpreted to be part of a transgression. The upper Blair includes upward-coarsening, storm-wave dominated deltas or shorefaces. These are interpreted as highstand deltas or shorefaces that formed along straighter coastlines. The three units of the Blair form a classic lowstand to highstand stratigraphic sequence. Understanding the evolution of the depositional systems of the Blair Fm. within a sequence stratigraphic context will aid the exploration of hydrocarbons and elucidate the applicability of the Blair Fm. as an analog for other ISMS reservoirs in the WIS.



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