

INTEGRATING SEDIMENTOLOGY, ICHNOLOGY, AND IMAGE-ENHANCED ARCHITECTURAL ANALYSES TO DEVELOP AN UNCONVENTIONAL RESERVOIR MODEL OF THE BLAIR FORMATION, ROCK SPRINGS UPLIFT, WYOMING

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ABSTRACT

The Blair Formation (Blair) is considered to be a regressive clastic shoreline-deltaic wedge and fine-grained isolated shallow marine sandstone (ISMS). ISMS are common along the Cretaceous Western Interior Seaway (CWIS). These sandbodies are pseudo-linear, elongate, and partially to completely encased in mudrock, and thus isolated from their coeval distributary systems. They commonly act as hydrocarbon traps. Available studies on ISMS provide conflicting depositional histories that are recurrently debated. The best documented of these sandbodies, the Shannon Sandstone, is notably a poor classic example because the Shannon contains facies and architectures that are not necessarily representative of the tidal deposits found in many CWIS clastic wedges. The excellent exposures of the Blair along the Rock Springs Uplift, Wyoming provide an ideal setting for a high-resolution base-to-top study of a complete sequence containing an ISMS. Also, syn-sedimentary deformation is abundant in the Blair and may be related to a combination of high sedimentation rate, sediment loading, and earthquakes. No sedimentologic, ichnologic, quantitative architectural-imagery analysis, and subsurface study of the Campanian Blair Formation has been undertaken. I propose a multi-proxy (outcrop and wireline data), high-resolution study of the Blair Formation that incorporates facies-architecture analyses into an unconventional, tight-gas reservoir model that will provide an analogue for other poorly exposed, fine-grained ISMS of the CWIS. I also propose a meta-analysis that combines Blair data with literature-derived data of other fine-grained ISMS into a multi-scale, hierarchical-spatial study to test the applicability of the Blair as an analogue for other fine-grained ISMS.

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