

## Shelf Tidal Ridges: The Sweet Sandstone reservoirs of the Cretaceous upper Almond Formation, Washakie Basin, Wyoming

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The Almond Formation contains the very last transgression of the Western Interior Seaway in South Wyoming, and caps the last and largest prograding clastic wedge of the seaway. A field study of the uppermost Almond formation in outcrops of the Rawlins and Rock Springs uplifts of Southern Wyoming provides new insight on the type of sand-bodies produced by the final transgression.

Almond Fm. sits atop and basinward of the fluvial Canyon Creek/Pine Ridge units and it is commonly divided in two members. The lower member contains the facies association (i.e. paralic coals, small distributary channels with some tidal influence, crevasse splays and flood plain shales) typical of coastal plain environments with some shallow marine intervals that show clear tidal influence. The upper Almond is formed mainly by repeated regressive strandplains (i.e. offshore mudstones, shoreface hummocky and rippled sandstones, and foreshore low angle sandstones). The sand bodies of the upper member, although part of the overall transgressive Almond Fm., are product of short time scale, thick progradational pulses, with thin veneers of transgressive deposits capping the strandplains.

The top-most sand-bodies of the Almond Fm. are very different from the regressive strandplains. These sandstones have sharp (erosive) base, no obvious coarsening upward trend, stacked planar and trough cross-strata with individual sets up to 1.5m in thickness, bi-directional cross-laminations and moderate bioturbation with open shelf ichofauna. Symmetrical (wave) ripples and hummocky or swaley bedding was not observed. These bodies have been previously loosely identified as sand bars or grouped up with the underlying shorfaces. However, based on the sedimentary facies and the stratigraphic position we interpret them as *transgressive shelf tidal ridges*.

The recognition of the 5-20 m thick and 200 m to 2 km long upper Almond sandbodies as tidal ridges and its proper architecture characterization is very important since some of them might represent a prime target for exploration and production of gas in the Washakie Basin, where the Upper Almond is targeted by more than 2300 active wells with a production exceeding 500 MMCFGD. These tidal ridges would be better reservoirs than the marine strandplain deposits immediately underneath because they are relatively cleaner due to the tidal rework and are encased in fine shelf deposits.

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