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Stratigraphic Controls on Reservoir Strata: A Comparison of Fluvial and Tidal Reservoirs in the Almond Formation, Wamsutter, Echo Springs and Rock Springs Fields, Washakie Basin, Wyoming

A high-resolution stratigraphic study of the Almond Formation (Late Cretaceous Mesaverde Group) was conducted in the Coal Gulch, Echo Springs, Wamsutter and Table Rock fields in the Washakie Basin, Wyoming. Thirteen small-scale (?7 m thick) progradational/aggradational units comprising coastal plain, shoreface and tidal strata are arranged in alternating landward- and seaward-stepping stacking patterns. Fluvial channel and tidal sandstones are coarser (lower and upper medium sand) than shoreface (upper fine) sandstones, and are the best reservoirs. Tidal strata occur as a transgressive facies above regressive shoreface and coastal plain strata only in the last (stratigraphically highest) of a series of landward-stepping progradational/aggradational units, that is, in the position of maximum accommodation: sediment supply (A/S) regime. The regular occurrence of tidal strata above shoreface and coastal plain strata in a high accommodation setting suggests they are a genetic couplet. The seaward depositional limit of tidal strata is approximately coincident with the seaward depositional limit of shoreface strata. The landward depositional limit of tidal strata is up to 18 km landward of the landward depositional limit of shoreface sandstones. The contact between tidal and underlying coastal plain or shoreface strata is sharp, but of very little or no relief; there is no obvious indication of scouring ('ravinement') during transgression. Fluvial reservoirs occur as isolated channelbelt sandstones encased within coastal plain siltstones, mudstones and coals. They are best developed in some seaward- and landward-stepping progradational/aggradational units that lack tidal sandstones, that is, in lower A/S regimes. Fluvial and tidal sandstone reservoirs are stratigraphically out-of-phase. Fluvial reservoirs develop during the early stages of an increasing accommodation setting, whereas tidal reservoirs develop in the later stages of a long-term increasing A/S regime. Using seismic attributes extracted from 3-D data volumes it is possible to image depositional trends and predict infill locations that will encounter these reservoirs.