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Characterization of Grain Size, Sorting, Heterogeneity and Facies Trends from Upper Cretaceous Shallow Marine Reservoirs: Relevance of the Stratigraphic Context in Reservoir Characterization

Reservoir characterization of Cretaceous Gallup Sandstone, Crevasse Canyon Formation strata in the Western San Juan basin, NM was achieved by taking into account a robust 3-D high-resolution genetic stratigraphic framework and the internal facies distribution. We used 1200 m of measured section, 1200 m of outcrop gamma ray and 85 core-plugs. We characterize facies from tidal dominated open bay and bay-margin/intertidal flat units stepping seaward and landward. This allowed to conducting a refined and systematic analysis of the variation of petrophysical features among these units and with respect to stratigraphic position. Tidal dominated open bay cross-bedded facies in the long term base level fall hemicycle (LTBLFH) are less coarse (%), more amalgamated, more sorted than similar facies in the long term base level rise hemicycle (LTBLRH). Proportion of tidal cross-bedded facies in the (LTBLFH) is higher than the same facies in the (LTBLRH). Proportion of bay-margin/intertidal flat cross-bedded facies in the (LTBLFH) is lower than the same facies on the (LTBLRH). Likewise, porosity and permeability can be characterized, if data is available. Facies diversity in the tidal facies tract is higher in the LTBLFH than in the LTBLRH. Facies diversity in the bay-margin/intertidal flat facies tract is lower in the LTBLFH than in the LTBLRH. Those changes are expressions of sediment volume partitioning and facies differentiation accompanying changes in accommodation and sediment supply (A/S). Using a stratigraphic framework, petrophysical changes can be better calibrated and quantified. So, they are more helpful to measure uncertainty of the different reservoir models generated.