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The Late Jurassic Alpine C Sandstone—A Bioturbated, Paralic Reservoir Deposited During a Slow Transgression: North Slope, Alaska

The 429 mmbo Alpine Field produces from the basal Alpine A, an upward-coarsening shoreface succession of very fine to fine-grained, well-sorted sandstone to muddy siltstone, and the overlying Alpine C, a well-sorted, fine-grained glauconitic sandstone. An unconformity separates the Alpine A and C sandstones. The reservoir sandstones exhibit an archetypal to Proximal Cruziana ichnofacies; however, distinct assemblages of traces delineate the A and C units. Most of the reserves occur in the Alpine C sandstone, although reservoir quality and thickness vary field wide. The reservoir and trap originated through marine and terrestrial erosion, in situ sediment winnowing, aggradational filling of antecedent topography, and burial by marine shale. During the Late Jurassic, a low-gradient coastal plain with an east-west oriented coastline (Alpine A) prograded from north-to-south on Alaska's North Slope. A relative sea level fall accelerated coastal plain erosion and established a lowstand shoreline basinward. Seismic mapping and wireline-log correlations reveal irregular topography created on the coastal-plain by fluvial and tidal erosion (relief exceeds 100 ft; 33 m). A Glossifungites ichnofacies demarcates this marine and terrestrially modified unconformity. Marine processes reworked Alpine A sediments during a slowly rising sea level to form a retrogradational barrier-island coast. Well-sorted, fine-grained, sandstones were deposited in tidal-inlet/spit, flood tidal delta, and bay margin environments. Transgressive sediments onlapped this unconformity and aggradationally filled the Alpine A topography to form the Alpine C reservoir. Complete transgression is recorded by a transgressive-surface of erosion that truncates the Alpine C sandstone. A fissle marine shale seals the reservoir.