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Facies Architecture, Branching Pattern, and Paleodischarge of Lower Delta-Plain Distributary Channel System in the Cretaceous Ferron Notom Delta, Southern Utah, U.S.A.

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Distributary channel systems are an important component of deltaic systems, but details of their branching pattern, internal variability, complexity, and relationship with adjacent levee, bay, and crevasse splays, are rather poorly documented in ancient examples. A gooseneck-shaped canyon in southern Utah, U.S.A. provides 3-D outcrop exposures of a lower delta-plain distributary channel system of the Late Turonian Ferron Notom delta. Thirty two measured sections and 9 cross sections allow direct mapping and documentation of the branching pattern of a distributary system. A main channel belt of about 250 m wide narrows to about 200 m downstream of the branching point. The subordinate channel belt is about 80 m wide. Water discharge from the main channel belt, upstream of the branching point, is estimated to be 85-170 m³/s. Compared to paleohydraulic estimates of trunk rivers mapped in previous studies, the branching documented in this study is probably a 4th order split. The distributary channels are characterised by a U-shaped geometry in oblique and strike-oriented cross sections. They are filled with medium-grained, cross-bedded sandstone, metre-scale inclined beds, ripple-cross-laminated sandstone, and muddy abandoned channel deposits with local tide- and wave-influenced deposits. Detailed bedding diagrams indicate a meandering channel pattern with local braided threads within the main channel belt. Distributary channels erode into adjacent levee and underlying heterolithic bayfill deposits. The subordinate channel belt fed a crevasse splay, which is characterised by a coarsening upward facies succession consisting of interbedded wave-rippled, current-rippled and planar-bedded very fine-grained sandstone and thin mudstones. ■

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