

Atkinson and others, 1990

Data Set 3

Reference: Atkinson, C.D., J.H. McGowen, S. Bloch, L.L. Lundell, and P. N. Trumbly, 1990, Braidplain and deltaic reservoir, Prudhoe Bay Field, Alaska: in Sandstone Petroleum Reservoirs, J.H. Barwis, J.G. McPherson, and J.R.J. Studlick, eds, Springer-Verlag, p. 205-224.

Author's affiliation: ARCO Oil & Gas Co.

Age: Permian-Triassic

Formation: Ivishak Formation, Sadlerochit Group

Location: Prudhoe Bay, Alaska, United States

Wells: single well in eastern portion of field.

Depth range: approximately 8500-9000 feet.

Depositional environment: "...the Ivishak sandstone was deposited in a fluviodeltaic complex which prograded southward into a marine basin. ... Stratigraphically, the Ivishak comprises two main depositional megacycles: (1) a lower, upward-coarsening fluvial progradation (overall regressive) sequence involving a vertical transition from predominantly interbedded sandstone and marine shale to amalgamated sandstone and conglomerate, and (2) an upper, finer-grained interval of fluvial sandstone and shale which is interpreted to represent a period of fluvial retreat (overall transgressive). ... The Ivishak sandstone accumulated in depositional environments ranging from delta front to braided stream."

Lithology: "Monocrystalline quartz and chert are the most abundant detrital components in the Ivishak clastic rocks. The Ivishak sandstones are litharenites and sublitharenites (terminology of Folk et al., 1970). The quartz-chert ratio is a function of grain size and increases with increasing distance from the sediment source area. Two types of chert are present: (1) nonporous ("dense") chert and (2) microporous chert. Other detrital components, typically present in minor amounts, consist of polycrystalline quartz, sedimentary (other than chert) and metasedimentary rock fragments, and trace amounts of feldspar. Detrital clay matrix is a minor constituent except in very fine-grained sandstones, siltstones, and mudstones. The advanced stage of mineralogical maturity suggests that Ivishak rocks originated as a recycled sediment accumulation."

Alteration: "Diagenetic effects were gradually superimposed on the component facies of the fluviodeltaic system. Porosity-reducing diagenesis most commonly consists of partial cementation by quartz, siderite, kaolinite, pyrite, and ferroan carbonate, and compaction (including formation of stylolites and pseudomatrix). ... Pore types include primary intergranular macropores, relatively sparse secondary intragranular macropores, and micropores. Secondary macroporosity is the result of partial to complete dissolution of siderite cement and sedimentary rock fragments. Micropores, an important form of microscopic heterogeneity in the reservoir, occur in partially leached chert fragments and in kaolinite cement."

Production: oil

Core measurement conditions: not stated; assumed to be conventional core analysis.

Data entry: manual entry from Figure 1-16A and B of the referenced paper. Graphs do not display any data less than 10 millidarcy.