AI Tool to Obtain Petrophysical and Geological Analog Data on Percussion Side Wall Cores in Low Resistivity Sands, from the Olmos Sandstone, Frio County, Texas

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Abstract

Often times, limited rock material is available to conduct petrophysical tests to characterize prospects. In the realm of percussion side wall cores, portions of the samples are damaged by the explosive nature while obtaining the sample. This damage complicates traditional right cylinder conventional tests such as electrical properties and routine properties. Artificial Intelligence, paired with a database of lab-measured core data and highresolution thin section images, creates a probability-based method to provide analog core-derived data. Submission of thin section images from poorly archived cores, core chunks, plug trims, rotary sidewall cores, percussion sidewall cores, and even cuttings can provide analog data early in the decision-making process, while waiting on additional lab-measured data to characterize reservoirs. In this case study, percussion side wall cores were obtained in low resistivity sands in the Olmos Sandstone, Frio County, Texas. Core quality was sufficient for porosity, permeability, and saturations but not suitable for measurements of special core analyses. Image-matched analog data allowed for mineralogical composition to be obtained in lieu of traditional XRD minerology. Furthermore, this analog data was used to obtain electrical properties “m” and “n” when special core analysis was not feasible. These additional petrophysical properties allowed for the refinement of the petrophysical log interpretation to accurately characterize pay zones in this low resistivity sand reservoir.