Porosity Partitioning for Permeability and Texture Analysis in Thamama and Shuaiba Formations

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Data from eight wells in four Abu-Dhabi on-shore fields were gathered and interpreted.

The objective was to evaluate a new methodology for porosity and permeability analysis in Carbonates with Inter-granular and Macro porosity. This methodology uses NMR log data, and electrical image data when available, to partition porosity into micro, meso and macro components - and then uses that partition to reconstruct the permeability and do a facies analysis.

The results of the interpretation were validated against core plug permeability and a traditional Reservoir Rock Type classification.

The main conclusions are: ·The methodology and its underlying model of pore-to-pore connectivity is widely applicable to Carbonate formations such as the Thamama and Shuaiba reservoirs. ·The methodology can be applied without whole core. We established optimum formation specific parameter values which give reasonable results when compared with results obtained by using parameters that best fit core data on a well-by-well basis. The interpretation results are therefore reasonably analyst-independent. ·Spot measurements of permeability or mobility, from formation test data or sidewall coring, are strongly encouraged to validate the results. ·When available, electrical image data help identifying and quantifying the Macro porous zones. ·NMR logs respond to both the pore size and to oil properties. In one well the oil signal dominated and it was not possible to compute an accurate permeability. ·The log derived facies correlate with the broad features of the traditional Reservoir Rock Type definition. This is encouraging, even though more work is needed there.