Contribution ID: **505** Type: **Poster + 3 Minute Pitch**

The characterization of multimodal structure and pores in conglomerate reservoir

Thursday, 17 May 2018 12:11 (2 minutes)

Multimodal conglomerate rocks have complicated structure depending on the packing state and the relative proportions of sand and pebble-sized grains in the rock. The relation between porosity and permeability, and porosity and water saturation, in multimodal conglomerate rocks quite different from those common in clastic reservoirs having unimodal grain-size distributions. The characterization of multimodal structure in conglomerate reservoir is important to the enhanced oil recovery (EOR).
The primary goal of this study is to qualitative and quantitative characterization of the shape, size, combination and proportions of different sized grains in the conglomerate rocks. Furthermore, the size, shape and connectivity of different pores caused by the multimodal structure are analyzed. The methods used by this study combined with conventional and unconventional techniques: The grain size analysis is used to separate different sized grains quantitatively; The shape and size of different grains/pores can be determined by thin sections and scanning electron microscope (SEM) analysis; The pores and throats can be measured quantitatively by rate-controlled mercury intrusion porosimetry (RCP); Micro-CT can detect the shape and connectivity of pores and throats; Nuclear magnetic resonance (NMR) is used to evaluate the flow capacity of oil in the multimodal pores and throats.
This study shows that the conglomerate rocks have at least three-level grains: pebble-size grains, sandy sized grains and muddy sized grains. Their relative proportions can be different, thus the pores and throats can be different: high permeability zones are formed when different pebble-size grains contacted, those zones usually have the shape of flats; middle pores with radius from 53μm to 559μm (average radius is 214μm), they are formed when pebble-sized grains contacted with sandy sized grains or sandy sized grains contacted with each other; the small pores with radius less than 50μm, they formed when muddy sized grains contacted with sandy sized grains. What's more, the pores and throats have complex connection relationships, all of those determined the flow in the pore and throat systems. NMR shows that the fluid in the high permeability zones flow first, then the fluid in the middle pores can flow, finally the oil mainly resides in the small pores.

References

Acceptance of Terms and Conditions

Click here to agree

Primary authors: Dr QIN, guosheng; Mr HU, wenrui

Presenter: Dr QIN, guosheng

Session Classification: Parallel 10-D

Track Classification: MS 3.08: From microns to meters: Heterogeneity across laboratory scales