Geophysical Research Abstracts
Vol. 18, EGU2016-17851, 2016
EGU General Assembly 2016

Reservoir evaluation of thin-bedded turbidites and hydrocarbon pore thickness estimation for an accurate quantification of resource

Bayonle Omoniyi and Dorrik Stow
Institute of Petroleum Engineering, Heriot-Watt University, Edinburgh, Scotland (bayonle.omoniyi@pet.hw.ac.uk)

One of the major challenges in the assessment of and production from turbidite reservoirs is to take full account of thin and medium-bedded turbidites (<10cm and <30cm respectively). Although such thinner, low-pay sands may comprise a significant proportion of the reservoir succession, they can go unnoticed by conventional analysis and so negatively impact on reserve estimation, particularly in fields producing from prolific thick-bedded turbidite reservoirs. Field development plans often take little note of such thin beds, which are therefore bypassed by mainstream production. In fact, the trapped and bypassed fluids can be vital where maximising field value and optimising production are key business drivers.

We have studied in detail, a succession of thin-bedded turbidites associated with thicker-bedded reservoir facies in the North Brae Field, UKCS, using a combination of conventional logs and cores to assess the significance of thin-bedded turbidites in computing hydrocarbon pore thickness (HPT). This quantity, being an indirect measure of thickness, is critical for an accurate estimation of original-oil-in-place (OOIP).

By using a combination of conventional and unconventional logging analysis techniques, we obtain three different results for the reservoir intervals studied. These results include estimated net sand thickness, average sand thickness, and their distribution trend within a 3D structural grid. The net sand thickness varies from 205 to 380 ft, and HPT ranges from 21.53 to 39.90 ft. We observe that an integrated approach (neutron-density cross plots conditioned to cores) to HPT quantification reduces the associated uncertainties significantly, resulting in estimation of 96% of actual HPT. Further work will focus on assessing the 3D dynamic connectivity of the low-pay sands with the surrounding thick-bedded turbidite facies.