Tar and Heavy Oil Description using Logs, Cores & Fluid Samples

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Tar and heavy oil deposits are often found in association with the more conventional light oil accumulations in many Middle East carbonate reservoirs. Proper characterization of these deposits in these cases is critical not only for accurate formation evaluation, but also for the optimal placement of injection and pressure maintenance wells.

The first step in characterization involves detection. Clues are found in a number of wireline measurements; such as resistivity, caliper and NMR logs; and formation tester data. However, the response to tar is not unique and the best approach given the non-uniqueness is the integration of all available data; including open hole and mud logs; formation tester, core, samples and geochemical data.

The transition from light oil to tar is not always sharp: the change may be gradational, or the *gross* tar interval may contain sweet spots - localized zones of light oil. Exact knowledge of the spatial distribution then becomes essential, because formation evaluation properties - such as Archie's electrical parameters m and n - deviate from the well established values in the presence of tar. These complications, as well as others are discussed, and why characterization can be quite complex.

Various methods utilized in the characterization of tar, and evaluation of their effectiveness using real-life case histories from Middle East carbonate reservoirs is presented. Characterization from old legacy data, as well as in real-time for well placement, are given special attention. Examples illustrate that the overall process is challenging and requires a true multi-disciplinary approach.