

Identification of Low Resistivity Hydrocarbon Bearing Reservoirs in Lower & Middle Indus Basin Using Available Wireline Logs.

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Low resistivity pays (LRP) are recognized as a worldwide phenomenon occurring in basins from the North Sea to West Africa. There are examples in Lower and Middle Indus in Pakistan where similar behavior of sands has been recognized. This paper identifies these sands and examine its causes. Effective techniques using successful conventional and advanced technologies will be discussed.

LRP might be a result of high irreducible water volume (both capillary bound and clay bound water) due to fine grain size, conductive minerals (complex mineralogy) or thin shale-sand laminations (beyond Gamma Ray resolution). The primary cause of LRP is also the inherent conductive nature of clays. Clay contributes to low resistivity response, which depend on its type, volume and distribution. This phenomenon leads to an increase in the surface area that leads to more irreducible water. These effects can be investigated by detail core analysis. However, decision to complete or abandon a well is usually made on the basis of conventional open hole logs.

This paper will explain why the bound water quantification is so important and how to identify fluid types in LRP. Two examples from Lower/Middle Indus basin will be discussed, where conventional open hole logs were at their limits to distinguish oil, gas and water in sandstone reservoirs due to low resistivity.