

## **An Innovative Log Overlay Technique Based on Reverse Modeling Provides Insight Into Non Archie Reservoirs of Ankleshwar Field in Cambay Basin, India.**

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Identification of potential hydrocarbon bearing zone in non Archie reservoirs i.e. silty/ shaly reservoirs always poses problem because of log characteristics which usually does not show any meaningful results on conventional log evaluation. For this reason most of the silty/ shaly layers usually been left out or interpreted as non reservoir.

In Ankleshwar field of Gujarat, India some of the similar silty/ shaly zones within Hazad and Ardol members have been tested and found to be oil producer. So the main objective of the study was to search for other prospective zones within the non Archie reservoirs, mainly by integrating the log signatures along with the testing results and other geological information using reverse modeling.

Since conventional log processing/ evaluation techniques are not much useful in this type of reservoirs, so it was quite challenging to identify the prospective zones only by studying the log responses, testing results and other geological information. For this purpose, different log overlays mainly SP–Resistivity, Resistivity–GR and Density–GR have been used. Out of these combination first two overlays along with other log information was useful for identification of good facies, whereas the innovative overlay of *Density Vs GR (in reverse scale)* found to be a good identifier for prospective zones as it shows *cross-over* against the porous and permeable zones. This overlay technique has also been validated in other clean reservoirs developed in Hazad and Ardol members of Ankleshwar field.

Non Archie reservoirs of more than fifty wells of Ankleshwar field have been studied, which reveals that SP, GR and Density logs, supported by caliper data plays a vital role in identifying the porous & permeable layers within the silty/ shaly zones. More than 30 porous & permeable layers have been identified in 21 wells by the above technique, which appears to be promising from hydrocarbon point of view and recommended for testing.