

Formation evaluation of the Jurassic Stø and Nordmela formations in well 7220/8-1, Barents Sea, Norway

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Challenge: Performing formation evaluation in formations such as Stø and Nordmela meet the challenge of quantify the electrical effect on logging tools caused by the bound formation water in clay minerals. The electrical properties will otherwise cause a too low hydrocarbon saturation since it is based on the bulk rock. The desired outcome is a water saturation based on the properties in the reservoir rock only.

Method: The Archie equation for determining water saturation is compared to an equation based on sand resistivity. The data for sand resistivity is derived from the triaxial induction logging tool. The outcome is a formation resistivity detecting sand intervals in alternating shale and sand sequences by comparing vertical and horizontal resistivity.

Results: Using the sand resistivity as opposed to formation resistivity gives a lower water saturation and thus higher hydrocarbon saturation in alternating sand and shale sequences.

Conclusions: Exploration and production costs for the petroleum companies increase as hydrocarbons are found in geologically more complex areas. In order not to abandon an explored reservoir the revenues has to exceed the costs. A critical step in achieving this is to determine the correct hydrocarbon saturation. The impact from clay minerals on the bulk formation resistivity are here shown having the potential effect of project closure and resulting monetary loss for the petroleum companies.

