

An Innovative Approach to Select Core Point in Challenging Environment Using the GWD™ (Gas While Drilling) Methodology

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Abstract

Core point selection plays a vital role to ensure that cores are cut in the best part of the reservoir to fulfill the objectives determined during well planning and to obtain direct information about the properties of the target formation. Different conventional methodologies, including the evaluation of drilling parameters, real time cutting analysis after bottom up circulation and correlation of LWD logs with reference wells, are commonly applied to properly select the coring point. Depending on different geological or operative environment, these approaches reflect some criticalities as rig time, offset of LWD tools from bit, absence of LWD markers etc. In this paper an innovative approach based on the analysis of the mud gas shows using the GWD™ methodology is described. This methodology, recently developed in the framework of a common R&D project between Eni and Total, consists of the computation of several ratios obtained using the different gas components of the hydrocarbon mixture (C1 to C5) continuously extracted from the drilling mud and monitored at the rig site by the mud logging company. A successful case history of this approach coming from a well recently drilled in the Bhit field is presented. In this case, the absence of drilling parameter changes and specific GR marker within the thick shale sequence above the reservoir does not allow a proper identification of the coring point. Mud gas data from two reference wells were analyzed using the GWD™ methodology and distinctive gas ratio trends in the interval between the shale sequence and the reservoir (coring target) were established, both qualitatively and quantitatively. After the application of dedicated QC criteria, the same trends were recognized in real time in the new well and the coring point was successfully selected ahead of reaching the coring target. Further confidence of quantitative aspects of this methodology help refine the coring point selection, thus significantly saving rig time and costs.