

Integrated Drilling and Logging Program Approach in HPHT Environment: Successful Drilling of Deepwater Oberan Field, Nigeria, ENI's Deepest Well in West Africa

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In this paper we present the approach, design and execution of the integrated drilling and logging program, of the deepest well so far drilled by ENI in West Africa in deepwater and HPHT environment. Oberan 2 (Total Depth at 4,479mMD) confirmed to be a high Pressure (10,800psia) - High Temperature (157° C) deepwater well both from drilling parameters and logs.

Oberan 2 is an exploration/appraisal well located about 80km from the coastline in 674m water depth, in the southeastern corner of ENI Nigerian Agip Exploration Ltd. (NAE) operated OML 134. Well objectives were to test and characterize the deep section of a faulted anticline structure in the equivalent Bonga clastic Miocene sequence in HPHT environment. Each section of the well needed to be drilled to the maximum depth possible in abnormal pressure regimes while maintaining verticality, mud circulation and controlling drilling induced shocks and vibrations.

A significant contribution is provided by using automated vertical rotary steerable system, real-time pore pressure management using LWD resistivity and sonic data, continuous circulating device and subsequent wireline logging suite in fast and successful delivery of Oberan-2. High quality real-time MWD/LWD data along with the use of vertical rotary steerable system and continuous circulating device ensure effective pore pressure and shock management. Each section was drilled to maximum depth allowing real-time decisions in setting casing points which coupled with wireline petrophysical suite and fluids sampling resulted in significant savings in time and cost to NAE.

An intelligent and fit-for-purpose approach is essential in designing and executing drilling and logging programs for deep, cost effective wells in challenging Nigeria offshore. Sands and shale lithologies coupled with abnormal pressure regimes in HPHT and deepwater environment pose significant risk for successful drilling and completions of wells.