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Intelligent Well Completions in Agbami: A Review of the Value Added and Execution Performance

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Abstract

Application of Intelligent Well Completion (IWC) technology has continued to grow within the industry even in the face of perceived risks associated with installation and longevity of the system. In Agbami, where 80% of the development wells are planned with IWC installations, understanding these risks played a key role in justifying intelligent completions. This paper will present the methodology used to quantify the realizable value from zonal control and data acquisition, and review the execution performance for the initial IWC wells.

The Agbami field is Chevron's first operated deepwater asset in offshore Nigeria. It is located 70 miles offshore of the Niger Delta in ~5000 feet of water. The subsurface is characterized by a double-plunging anticline structure with a thrust fault along the main axis and multiple flank normal faults dividing the three major reservoirs into five or six main producing areas. Each major reservoir is vertically subdivided into 3 or more sub-reservoirs. The field is being developed with 38 wells, consisting of 20 producers, 12 water injectors and 6 gas injectors spread over 3 development drilling stages. Pressure maintenance will be via peripheral Water Injection and produced Gas Re-injection. The production facilities include full Subsea infrastructures (trees, manifolds & flowlines) producing to a Floating Production, Storage, and Offloading vessel (FPSO).

The Agbami wells are typically completed in multiple zones of the same reservoir. The completed zones are geologically in pressure equilibrium, but vertical and lateral/cross-fault connectivity under dynamic conditions is still very uncertain. Given this uncertainty, the water and gas flood-fronts are likely to advance at different rates through the reservoir. To optimize field performance and recovery, Intelligent Completions with downhole control valves are being installed in Agbami wells. The system will provide zonal information and control of production and injection into the completed sub-reservoir zones.