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## **Multilateral Wells to Improve Production Performance in Heavy-Oil Reservoirs: The Challenges of the ZAM-408ML Well**

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### **Abstract**

The Zatchi field, located in the Lower Congo Basin offshore, is a multi-layer reservoir of Cenomanian/Albian age operated by Eni Congo in partnership with Total Congo.

The “Zatchi B” reservoir is 30 m thick sand characterized by a large accumulation of heavy and highly viscous oil (15° API, 1000 cP) trapped in the marine-transgressive sands of the “Gres de Tchala” formation. Three aspects make the successful development of such reservoir an extreme challenge: the presence of both bottom water and a gas cap, the very low reservoir pressure, the very high viscosity of the oil. As a matter of fact, over the 27-year life of the field, only three wells were put in production from the “B” layer, with not satisfying results due to the heaviness and viscosity of the oil and the severe problem of gas coning and cresting.

The multilateral technology generally allows increasing the reservoir exposure with fewer wellbores, reducing and spreading the drawdown along the drains reducing the potential for coning. This technology has been proven effective in several heavy oil deposits recovery worldwide. For this reason, in order to improve the reservoir drainage reducing times and costs, the layer B was selected as the optimal candidate for the first multilateral well in the Congo basin: well ZAM 408 ML.

This paper will review the Zatchi B reservoir history and development challenges with a focus on the multilateral well reservoir modeling, the TAML6 completion and artificial lift design. Furthermore, the challenges encountered during the operations in terms of reservoir properties sampling, operations geology, drilling, completions and production will be described in detail.

### **Introduction**

Heavy oil has become an important theme in hydrocarbon industry with an increasing number of operators getting involved or expanding their plans in this market around the world.

A huge number of “non conventional” oil reservoirs have been discovered worldwide, but only a small percentage of them is producing or is under active development.

Heavy oil represents a massive world resource, but the great challenge is to find the best way to produce, transport and process it.

Eni Congo is taking part to this challenge, concentrating the efforts on the heavy oil of the Zatchi B reservoir.

The Zatchi field is located in the Congo offshore basin, with water depth ranging from 55 to 57 meters and an areal extension of about 34 km<sup>2</sup> (fig.1)

The field is characterized by multiple stacked reservoirs (from A down to E) belonging to the “Gres de Tchala” and “Carbonates de Sendji” formations (Cenomanian/Albian age).

Like many other commercial reservoirs in offshore Congo, the Zatchi field is characterized by sandy and dolomitic rocks deposited during the early drift phase in the mid-Cretaceous, with structural-stratigraphic traps created by movement of the transition-phase Aptian salts (fig. 2 and 3).

The Zatchi field was discovered in 1980 with the first exploratory well ZAM-1, which found oil accumulations in the Cenomanian/Albian section.