
Petrophysical Characterization of Offshore Golden Lane Carbonate Rocks

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ABSTRACT

The main problem in the study of carbonate rocks from the Golden Lane area in the offshore section is the characterization of porosity types (inter-granular, intra-granular, moldic, vugular, fracture porosity, etc.). This results in major uncertainties in permeability, effective porosity and water saturation calculations which in turn have a significant impact on reserve calculations.

The main objective of the present work was to do the petrophysical characterization of the middle Cretaceous rocks by applying the methodology of NExT to yield rock types and flow units. The well data from Ba-1 was used in the application of this methodology. Ba-1 is an oil-producing well in the El Abra Formation from the middle Cretaceous at 2600 meters and is located off the coast of Veracruz, in the offshore Golden Lane Atoll in the Tampico-Misantla Basin.

The methodology is divided into three stages: geological framework, rock types and fluids, and formation evaluation along with flow unit analysis. The study of basic petrophysics and coherent plug analysis data resulted in four rock types from the interval of interest. Formation evaluation was then performed calibrating well logs to core data. This allowed for the analysis of flow units. For an initial exploitation stage, 23 flow units have been determined. These can be redefined into 4 flow units for a future simulation.

Based on this analysis, Rock Types 2 and 3 are the most abundant types contributing significantly to production. From the 23 flow units that have been determined, 12 have flow capacity and 11 are possible flow barriers. In addition, the secondary porosity present in the reservoir controls hydrocarbon storage capacity; however, it is isolated. This means that, in most cases, fracturing and micro-fracturing are needed to enhance production.