



Do You Understand Your Petroleum Reservoir Well Enough for a Sustainable Production?

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Petroleum systems include a series of elements and processes that lead to the formation of oil and gas accumulations. A given petroleum composition and its distribution in the basin are the result of a combination of multiple processes within the system. In order to exploit oil and gas reserves efficiently, a sensitive understanding of the corresponding petroleum systems is crucial. From the source to the wellhead, petroleum geochemistry provides essential tools to help with the better understanding of the processes that affects oil quality distribution and flow units in the reservoir. This allows to assess issues such as the existence and distribution of highly viscous or immobile oil zones (tar mats), asphaltene precipitation, compartmentalized reservoirs and in general to support the design of a development plan that fits your reservoir and leads to a sustainable production of the resources. Using integrated approaches with multiple disciplines is a key factor!

Typically, only parameters based on ratios of biomarkers and some non-biomarker compounds are used in the oil and gas industry with oil-source rock correlation purposes and to assess levels of maturity of source rocks, and the effect of other post accumulation processes. However, the information obtained from ratios is very limited, particularly when it comes to their application to oil fields development. The absolute concentrations of the multiple components of the oil give the information required to determine, for example, levels of biodegradation and the existence of oil quality gradients associated with this alteration process, mixing of different oil charges and contributions from different sources, migration distances, development of steam chambers during thermal recovery of heavy oil, water breakthrough during secondary production or flooding procedures, proximity to oil-water contacts,

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production allocation, reservoir compartmentalization and assessment of seal integrity, among other benefits. Hence, a detailed baseline molecular characterization of the hydrocarbon and polar fractions of the oil before starting the production operations is strategic and will definitely save money. Other geochemical techniques, such as for instance stable isotopic composition, elemental analysis and metal content, and the direct determination or estimation of oil physical properties also provide key information.

We at Gushor have developed analytical methods that assure high accuracy in the determination of absolute concentration of multiple oil components and measured oil physical properties from conventional to extra-heavy oil. Moreover, our solid expertise on the several issues related with petroleum exploration and production, as well as our experience with a diversity of petroleum systems, allows us to provide our clients with not only top quality data and excellent turnaround times, but also a complete interpretation to help with the decision making process. With this purpose, we consider that the sampling strategy is instrumental. The determination of the composition of a single petroleum or source rock sample will not make it. An evaluation of the spatial relationships between samples is a must to allow the determination of the main processes involved and to predict the distribution of oil quality on a local or basin scale based on geochemical and fluid information integrated with geology and reservoir engineer data.

If you wish for more information on this topic or any other topic found on Gushor's website, please contact us at info@gushor.com.

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