

# **CHARACTERIZING SECONDARY POROSITY IN A NATURALLY FRACTURED REEFAL RESERVOIR: CASE STUDY FROM THE GULF OF SUEZ**

**Jawaid Saeedi, Hani Elshahawi, and Indrajit, Bandyopadhyay, I.**  
*Schlumberger Oilfield Services*

Quantifying porosity in a naturally fractured reefal reservoir is a compound problem. The mineral composition is often quite variable, and the porosity is almost never simply intergranular as diagenetic processes in reefal carbonates have a profound porosity-altering effect.

The Nullipore is a naturally fractured reefal reservoir located in Egypt's Gulf of Suez area. Like most naturally fractured reservoirs, the Nullipore has complex secondary-porosity systems with widely varying percentages of primary and non-primary porosity, with the latter type containing variable proportions of vugs, molds, and fractures. Petrophysical evaluation of this reservoir has been further complicated by non-homogeneity and by the limited vertical and circumferential resolution of conventional tools. This, in addition to the high oil viscosity, has made it difficult to locate and hence drain oil effectively, and the Nullipore was traditionally considered a backup prospect.

This paper describes the methods used to locate the natural fractures and dual-porosity systems that are responsible for most of the Nullipore oil production. These methods have led to an improved understanding of the impact of secondary porosity on the reservoir's productivity. New horizontal wells were drilled and completed on the basis of the newly acquired information and older wells were recompleted using the data acquired from these horizontal wells, leading to large increases in production.