

Applied Rock Mechanics in the Ram Powell Redevelopment Project, Deepwater U.S.A., Gulf of Mexico

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This paper describes the method used in the Ram Powell Redevelopment Project for defining a stable pressure window to maximize the efficiency of the drilling process. The method combines formation evaluation, log and laboratory derived rock properties, well site pressure integrity testing, geophysical data, and actual minifrac results. As a result of using this synergistic approach, the subject extended reach wells were drilled with no wellbore-related down time.

The process begins with a definition of the pore pressure cells, both in magnitude and position, generally delineated by studying the seismic profile along the projected wellbore and analyzing log and pressure testing data. The pore pressure data and rock properties are used to model the minimum wellbore pressure for stable drilling. A study of the changing seafloor profile along the well path is used to adjust the overburden pressure, which is then combined with rock properties to estimate the in-situ stresses, resulting in an estimate of the fracture gradient, or the maximum allowable wellbore pressure to avoid drilling fluid losses.

The approach is applied to two extended reach wells and the paper documents the entire process from planning to drilling and completion.