

The Greater Mars Basin – Deep, Subsalt Exploration Success in a Mature Basin

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Since the 1989 discovery of Mars Field, the Greater Mars Basin has developed into one of the premier hydrocarbon basins in the Deepwater Gulf of Mexico. Over the past 15 years, the basin has experienced significant exploration and development activity, resulting in current production of some 400 mboe/d from two TLP hubs (Mars, Ursa) and three subsea satellites (Crosby, Europa, King). In addition, the Princess subsea project is currently under development, with expected first subsea oil in early 2004.

Despite the maturity of the basin, recent exploration efforts have delivered significant discoveries and a high density of hub-class exploration opportunities. This latest exploration activity has been focused on progressively deeper subsalt prospects below and adjacent to existing fields. Continued exploration success is enabled by new technology applications, progressive learning through staged drilling results, significant geological and geophysical interpretive studies, and close coordination among exploration, development, and production teams. This paper describes the exploration approaches used, including the following:

- Use of high-quality regional 3D seismic PSDM
 - Progressive improvement in subsalt seismic imaging techniques, including advanced migration approaches, improved velocity modeling, refined salt body modeling, and noise and multiple reduction
 - Detailed regional and local geologic studies of petroleum systems, high-resolution genetic stratigraphy, quantitative biostratigraphy, spatial variations in porosity, and geochemistry
 - Fully integrated 3D earth models for subsalt 3D vertical-effective stress and pore pressure predictions
 - Drilling performance improvements in difficult drilling environments (deep, subsalt, narrow pore pressure/frac gradient margin)
 - Continuous play calibration as new wells are drilled progressively deeper into untested sections
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