Hunting for Elephants: Exploration and Appraisal Learnings from the Western Atwater Foldbelt of the Ultra Deep Water Gulf of Mexico

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Abstract

Recent major discoveries at Mad Dog, Atlantis, and Neptune have opened a major new hydrocarbon province in the Western Atwater Foldbelt (WAFB) of the ultra deep water Gulf of Mexico. A total of nine exploration wells and six appraisal wells have been drilled to date leading to an understanding of the nature and scale of the petroleum system as well as increasing our confidence in the presence of the large reserve sizes needed to support development in the ultra deep water.

The two main predrill risks in the WAFB were the presence of reservoir quality sandstone and hydrocarbon maturation and migration into the reservoirs. The nearest well that penetrated middle and lower Miocene age section was 90 miles away. The first test was the Neptune discovery well drilled on the AT 575 block in 1995. This well found oil reservoired in Miocene age sandstones. The next two exploration wells were drilled in 1998 and led to the discovery of the Mad Dog and Atlantis fields. Eight structures have been drilled in the WAFB with four announced discoveries. This proves the presence of a large working petroleum system in the WAFB.

At the beginning of the appraisal phase the main risk shifted to the extent and continuity of the Miocene reservoir sandstones. Combining well data and seismic mapping led to the development of a geologic model for the reservoir intervals. The reservoir rocks in the WAFB are interpreted to be Middle and Lower Miocene age submarine fan systems deposited on the abyssal plain near the base of slope. The fan systems appear to be larger than the individual prospect size with a scale of tens of miles.