

De-Risking Deepwater Sarawak with Controlled-Source Electromagnetic Imaging

Robinson, Kevin M.¹, Andrew Thomas², Paul Baltensperger², William Schneider², Alan J. Finlay¹, Chandra Velu¹, Paula Hix² (1) Newfield Exploration, Kuala Lumpur, Malaysia (2) Newfield Exploration, Houston, TX

Newfield and Petronas Carigali, in late 2005, acquired controlled source electromagnetic imaging (CSEMI) data over a series of rank, wildcat prospects in the Deepwater 2C block, offshore Sarawak, Malaysia. The CSEMI, in conjunction with 3-D seismic and other remote sensing data was used as a risk reduction tool to high grade a prospect for drilling in late 2006.

The CSEMI survey acquired 390 Kms of data along 10 lines over eleven prospects and two dry holes. The prospects are Pliocene turbidites and large structures at the Mid Miocene unconformity (MMU). Water depths were generally greater than 1,000 meters with reservoir targets 1500 to 2500 meters below seabed. Sediments are primarily shales and sands, with resistivities in the 1.5 to 2.5 ohm range. Data was collected at approximately 1 Km intervals along the lines with a fundamental transmission frequency of 0.25 Hz.

A series of EM anomalies, 20 to 60% above the normalized field amplitude, were found over a number of the Pliocene turbidite prospects and large MMU structural prospects, although not all of the turbidite or MMU prospects showed EM anomalies. In addition no EM anomalies were found at the two dry holes. Unconstrained and constrained 2.5D inversion, co-rendered with the 3-D seismic, confirmed that the EM anomalies coincided with identified prospects and were in good agreement where the EM lines crossed. A positive test of the EM anomalies will considerably reduce future exploration risk in the block.