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#### ABSTRACT

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### **Frontier Exploration Deepwater Sarawak Block F: A First Bite at the Cherry**

Block F is located at the Northwestern limit of Malaysian (Sarawak) waters in the South China Sea. The block covers an area of 9,667km<sup>2</sup> in water depths ranging from 200m to 1200m at the edge and down the slope of the continental shelf.

Initially, geological information on this undrilled block of the Northwest Borneo margin was scarce; however regional 2D seismic lines indicated the presence of NW-SE trending anticlines within the block, associated with thin-skinned gravity tectonics. Sediments were interpreted as Late Miocene and Pliocene deepwater facies of the Bunguran delta system overlain by thick prograding Pleistocene slope deposits, in contrast to the neighbouring North Natuna and North Luconia margins, where exploration had focused on geologically older sediments.

AMERADA HESS signed the Block F PSC in June 2000, reprocessed and interpreted 1,100 line km of existing 2D data and subsequently acquired & processed an additional 5,089 line km of 2D seismic data in 2001. Meanwhile technical co-operation was initiated with TOTALFINAELF, who became an official partner in the Block F PSC in June 2002.

The 2001 vintage 2D seismic and concurrently acquired marine gravity data served to improve the understanding of the petroleum system. A dedicated seismic line linking the 2001 survey to the Mulu-1 well to the Northeast provided initial age calibration of the seismic horizons, on which basis the geometry and timing of the delta-toe structures were mapped. Seismic stratigraphy and amplitude analysis were undertaken on the 2D data grid, the integrated interpretation of which was linked with the shelf area to the south in order to establish the conceptual reservoir depositional model.

Although basin modelling indicated favourable timing for charging the mapped structures, the existence of a hydrocarbon sourcing system remained unproven. Consequently, a geochemical exploration seabed coring and heat flow measurement programme was conducted for Hess by TDI-BI in 2002, the results of which indicated the existence of a thermogenic petroleum system.

On the basis of the 2D seismic data evaluation and the evolving geological model, a core prospective area was defined for more comprehensive play evaluation.

Accordingly, a 2,360 km<sup>2</sup> 3D seismic survey was acquired in mid-2002, the interpretation of which resulted in the selection of a well location designed to test the most promising perceived reservoir potential within the play fairway. Additionally, the 3D data was of significant value in well design, forming the basis for pore pressure prediction work and, in conjunction with high-resolution reprocessing, shallow hazard analysis in lieu of a dedicated site survey.

Exploration well Jelawat-1 ST-1 was drilled in mid-2004, the results of which proved to be somewhat disappointing in terms of reservoir quality, due primarily to very fine grained sands and evidence of diagenesis. However, on a more positive note, the existence of a thermogenic hydrocarbon system was confirmed by gas isotopy studies.

The large amount of new data acquired from the well constitutes the first direct calibration for the sub-basin. This provides the input for an update to the geological model on which to base the evaluation of the future prospectivity within the block.