Poster 2

Reservoir and fault delineations using Spectral Decomposition in West Patricia Field, offshore Sarawak

MOHD KHALID JAMIRAN
Murphy Sarawak Oil Co. Ltd.

The West Patricia Field is located approximately 40 km north of Bintulu, in the Balingian Province, Offshore Sarawak. The major reservoirs in the field comprise of Early to Middle Miocene Cycle III sandstones. These reservoirs are interpreted to be deposited by fluvial/deltaic distributary channels in a lower coastal plain environment. The resultant channel sands are generally thin (~ 10 m thick) and laterally variable, reflecting the rapid changes associated with meandering channels. Structurally, West Patricia field has undergone at least three major tectonic phases, and this is reflected by the complex fault patterns that dissect the field today. Following early rifting (major normal faults), the structure underwent transpression and inversion that resulted in a series of reverse and normal faults. This was subsequently followed by a phase of structural relaxation that produced intensed normal faultings.

To image the complex stratigraphy and faulting, 3D seismic data was acquired in West Patricia in mid-2000. However, the presence of intense faulting, shallow reefs and gas clouds resulted in poorer than expected data quality especially at the crest. Efforts are currently underway to improve the data quality through seismic reprocessing. In parallel, new ways of interpretation are being adopted. One of these is the use of frequency and phase domain interpretation using Spectral Decomposition (SpecDecomp™) technology. SpecDecomp™ works by transforming the seismic data via a Discrete Fourier Transform (DFT) into the frequency domain. The transformed (phase independent) amplitude spectra is utilized to delineate temporal bed thickness variability, while the phase spectra is used to indicate lateral geologic discontinuities. The theory behind this analysis is that a reflection from a thin bed has a characteristic expression in the frequency domain. This characteristic is indicative of the temporal bed thickness and can be resolved below one fourth of a wavelength.

This poster would describe and discuss the results observed from the application of spectral decomposition technology in West Patricia.

Warta Geologi (Newsletter of the Geological Society of Malaysia), Vol. 28, No. 5, September-October 2002