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USING ACOUSTIC IMPEDANCE DATA FOR TABU FIELD SUBSURFACE MAPPING AND RESERVOIR CHARACTERIZATION

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The Tabu oil and gas field, located in the southeast part of the Malay basin, was discovered in 1978 by Esso Production Malaysia Inc with the drilling of the Tabu-1 well. Oil production commenced in 1986 and is currently producing from Tabu-A and Tabu-B platforms. A field study was conducted from 2004-2006 utilizing a recently acquired 3D seismic survey to exploit the non-associated gas (NAG) and gas-cap blowdown (GCBD) resource at Tabu.

Accurate reservoir characterization is required for a successful development. For Tabu field, seismic inversion was carried out with the objective of improving reservoir characterization. Acoustic impedance inversion is a process of generating an acoustic impedance volume from the seismic reflection data. It has several advantages over a seismic reflectivity volume. The acoustic impedance data has improved resolution due to the contribution of very low frequencies from the well log data. Representing the subsurface as layers instead of layer interfaces by removing the complexity caused by the seismic wavelet, results in an improved link to the petrophysical properties of the subsurface formations.

Seismic inversion was carried out using the JASON Constrained Sparse Spike inversion (CSSI) algorithm. High quality well ties are important for determining the low frequency acoustic impedance trend, seismic wavelet extraction, and inversion of the seismic trace. Careful selection of CSSI parameters and the merge point between the low-frequency model and the inverted band-limited acoustic impedance are required for a successful inversion.

The results of the acoustic impedance volume have had a significant impact on the interpretation of the Tabu Lower "J" reservoirs, one of the key gas reservoirs. Improved reservoir characterization, including geometry and reservoir properties has resulted. Based on the results of the interpretation a seven well development of the reservoir was initiated. Initial drilling has confirmed the validity of the interpretation model.

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