WA Branch

A Geophysical Appraisal Of The East Spar Gas/Condensate Field

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In order to appraise and define the East Spar gas/condensate field the WA-214-P joint venture has employed various geophysical techniques. The East Spar field is a Top Barrow Group four-way-dip closure in depth, but has no closure in time, requiring accurate velocity interpretation for depth conversion. Evaluation of the field has followed an approach of 2D reprocessing followed by acquisition of a 3D survey. Appraisal techniques have included inversion to acoustic impedance, amplitude versus offset studies and amplitude mapping.

Initially defined from regional well control, a velocity model was constructed from multivintage velocity data, then later refined from the 3D velocity data. The velocity model was constructed by detailed interpretation of normal moveout velocities from seismic processing. The velocity field is affected by anomalous velocities in the shallow section and a slow velocity zone over the field, possibly related to gas permeation throughout the seal.

A probabilistic approach was adopted for depth conversation and reserves estimation. Minimum, most likely, and maximum case depth maps were derived by perturbing the velocity model away from well control. Alternative depth conversion techniques were employed, with varying success, to quantify the uncertainty and accuracy of the velocity model.

The reservoir sand exhibits a discrete phase change. Such gas sands are notoriously difficult to identify, interpret and map. Slight changes in the reservoir and sealing unit quality affect the phase and amplitude response of the seismic data. Normal incidence seismic models were constructed to analyse the effects of variations in reservoir, seal and and sand thickness on the seismic response. These models were used to constrain several attribute based net pay maps. The reserves estimates from these attribute based maps compared favourably with the highest confidence estimates derived from depth mapping.

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