FEBRUARY MEETINGS

WA BRANCH (Feb 25th)

AVO and Inversion Mapping — Campbell Gas Field

by M. Micenko

Amplitude-versus-offset (AVO) analysis, in conjunction with seismic inversion, has resulted in revised mapping of the Campbell Gas Field and had a significant influence on selection of development drilling locations.

The Campbell Field is located in Licence TL/5 in the Barrow Sub-Basin of Western Australia, approximately 24 km north-east of the Harriet Oil Field. The Campbell structure is a four-way dip-closed anticline on the downthrown side of the Harriet Fault System.

Campbell-2, drilled in 1986, intersected 20.6m of nett gas and 1.5m nett oil over a 24m interval of the Early Cretaceous Flag Sandstone. The well tested up to 9.5 MMCFD of gas and 140 barrels per day of condensate from a 2m zone. Production from the field commenced in the third quarter of 1992 as part of the Harriet Gas Gathering Project.

Past mapping of the structural closure has been hampered by misties between the various vintages of seismic data across the field. Recent reprocessing and phase matching between vintages and with synthetic seismograms at well locations has minimised misties and resulted in a more consistent time structure map.

Modelling of Campbell-2 indicates a strong amplitude-versus-offset response where gas is present within the Flag Sandstone. This response is best seen on an 'intercept times gradient' display. Synthetic prestack gathers from Campbell-2 show a large amplitude increase with offset and correlate with conditioned 'Ostrander' seismic gathers from the well location.

The areal extent of the AVO anomalies was found to extend outside the previously defined field limits, suggesting a velocity gradient may exist across the structure. The revised depth map, incorporating a lateral velocity gradient, caused development locations to be changed from those proposed in the original development plan.

Interpretation of the field limits using the impedance sections agrees well with the revised depth mapping of the Campbell structure.

Use of the latest AVO analysis techniques has resulted in significant changes to the mapping of the Campbell Field and selection of appraisal and development well locations. Further modelling, incorporating results of 1992 drilling, will allow a more accurate geological model of the field to be produced.

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