

## **Regional gravity and magnetic investigation of the Eromanga Basin, NSW, Australia for hydrocarbon exploration**

CLIVE FOSS

### **Laporan (Report)**

Dr. C. Foss of Encom Technology Pty. Limited, NSW, 2061, Australia, gave the above talk on Friday, 17th May 1996 at the Geology Department, University of Malaya.

We greatly appreciate his constant contributions to the Society's activities despite being in Australia now.

### **Abstrak (Abstract)**

The Eromanga Basin of eastern Australia is an extensive intra-continental sag of Jurassic to Cretaceous age. The Eromanga overlies the older Permian Cooper Basin which has its depocentre to the north and west in South Australia and Queensland. The Cooper Basin is a prolific producer of oil and gas.

The NSW Department of Mineral Resources has instigated an initiative 'Discover 2000' to promote exploration in the state for minerals and petroleum. As an early step in this programme the Department contracted ENCOM TECHNOLOGY to compile existing geo-

physical data over the Eromanga Basin and to interpret that data. The objective was to establish a structural framework that would be of value to companies wishing to explore the basin.

The main gravity and aeromagnetic data sets available for this project were regional coverage acquired by the Australian Geological Survey Organisation as part of nationwide geophysical data sets. Gravity data consist of measurements made at a nominal 11 km spaced grid. These data are supplemented by more detailed surveys undertaken in previous exploration of the area. Aeromagnetic data is from a mosaic of 1:250,000 scale map sheets flown at different times and with different survey parameters. The most detailed information about the thickness of Eromanga section itself has come from water bore data. The gravity and magnetic interpretation has focussed on investigation of the basement and older sediments beneath the Eromanga.

Gravity data reveals a northwest trending linear negative anomaly over the Bancannia Trough. This trough is known from the Darling Basin in the south where it is believed to have a thickness of over 8 kilometres of Devonian sediments. A similar northeast trending anomaly within the current study area termed the Paka Tank Trough is interpreted to also have considerable thickness of Devonian sediments. Both of these features have associated positive magnetic anomalies from underlying intrusives which suggest that they are failed rifts. Other Devonian basins which lack prominent gravity expressions are interpreted from discordance between magnetic depth estimates and the known base of Eromanga. These may be relicts of an originally more pervasive Devonian cover sequence. From integrated gravity and magnetic interpretation basement itself can be split into structural provinces, and major basement faults can be mapped. Adjacent to one of these basement faults the Caryapundy Trough is perhaps one of the most prospective structures recognised. This basin is open to the north where the nearest proven source rocks occur. Gravity modelling suggests that the infill of this basin is less dense and therefore possibly younger — or Permian(?) age.

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