

## 1997 Acreage Release Prospectivity Studies

The Bureau of Resource Sciences has released two *Petroleum Prospectivity Bulletins* in support of the 1997 offshore acreage release.

The ***Offshore Sydney Basin Petroleum Prospectivity Bulletin*** reviews release area NSW97-1 located in the offshore Sydney Basin between the cities of Newcastle and Wollongong. Although no wells have been drilled in the offshore area, the onshore stratigraphy is well known from numerous exploration wells. In the offshore part of the basin the stratigraphic sequence, based on seismic data correlated with onshore well data, comprises in excess of 9 km of Permo-Triassic marine and non-marine sediments overlain by a thin veneer of post break-up Cainozoic sediments. Seismic interpretation has identified several leads.

Whilst the Basin is considered gas-prone, numerous significant shows, including both bleeding oil and gas flows, have been reported, supporting the assessment that the Basin contains an active petroleum system. Currently petroleum production is confined to a single coal-bed methane and coal mine drainage system.

This *Prospectivity Bulletin* highlights the outcome of a review of previous seismic data and onshore geological data including the results of recent stratigraphic, geochemical, and petrophysical studies of the adjacent onshore well data. Pivotal to the reinterpretation is the recognition of the pre-eminent role played in the early development of the Sydney Basin by easterly directed thrust loading by the offshore Currarong Orogen. Previous explorers of the offshore Sydney Basin held differing views as to the structural style and evolution of this feature.

Our interpretation shows structural reactivation to be intimately linked with the development of the Sydney Basin from its inception. The resulting palaeogeographic model has enabled the identification of regions of anoxic, restricted circulation favourable to the preservation of organic material. Likewise, areas skirting the emerging orogen, and particularly its shallowing eastern flank, were subjected to marginal and shallow marine, wave-base, barrier and strand bar deposition, favourable to enhanced reservoir development. To date it has been the absence of perceived suitable reservoirs that has impeded further exploration effort within the offshore Sydney Basin.

The ***Southern Timor Sea Petroleum Prospectivity Bulletin and Data Package*** presents the results of a regional study of the petroleum prospectivity of release areas W97-1 to W97-7 located on the Londonderry High area of the Timor Sea. The areas have only been sparsely to moderately explored, with regional and detailed seismic coverage and a variable well coverage. The study has identified hydrocarbon potential in Upper Permian, Triassic, Jurassic and Cretaceous units, and includes both structural and stratigraphic plays.

A thick Palaeozoic sequence of sediments (up to 5 seconds in thickness) underlies the whole of the region, suggesting that Petrel Sub-basin sediments extend north and west of the present Petrel Sub-Basin limits. On the western side of the Londonderry High, extensive erosion in the Late Jurassic has removed much of the Triassic and Jurassic age sediments that overlie the Palaeozoic. Toward the western edge of the High, Palaeozoic sediments are within 2 seconds of

the surface, making Permian porous sandstone and limestone units potential reservoir targets in this area.

The main reservoir targets over the Londonderry High are expected to be Triassic and Jurassic sandstones sourced from Jurassic and Early Cretaceous source rocks in the Sahul Syncline. Additional potential source is postulated from the thick Permian and Carboniferous source rocks that cover the Londonderry High. Migration would be expected through the numerous faults that exist in the area.

Because the Londonderry High is highly faulted and structurally complex, the potential for structural trapping in the area is high. Both structural and stratigraphic play types are recognised within the study area. Most of the structural traps are likely to be fault dependent for structural definition and closure.

### Contact:

**Barry West**  
**Manager, Regional Prospectivity Program**  
**Tel: 02 6272 3324**  
**Fax: 02 6272 4696**  
**Email: bgw@mailpc.brs.gov.au**

**Tun U Maung**  
**Project Leader, Sydney Basin Study**  
**Tel: 02 6272 5144**  
**Email: tum@mailpc.brs.gov.au**

**Virginia Passmore**  
**Project Leader, Timor Sea Study**  
**Tel: 02 6272 3374**  
**Email: vlp@mailpc.brs.gov.au**