

4 GEOLOGY

4.1 Regional Setting

The Bass Basin is one of a series of basins along the southern margin of Australia that were formed as a result of Cretaceous-Early Tertiary rifting between Australia and Antarctica, and were subsequently modified by Late Tertiary compression.

The Pelican and Cormorant Troughs are the two major depocentres of the Bass Basin (Figure 2). The Pelican Trough is bounded to the NE by a major NW to SE trending listric normal fault system downthrown to the SE. The proposed Flinders 1 well lies on the southwestern dip flank of the Pelican Trough.

4.2 Regional Stratigraphy

The stratigraphic succession in the Bass Basin includes sediments which range in age from the Early Cretaceous to Recent (Figure 3). The Early Cretaceous Otway Group rests unconformably on pre-rift Mesozoic and Palaeozoic rocks, but have not been penetrated by any wells in T/25P. The nearest control is provided by Durroon 1, located approximately 100km to the east, which penetrated an Early Cretaceous sequence of clastic and volcanoclastic fluvial and deltaic sediments comprising sandstone, siltstone, shale and coal. The Otway Group is considered to be less prospective than the overlying Eastern View Coal Measures on the basis of reservoir and source potential.

The Late Cretaceous to Late Eocene Eastern View Coal Measures (EVCM) unconformably overly the Otway Group and comprise a thick sequence of sandstone, siltstone, shale and coal deposited in predominantly fluvial, deltaic, and lacustrine environments, occasionally subjected to marine inundation. The EVCM are thickest in the centre of the troughs where seismic data suggest a total thickness greater than 5500m. The thickest sequence drilled is at Pelican 5 where 2507m was penetrated. The EVCM thins markedly towards the basin margins and exhibits both onlap onto basement and erosional truncation following uplift.

A three fold stratigraphic subdivision of the EVCM is recognised based on palynological and microfossil assemblages, and unconformities recognised on seismic. The intra-formational unconformities are most apparent over basement highs and near to the basin margins, but are less obvious in the centres of the major troughs where continuous deposition occurred. Each of the unconformities corresponds to a period of structural movement accompanied by volcanic activity.

The lowermost sequence of EVCM sediments is largely unexplored because of its depth of burial. It extends between the major unconformity at the base of the EVCM (usually top Otway Group) to the basal *T.longus* unconformity. The basal *T.longus* unconformity (Late Cretaceous) is associated with a period of major tectonic movement including extensional tilted block faulting and subsequent erosion. This sequence has only been partially penetrated within T/25P by Pelican 5.