

## IV. DISCUSSION OF REGIONAL GEOLOGY

1. Perth Basin Area<sup>\*</sup>

The Perth Basin comprises a N-S to NNW-ESE trending graben complex lying adjacent to the continental margin of western Australia. It is thought to have come into existence during the early Mesozoic. In the offshore shelf area, a number of NE-SW trending ridges and basins have been recognised by WAPET and these have been interpreted as continuing into the deeper water area as far as the base of the slope (Encl. 7). On all of the Petrel seismic sections the sedimentary sequence is thin. It is partly absent from zones of the slope, where it has been removed by slumping and erosion.

The sedimentary sequence represented on the isopach map (Encl. 13) overlies a prominent regional unconformity of Neocomian age that is recognisable in the Perth basin (Brown et al., 1968) and probably correlates with the age of the basement in the deep sea (GC. 259). It onlaps onto a sharp relief that probably had a similar configuration as at the present-day.

At the landward ends of the lines, reflections can be seen below the unconformity: they mostly dip in a landward direction (Encl. 16, N 316) and are thought to represent Permian and Triassic deposits lying close to the western rim of the Perth basin proper. A trough-like area seen on lines N 311 and N 312 (Encl. 7), however, may represent a separate sub-basin. Pre-Cambrian metamorphic basement is thought to underlie the regional unconformity in the lower part of the slope.

Towards the seaward ends of the lines the pre-Neocomian is composed of a flat or nearly flat-lying volcanic basement that seems to onlap the continental basement at the base of the slope. Isolated reflections in this basement are parallel or subparallel to the unconformity surface. The crustal structure in the offshore area is thought to be of normal oceanic character (Francis and Raitt, 1967).

The post-Neocomian period has been marked by quiet deposition in deep waters - possibly at very much the same depths as at the present-day. The isopach map (Encl. 13) shows that with the exception of basinal or valley-like areas in the unconformity surface, the sediments are rather thin. The entire section penetrated in GC.259 consists of deep-water clays, although large intervals are not represented (e.g. KU, EOM-PL), a fact attributed to local current activity or slumping.

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\* The interpretation of this area includes data from a number of lines observed during Shell's 1971 survey in northern and western Australia (Report EP-44157II).