4.2 SUMMARY OF REGIONAL GEOLOGY

The Bass Basin is an elliptic northwest-southeast trending graben produced by a NE-SW oriented tensional stress. It covers 62,000 sq. km in the Bass Strait between Tasmania and the Australian mainland. (Figure 3).

The Bass Basin appears to have initially developed in Late Jurassic time as the result of northeast-southwest tensional stress caused by the initial break-up of the Australian and Antarctic plates.

The Bass Basin is an excellent example of aborted, or failed rifts. Crustal extension during the Cretaceous developed a high relief, rifted terrane of graben and half-graben depocenters filled during the Early Cretaceous with volcanogenic detritus under fluviatile and alluvial conditions. In the Bass Basin the rift system trends NW-SE. In the northwest half of the Bass Basin most rift faults are downthrown to the southwest, forming a series of half-grabens with similar polarity. In the southeast half, rifting was more complex with two rift sequences of different trends.

Major structural features are a deep basin, basin edges, and a number of fault controlled structural noses: Dondu, Paipan, Konkon and Damala noses.

The predominant structural style is that of faulted basement blocks with onlap and compaction of sediments over upthrown blocks. Other characteristics are faulted anticlines and arches or folds generated by intrusive or extrusive rocks.

Predominantly vertical movements seem to have controlled structural growth throughout the basin's history.

The earliest tectonic events (Late Cretaceous) are seen in the southern area, while the latest activity (Late Tertiary) is observed in the northwestern area.

Worldwide, aborted rifts are ideal environments for occurences of hydrocarbons. The combination of high quality source rocks and optimum thermal history allow for above average productivity on a volumetric basis. Good examples of prolific aborted rifts include the Gippsland basin, the Dampier basin, Vulcan graben and the Viking graben. All of these examples developed through a two-stage evolution. The stages are:

1. Crustal upwarp and extensional rifting
2. Post-rift sag