

5. Structure

Esso Bass-2 is located on the crest of a well-defined anticlinal feature, as mapped by seismic, trending northwest-southeast. The structure is developed from basement to the top of the Oligocene. The age of the structure is primarily Upper Cretaceous? or Paleocene, but exhibits some growth during Eocene time. A basement fault block is responsible for this being a positive area. This faulting was active from Mesozoic time up to the close of the Oligocene, however closure is primarily anticlinal and not dependent upon faulting.

Vertical closure at the intra 'deltaic complex' reflecting horizon (seismic unconformity) is 250+ feet and areal closure is approximately 40 square miles. Vertical closure has decreased to 200 feet at the top of the Eocene and to 100 feet at the top of the Oligocene. There is approximately 1,000 feet of vertical closure on basement.

6. Relevance to the Occurrence of Petroleum

The drilling of Esso Bass-2 has indicated that relatively rapid lateral facies changes occur within the Tertiary sequence in the eastern half of the Bass Basin. Significant quartzose sand developments were encountered in the calcarenite unit of Middle and Upper Miocene age, in the base of the Oligocene section and in the basal Tertiary deltaic complex; these are discussed below.

Middle and Upper Miocene - Esso Bass-2 encountered fine quartzose sand from approximately 1,400 to 2,164 feet. This is significant in that it may reflect proximity of a provenance area during this period and it may be evidence of a regional transgressive pulse which is seen in both the Otway and Gippsland Basins during this time.

Oligocene - Three hundred and twenty-eight feet of quartzose sandstone of marine origin were encountered in Esso Bass-2 at the base of the Oligocene; this compares with only 30 feet of sandstone at the base of Oligocene in Esso Bass-1. The thick sandstone interval seen in Esso Bass-2 reflects a large-scale facies change in the Oligocene series. The change from silty mudstone to sandstone may in fact be so rapid laterally, over the Esso Bass-2 structure as to open the closure seen by the seismograph on the top of the Eocene.

Upper Eocene - The Eocene marine mudstone interval (Demon's Bluff equivalent in Esso Bass-2) is 221 feet thick. This compares with 358 feet of the same interval in Esso Bass-1. The same rapid lateral facies change as seen in the base of the Oligocene is apparently the case at the base of the Demon's Bluff and it is quite possible that this change means that the porosity in the Demon's Bluff is not sealed.

Paleocene-Eocene Delta Complex - Sixty-eight percent or 1,222 feet of the total 1,745 feet of this sequence in Esso Bass-1 was porous sandstone; this compares with 80 percent sand count in the Esso Bass-2 well over the same interval. The sands within the complex at the Esso Bass-2 well were generally more coarsely grained, cleaner and hence better reservoir rocks than those at the Esso Bass-1 well. Again, as in the overlying intervals, an increase in sand count is evident in an easterly direction from the Esso Bass-1 well.

Closure evident on the "intra-complex reflecting surface" is a "sand on sand" contact and hence represents no effective seal.