regional Bass Basin geologic history.

Basement is an irregular surface composed of igneous and metamorphic Paleozoic and Mesozoic rocks. Prior to Tertiary deposition a system of faults developed on the northeast and southwest flanks of the basin. The faults generally are en-echlon and in some instances a system of regional horsts and grabens are found. These faults are on trend with the northeastern Tasmania fault systems.

The Bass Basin is of Tertiary depositional origin and began as a large embayment of the South Australia-Otway Sea, bounded by Victoria and Tasmania to the north and south and the Bassian rise to the east. Structural movement throughout most of the Tertiary has been in the form of subsidence with the present highs remaining as stable areas.

Gentle regional subsidence with swamp conditions and dominantly continental deposition prevailed during the Paleocene and lower Eocene epochs. The sediments as seen in the two wells drilled in the basin are a deltaic complex made up of interbedded sandstone, siltstone, shale, and coal. A marine pulse is evident near the top of this unit in Esso Bass-2. The close of the lower Eocene was marked by a period of gentle uplift, fault rejuvenation and a widespread unconformity.

Gentle subsidence resumed during the upper Eocene with local uplift and faulting along the older fault zones continuing. The 1500 + feet of sediments underwent a transition from non-marine to restricted marine deposition. The marine sandstones and mudstones lay apparently conformable upon and interfingers with the continental sands, shales and coal. The unit pinches out to zero on the basement beyond the limits of the Paleocene-lower Eocene sediments as the seas transgressed the erosional surface. Local volcanic activity was evident at this time. Gentle erosion around the margins of the embayment may have occurred at the close of the Eocene.

During the Oligocene, basin subsidence, transgressive seas, and marine deposition continued, depositing upwards of 1750 feet of sediments which overlapped beyond the Eocene on to basement. Local uplift and faulting were less pronounced than during the Eocene. The sediments were mostly shale and mudstone with some sandstone and tuffite. The tuffite was deposited by extensive volcanic activity which marked the close of the Oligocene. Many volcanic build-ups are recognizable on the seismic sections.

A time of major subsidence began with Miocene. The transgressive seas and marine deposition continued. Over 4000 feet of Miocene and younger Cenozoic deposits were laid down. The areas coincident with the northwest-southeast trending faults on the flanks of the basin remained relatively stable while the center portion of the basin subsided forming the basin as we see it today. The King Island-Mornington Peninsula uplift experienced its last major period of movement during the early Miocene. This feature was probably positive throughout the Tertiary period but was not elevated to its present magnitude until the early Miocene time. The Bassian rise continued to subside until it was overlapped by late Miocene sediments. This was the first known communication between the Bass and Gippsland Basins. Some mid-Miocene volcanic activity occurred. One of these build-ups was penetrated by Esso Bass-1.

A thin veneer of Quarternary sediments cover the Tertiary deposits.

Horizons Mapped - The interpretation for this report is presented by four structure and two isopach maps. These are the top of the Oligocene, top of the Eocene, and mid-Eocene Unconformity, Basement, top of the Oligocene to top of the Eocene and top of Eocene to mid-Eocene unconformity maps.

The Basement horizon has been mapped around the margins of the basin where basement is shallow enough for sufficient energy penetration to produce a reliable reflection. The general character of basement is an irregularly dipping high amplitude reflection.