

7.4.2 Porosity versus depth

Porosity versus depth plots (Appendix 2) were created for all wells in the study area to determine what relationships exist between porosity and depth so that predictive models of good porosity distribution can be determined.

The plots were created from wireline derived sonic porosities using the simple Wyllie equation. A gamma ray filter was applied to the data so that only the cleanest (<30 API) and therefore the highest porosity values were plotted.

The porosity versus depth graphs show that in nearly all wells there is a clear linear trend showing a uniform and gradual reduction in porosity with increased depth. Two variations from this simple trend are observed. The first occurs at Tilana 1 where an igneous intrusive has reduced the porosity of some sandstones by increasing diagenetic porosity reducing processes. The second deviation from this trend is best shown in the results from Pelican 5 in which over-pressured sediments were encountered below the top of the Palaeocene section (below top of Unit 5 of this report). In the over-pressured sediments there is an improvement in the log derived porosity such that at the boundary between the overlying normally pressured sediments there is an abrupt increase in porosity of approximately five percentage units.

A further observation is that the gradient of porosity reduction with depth in the normally pressured sediments is approximately the same in all wells except for Nangkero 1 and Poonboon 1 where there is generally better porosity than observed in the other wells at any given depth. To illustrate this a line representing the porosity depth profile in the Pelican Trough wells has been drawn on each of the graphs. Data from Poonboon 1 and Nangkero shows porosities typically 5% higher than the other wells.

In conclusion, the porosity depth plots examined in this study show that there is a clear relationship between porosity distribution and depth of burial, within Eastern View Coal Measures sandstones, which is only departed from when unusual diagenetic processes associated with igneous activity or over-