

Rock-Eval Tmax values are in good agreement with measured vitrinite reflectance (Figs. 5-7).

Rock-Eval production index, another maturity-dependent parameter, displays a less well defined trend of increasing values with depth in Koorkah-1 (Tables 4 and 5). Values increase from PI = 0.07 at the top of the Eastern View Coal Measures to PI = 0.21 at the base. The anomalously high production indices (PI = 0.31-0.50), and related very low S<sub>2</sub>, PC and HI values, of cuttings samples from immediately above the sill are the result of local heating caused by its intrusion into the basal part of the Eocene sequence. Other positive excursions in the production index versus depth profile for Koorkah-1 (Table 6) were investigated (section 4.4) to see if they represented zones of migrated hydrocarbons.

Headspace gas data also have the potential to delineate maturation trends (see e.g. Alexander et al., 1983; Monnier et al., 1983). In the Koorkah-1 well section, a clearly defined maximum in the total gas (C1-C4) profile (Fig. 1) coincides with the dolerite sill. The  $i\text{-C}_4/n\text{-C}_4$  profile (Fig. 3) is as would be expected for the maturity range documented by VR data (cf. Alexander et al., 1983, fig. 1). This isomeric ratio decreases to less than unity at the anticipated onset of significant gas generation (VR = 0.6%, 2750 metres depth).

Percent wet gas (Fig. 2) and  $i\text{-C}_5/n\text{-C}_5$  (Fig. 4) display no obvious relationship with increasing depth and/or maturity. In samples with significant gas yields (C1-C4 more than 10,000 ppm), wet gas values greater than 50% occur above 2750 metres depth (Fig. 2B). This may indicate extensive upward migration of C2-C4 hydrocarbons from within the underlying gas generation window.

#### Source Richness

Cuttings gas (C1-C4) yields below 1600 metres depth in Koorkah-1 are mostly fair (1,000-10,000 ppm), although intervals with good to very good gas richness (10,000-100,000+ ppm) are reasonably common throughout the Eastern View Coal Measures (Fig. 1). Wet gas (C5+) yields, however, are uniformly poor (less than 1,000 ppm) throughout (Table 2).

Total organic values (Tables 3-5) decrease with increasing depth in the Eastern View Coal Measures, thus:

|            | TOC       |        |     |
|------------|-----------|--------|-----|
|            | Range %   | Mean % | n   |
| Eocene     | 0.61-10.9 | 3.19   | 11* |
| Paleocene  | 1.35-2.16 | 1.83   | 4   |
| Cretaceous | 0.43-6.45 | 1.35   | 17  |

\*Excludes 2 samples which come from the same depth as the sill and therefore represent cavings.