

Two main types of Eocene organic matter can be recognised (Fig. 5A, B):

- 1) good quality oil and gas-prone Type II-III kerogen
 - HI = 150-430 mg S₂/g TOC
 - rich in vitrinite (45-85%) and exinite (10-40%) (Watson, 1986)
 - major exinites are resinite and suberinite, both thermally labile and therefore potentially generative at maturities as low as VR = 0.45% (main oil generation range, VR = 0.5-0.8%: Cook, 1986)
- 2) poor quality dry gas-prone Type IV kerogen
 - HI = 30-120 mg S₂/g TOC
 - mainly siltstone rich in inertinite

Paleocene

Hydrogen index values (HI = 55-360 mg S₂/g TOC: Tables 4, 5) reflect the presence of somewhat more mature oil and gas-prone Type II-III kerogen (Fig. 6A, B). Coal is less abundant in this part of the sequence which occupies the main zone of oil generation for resinite/suberinite-poor terrestrial organic matter (VR = 0.85-1.15%: Appendix 2).

Coal and carbonaceous shale/siltstone display systematic differences in maceral abundance, although exinite contents are similar (Watson, 1986):

	V	I	E
	%		
Coal	75-80	5-10	15-20
Shale/Siltstone	25-60	15-65	10-20

The major exinite in both cases is sporinite.

Cretaceous

The advanced maturity of the Cretaceous sediments (VR = 1.15-1.7%: Appendix 2) is apparent in their uniformly low hydrogen indices (HI = 40-175 mg S₂/g TOC: Tables 4, 5). Shale appears to be the most common organic-rich rock type.

Many shales are exceptionally rich in exinite (up to 85% of DOM, mostly micrinitised bituminite). Since the oil deadline for bituminite is VR = 0.9% (Cook, 1986), these Cretaceous shales are now spent (post-mature). However, at an earlier stage of their burial/maturation history, they were probably prolific sources of liquid hydrocarbons.

5. PETROLEUM GEOCHEMISTRY

5.1 Bulk Composition

The Pelican-5 condensate (RFT 3, 2788.2 m, Eocene) has a *paraffinic* C₁₂₊ bulk composition which differs markedly from the *aromatic-asphaltic* compositions of bitumen hand-picked from cuttings (2790-2799 metres), and gilsonite mud additive (Fig. 10).