

GEOCHEMISTRY

Prior to the geochemical investigation undertaken during this study, the hydrocarbons found in the Yolla-1, Cormorant-1 and Pelican-5 wells were thought to be from an identical source. A limited source rock study suggested that a Paleocene sample in Tilana-1 was a good source rock match. No other source rock candidates had been examined for source rock to oil correlations except the Tilana-1 Paleocene cuttings (Enclosure 34).

The initial geochemical investigation established that liquids recovered from the L. balmei RFT test in the Yolla-1 well, the shallowest M. diversus test in the Pelican-5 well, and the deeper N. aspersus test in the Cormorant-1 well were generated and expelled from the same source. The Yolla-1 and Pelican-5 oil are at the same maturity level, but the Cormorant-1 oil is less mature, having characteristics indicating the presence of biodegradation.

A subsequent geochemical study established that the multiple oil recoveries in the Yolla-1 well are all from a common source, linking the multiple zones of this study to the deeper zone and other wells of the earlier study.

age?
unlikely to have
biodegraded in
storage (Powell)

Two samples from the Yolla-1 L. balmei drill stem test and the sample from the deeper L. Balmei RFT were established to have been derived from a common source. Five of the six samples recovered from the multiple N. asperus drill stem tests were also established to have been derived from the same source as the L. balmei recoveries. The N. asperus samples exhibited characteristics indicating that they are less mature than the L. balmei recoveries. This has been attributed to the differences in reservoir temperatures. One of the six N. asperus DST samples from identical perforations as other samples exhibits different geochemical characteristics that do not match the source nature of the other samples. The variation in geochemical characteristics of one sample is not understood, but contamination is suspected.

A third geochemical study addressed the similarities in geochemical character between extracts of L. balmei cuttings from the Tilana-1 well and the Yolla-1 oils (Enclosure 34). This study concluded that the Yolla-1 oil is from a terrestrial source rock similar to the L. balmei cuttings, although some differences exist between the extracts and the oils.

The geochemical investigation undertaken during this study concentrated on establishing source rock to oil correlations over a greater spread of palynologic intervals. Thirty nine core chips were collected from twelve of the central Bass Basin wells. Seven core chip were collected from two wells on the edge of the basin. Four outcrops samples were collected from the October 1986 field trip through the coastal Otway Ranges area. Sample locations are illustrated on Enclosure 35. The samples were first analyzed for T.O.C. content. Selected samples to ensure complete palynologic coverage with greater than two percent T.O.C. were then