

***Clay mineral distribution in Cretaceous and Tertiary sediments of
the Labrador Shelf***

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The clay-size fraction of rock cuttings from three Labrador Shelf exploration wells was examined by semi-quantitative x-ray diffraction to determine the relative abundances of smectite, illite, chlorite, and kaolinite. Distribution of these minerals in sedimentary rocks is the cumulative result of many factors. Important among these are source rock composition and weathering history, depositional environment, rate of

burial, temperature and pressure during burial, and age.

Early results show that, with increasing depth, smectite, illite, and chlorite diminish in abundance, at Tyrk P-100. A corresponding increase in kaolinite is seen. At Roberval K-92 and Hopedale K-33 smectite abundance remains relatively constant in Tertiary sediments, with increases, beginning in Cretaceous rocks of the Markland For-

mation, continuing down-hole.

The smectite increase comes at the expense of kaolinite at Hopedale, and of chlorite at Roberval, with little effect on illite content at either location. Furthermore, the increases in smectite abundance at Hopedale and Roberval correspond to temperatures (31 and 46 degrees C, respectively) and depths (1140 and 1800 metres, respectively) which are unlikely to be sufficient to have caused a diagenetic transformation of smectite.

A geohistory diagram of Roberval shows

that the high smectite abundance corresponds to a period of slow subsidence. Recovery of gas condensate at Hopedale indicates that the Markland Formation may be suitable source rock. However, the absence of a diagenetic transformation of smectite to illite, which would correspond to the top of the oil window, indicates that organic-rich sediments in wells that have undergone a similar burial history have not been subjected to enough cooking to produce liquid hydrocarbons.