

Characterization and maturation of selected Cretaceous and Jurassic source rocks and condensate/crude oil from Scotian Shelf Wells

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Selected organic-rich rocks and light oil and condensate samples from various Jurassic and Cretaceous formations were examined by organic petrography, Rock-Eval pyrolysis, liquid chromatography, gas chromatography, stable carbon isotope and GC-MS of the aromatic fraction.

An organic facies and source rock characterization was made, based on more than 250 cuttings and core samples, which suggests the presence of multiple condensate and/or gas-bearing source rocks (Types IIB-III and III) which are associated with minor local oil-prone clastic source rocks (Types IIA and IIA-IIB). Vitrinite reflectance and fluorescence data suggest the possible presence of deeper condensate in the basin and indicate the possible timing of overpressuring.

The GC-MS data of the aromatic fraction of both extract

and light oil and condensate samples, when compared with stable carbon isotope, GC of both light and C₁₂+ hydrocarbons and liquid chromatography, reveal the following: Cohasset-Panuke-Sable Island oils belong to a non-thiophenic (low-sulphur) group possibly derived from lacustrine algal Type I or Type IIA source rock and the South Venture/Glenelg condensates belong to a moderately thiophenic group derived from a marine Type II or Type II-III source rock. Based on the Methylphenanthrene Index and the ratio of chrysene to benzo (α) anthracene, Cohasset-Panuke oils are less mature than Venture condensate which are formed within the "oil window". The stable carbon isotope and liquid chromatography data indicate the light oils and condensates can be grouped into three families. Cohasset source rock extracts are correlatable to some of the Cohasset oils.