

Oil shale occurrences in upper Assam Basin , India: An overview

V.K.Sibal and S.V.Raju, Directorate General of Hydrocarbons, New Delhi, India

The Upper Assam sedimentary basin is an important petroleum province in India that has witnessed oil and gas production for well over 100 years. Tertiary formations comprising predominantly clastic rocks occur in the stratigraphic sequence. The rocks range in age from Paleocene to Recent. Tectonically, the Upper Assam basin represents a structurally warped basin between two convergent margins. In addition to important petroleum deposits, the basin contains significant reserves of coal in the Barail Formation of Oligocene age. Organic rich oil shale occurs interbedded with these coals. The Barail sediments represent deposition in paralic conditions with marine incursions and are considered one of the principal source rocks for the petroleum found in the basin.

The coal and associated oil shale crop out in the thrust belt area known as the belt of schuppen. In the subsurface, these sediments have been encountered in boreholes at depths ranging from about 2,400m to 3,500m.

A pilot plant has been set up for syncrude production from the Barail coal. Rock-Eval analysis of the coal indicates a hydrocarbon generation potential up to 260mg hydrocarbons per gram of rock. The associated Barail oil shale has yield potential up to 75 mg/g. The kerogen is predominantly Type II and III. The coal and associated shale from the coalmines contain 1.5 to 5% organic sulfur. Based on maturity parameters such as Vitrinite Reflectance, Rock-Eval Tmax values and biomarker maturity ratios, Barail Formation coal and associated shale are either immature or in a very early stage of organic matter maturation. Interpretation of the biomarker data shows that the organic matter contains a significant proportion of the C₂₉ $\alpha\alpha\alpha$ sterane, which is indicative of derivation from terrestrial higher plants with a possible contribution from algae. The high hopane/sterane ratio is also indicative of the influence of land-plant-derived kerogen. The Directorate General of Hydrocarbons has initiated a project for the assessment of the oil shale resources and syncrude potential in the region.