

## **Geochemical Analyses of Oils in Goudron Field**

**Krishna M. Persad<sup>1</sup>, Suhas Talukdar<sup>2</sup>, and Neil Ritson<sup>3</sup>**

<sup>1</sup>*KPA Group of Companies*

<sup>2</sup>*ST Petroleum Geochemistry, LLC*

<sup>3</sup>*LGO Energy*

### **Abstract**

The Goudron Field is a mature oilfield onshore southeastern Trinidad, which has recently been reactivated under a field re-activation contract, by Goudron E&P Limited (GEPL), a 100% subsidiary of Leni Gas and Oil Plc. (LGO). Originally discovered in 1927, most of the wells in the field had found very light oils, from as shallow as 350 feet below surface. The API gravity is lighter than many of the oils produced in the neighbouring fields. In addition, wells which have produced from two different zones found, either lighter oil at shallower depths or some shallow oils were heavier than deeper oils.

The authors were aware that most Trinidad oils have been found to be geochemically altered, many by evaporative fractionation, others by biogredation. The former is a process whereby lighter ends of previously reservoir oils have re-migrated into shallower reservoirs (known here as evaporative oils or condensates) leaving behind heavier often waxier ends (known here as residual oils). Biodegradation is a process where lighter ends are consumed by aerobic bacteria, often brought in along faults by meteoric water.

The authors suspected from the API gravity characteristics that the Goudron oils had undergone various forms of alteration.

Thirteen oils were collected from the field, in different geographic areas and from different depths and different producing horizons. These range from the lower to middle Pliocene Gros Morne sandstone member of the Moruga Formation to the upper Pliocene Goudron Sandstone Member of the Mayaro formation. The latter includes oils from the upper Miocene Cruse formation and the Gros Morne sands. An oil was also collected from the upper Cretaceous fractured Naparima Hill formation in a well outside the field area, but was thought important because of the very heavy API gravity, at 15.0 degrees. In addition five sidewall samples were collected from a newly drilled well, from all of the known producing horizons within the field area. It was suspected that the deeper oils were residual oils, the shallower lighter oils were evaporative and the heavier shallow oils were biodegraded. It was also believed that the Cretaceous oil was either a residual oil or biodegraded or both.

The Company (GEPL) felt it was important to determine if the oils were altered and if they were, what alterations had occurred, because this could point the way to additional prospects. For example if evaporative oils were found to be the deepest in any area, it would imply that deeper residual oils were present. Or if residual oils were found without encountering shallower evaporative oils, it would mean that the evaporative oils were either lost to the surface or trapped in offset shallow reservoirs.

API gravities of all of the oils were provided by the Company. Analyses were done by Weatherford's Houston Geochemical Laboratory. The analyses done included High Resolution Gas Chromatography (HRGC). Geochemical interpretation was done by Suhas Talukdar and exploration implications were assessed by all three authors.

Results of the analyses, interpretations and exploration implications will be examined in some detail in the oral presentation.