

ABSTRACT

Isotope Analysis of Natural Gases in the Southeast Columbus Basin

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Natural gas can be divided into two distinct classes, namely biogenic and thermogenic gas. The type of natural gas generated depends on the conditions in the reservoir. It determines the value of the gas and can also indicate the presence of liquid hydrocarbons.

This research investigated the types and maturities of natural gas present in the southeast Columbus Basin, offshore Trinidad. The natural gas samples were analysed to determine their chemical composition and the isotope ratios of carbon and hydrogen. British Petroleum Trinidad and Tobago (BPTT) provided this data.

Interpretation of the data by the author was performed by this author and was based on theory from Schoell (1983) and Clayton (1991). The data was compiled and represented on four plots; the depth vs $\delta^{13}\text{C}$ methane plot, the Methane–Wetness crossplot, the $\delta^{13}\text{C}$ Isotope plot and the Schoell methane δD vs $\delta^{13}\text{C}$ plot. These plots were used to identify the type of gas

(biogenic, thermogenic or mixed), the maturity of the gas and migration patterns for gases in the Columbus basin.

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The study showed the gases in the Columbus Basin were of biogenic and thermogenic origin. The type of gas changed from thermogenic to mixed to biogenic, when moving from southwest to northeast across the Basin. This trend indicated differential burial of the source rock. The presence of mixed gas suggested there was migration of gas in the Basin.

Isotope analysis proved to be a useful tool to determine the type, maturity, and migration patterns of natural gas in the Columbus Basin. It can be used to complement other methods of reservoir evaluation during development and exploration activity.

Keywords: Isotope analysis; Natural gas; Columbus Basin; Biogenic and thermogenic.