AAPG Annual Meeting
March 10-13, 2002
Houston, Texas

Barry Jay Katz[1], Kenneth Williams[2] (1) Texaco Upstream Technology, Bellaire, TX (2) Texaco Exploration, Bellaire, TX

Biogenic Gas Potential Offshore Guajira Peninsula, Colombia

The Guajira region of Colombia has several TCF of discovered gas with the potential for additional reserves. Most of this gas is present in two producing fields, Chuchupa (5.7 TCF) and Ballena (1.2 TCF). Geologic considerations, including the nature of the stratigraphic column and low regional geothermal gradients, suggest that these gas accumulations are biogenic in origin. The geochemical character of the gas further supports such an origin, which is both dry and isotopically light.

A regional assessment suggests that future exploration will also be directed largely towards biogenic gas accumulations. Such a conclusion suggests that the timing of gas generation relative to trap development is critical, because biogenic gas accumulations require early trap development.

Unlike many assessments of hydrocarbon potential, which focus on trap capacity, this study examines the availability of hydrocarbon charge. The resource potential of both the region and specific prospects was assessed using a mass-balance approach. The amount of hydrocarbons was estimated using a geochemical model in which the amount of bacterially produced gas is a function of organic enrichment and temperature history. The volume of gas available was further constrained in this evaluation by comparing the timing of gas generation to the timing of trap development. The overall expulsion, migration, and trapping efficiencies of the system, which were established through a statistical assessment of known accumulations, ranged up to near 4 %. The estimated efficiency of the system was considered a minimum because of trap volume considerations for some of the known accumulations. Using the constrained system efficiency the gas available to individual structures ranges up to ~4 TCF. Additional upside potential may exist given the uncertainties of the estimates.