

ABSTRACT - FUTURE OF NATURAL GAS, G. J. MacDonald. The MITRE Corporation, 1820 Dolley Madison Boulevard, McLean, Virginia 22102.

Some fraction of natural gas found in deposits not associated with petroleum may have an abiogenic origin with the gas produced by igneous activity or as a result of the outgassing of primeval hydrocarbons accumulated during the formation of the earth. Evidence for an abiogenic origin include the ratios of the stable isotopes of carbon and hydrogen in methane, temperatures deduced from isotopic ratios of coexisting methane and carbon dioxide and methane and water, the bulk chemical composition of the gas deposits, the age and geologic setting of the deposits, the presence of methane in volcanic emissions and hydrothermal gases and the accumulation of large quantities of methane in the cold waters of recent lakes in the volcanic regions of the East African Rift Zone. The possible existence of abiogenic methane could greatly alter estimates of the remaining economically recoverable natural gas. In the United States, major structural features that could trap gas of whatever origin have probably been discovered. However, difficult to discover, stratigraphic traps are known to exist and exploration for these would be aided by knowledge of the source of the methane. Abiogenic methane could be expected to accumulate, for example, in the vicinity of regions of igneous activity or near deep faults that penetrate basement rocks but that do not reach the surface. Such regions have not been favored in conventional exploration of hydrocarbons.