

ORIGIN AND DISTRIBUTION OF PORES IN CENOZOIC VOLCANIC ROCKS FOR POTENTIAL HYDROCARBON RESERVOIR

OSAMU SATO, Teikoku Oil Co., Ltd., Technical Research Center, Tokyo, Japan

The so-called "Green Tuff", subaqueous volcanic complex in the middle Miocene, has extensive distribution in Japan. It has excellent potential for hydrocarbon reservoir. The "Green Tuff" which occurs about 3,700 metres below the surface of the Nagaoka Plain in Niigata oil-gas producing province consists mostly of lavas and hyaloclastites of rhyolite with some basaltic rocks. It has estimated pay thickness of more than 500 metres.

In the rhyolite, there are macro and micro pore spaces. Both visual open and micro fractures are especially effective to the permeability. Macro and micro vugs and intercrystal micro pores are important to storage space in the reservoir.

The cores of about 50 metres in total thickness were collected from thick piles of the "Green Tuff". Core analysis on the rhyolites shows 10-15 percent of porosity and 1-10 milli darcy of permeability. The porosity and permeability are affected by the rock facies of the rhyolites and the features of the pore geometries.

The microscopic character of the rhyolite is divided into four types. Three types are related to hydrating reaction in subaqueous volcanic rocks, namely of hyaloclastic rock facies. The other is of centre facies of a lava.

From petrographic research and observation of the rhyolite core, sample cuttings and analyses of electric logs, it is able to recognize what facies in subaqueous volcanic rocks the rhyolite occupy.
