Prospects for Commercial Oil in the Botuobinsk Region

V. Ye. Bakin, M. A. Parfenov

(SNIIGGiMS, no. 292, p. 11–18, 1981)

Several gas fields were discovered in 1970-80 in the Botuobinsk region of East Siberia in Lower Cambrian and upper Proterozoic sediments. See Fig. 1.

During step-out drilling on the gas pools, oil shows were found in cores and flows of non-commercial oil were recovered in some wells. It was concluded that testing had not been satisfactory under the conditions of low formation temperature (10-16°C) and anomalously low formation pressure of the region. New procedures had to be introduced. As a result the first commercial flow of oil in Yakutia was gained in the Srednebotuobinsk field.

In order to prevent the formation of a viscous oil-water emulsion by penetration of mud filtrate into the reservoir, the well was flushed with an invert emulsion in a hydrocarbon base, and then the well was pumped. Using this procedure on Srednebotuobinsk well 53, a flow of oil at 170 tons per day was recovered. Rise of the oil to the well head was assisted by a natural gas lift. The yield of gas was 142,000 m³ per day.

The oil of the Botuobinsk horizon of the Srednebotuobinsk field under formation conditions has a density of 0.818 and a dynamic viscosity of 5.94 cps. Gas content is 84.8 m³ per ton. These properties show the incorrectness of a widely held idea that the oil was not very mobile because of high viscosity at low formation temperature. As a result of the flow of oil recovered from Srednebotuobinsk well 53, this region is now regarded as a good oil play.

Oil saturated cores have been recovered from the Botuobinsk horizon in several other areas including the Tas-Yuryakh, Byuk-Tanar, and Toynokh. Similar shows have been found in Vendian clastics of the Nelbin and Mirnin areas.

Oil from the carbonate productive complex of the Botuobinsk region is very similar to that of the Botuobinsk horizon of the Srednebotuobinsk field. It is suggested that radical changes be made in the oil field technology, including new stimulation methods (at this point an article by Kedrovskiy and others (Petroleum Geology, v. 18, no. 11) is cited, which discusses stimulation by nuclear explosion.)

The oil prospects of the 14 favorable structures of the Botuobinsk region are evaluated. In addition to the Sredne-botuobinsk field, the Tas-Yuryakh, Byuk-Tanar, and Ozernaya areas are prime wildcat objectives. Other prime objectives are the Kubalakh, Sizn, Gorelaya, and Berezov structures, which have been found by seismic surveys on the north nose of the Nepa-Botuobinsk arch.

Also of great interest are the large structures found by geological surveys in the zone of junction of the Nepa-Botuobinsk arch and the Anabar regional high. Geochemical studies suggest that the ratio of hydrocarbons changes toward oil in a northwest direction. Consequently, oil-gas or even purely oil fields may be found. Prime areas here are the Cherayshev, Batyr, and Megelyakh structures, each of which is many hundred square kilometers in size.