

## **Discovery of Subbotina field as an evidence of large hydrocarbon potential of the eastern part of the Ukrainian Black Sea**

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The eastern part of the Ukrainian Black Sea consists of an area in shallow water off the Kerch Shelf (<100 m), and an area to the southeast of the Crimea Peninsula (the deepwater domain with water depth up to 2200 m). Main tectonic units of the deep water domain are: the easternmost part of the Western Black Sea Basin, the northwestern part of the Eastern Black Sea Basin, South Crimea Cenozoic Orogen, Tetyaev-Shatsky and Andrusov ridges, and Sorokin Trough. All the tectonic units formed from middle Mesozoic to Recent.

The drilling of Subbotina well 403 in 2006 to 4300 m has confirmed the huge oil and gas potential of the Kerch Shelf area. The well penetrated mainly terrigenous sediments of Eocene, Oligocene, Miocene, Pliocene and Quaternary. Subbotina field was discovered within the Subbotina anticline structure with closure of 34 km<sup>2</sup>. The main characteristics of the field are: reservoir rocks are sands; sand reservoirs have a thickness of 10–20 m (the thickest are 60–70 m); total thickness of Maykopian (Oligocene-Lower Miocene) reservoir rocks is 380 m (the total thickness of the Maykopian is 1900 m); porosity is 18–20% and higher; reservoir sands were deposited under conditions of an offshore transition zone (possibly a distal part of a delta system or a deep-marine turbidite channel system); 37 oil reservoirs were proved by the well; four oil reservoirs were tested in well 403 in the lower part of the Oligocene terrigenous sequence and with commercial oil inflow; the oil flow from each tested reservoir is up to 80 m<sup>3</sup>/d but some might produce much more (300 m<sup>3</sup>/d); two thick layers (sand thickness up to 100 m) with gas are expected in the upper part of Maykopian sediments; the recoverable reserves from Subbotina are expected to exceed 100 million tons of oil and ~100 billion m<sup>3</sup> of gas.

Most prospect leads in the Kerch Shelf are structures like Subbotina and therefore have very high hydrocarbon potential. 2D seismic has mapped many anticlines with closures of 20 km<sup>2</sup> (and more) within Oligocene-Miocene sediments to the south of the Crimea in shallow water depths. In the deepwater area, many anticlines exist in the Sorokin Trough between the Crimean Mountains and Shatsky Ridge. The geological structure and growth history of the prospects and Subbotina structure are similar. Some prospects have much larger closure than the Subbotina structure. A few huge structures (>350 km<sup>2</sup>) in Tertiary and older sediments exist within the Shatsky Ridge and Andrusov Ridge in water depths up to 2200 m. According to expert appraisal, every major lead within the Upper Mesozoic-Cenozoic section in water depths of 100–2000 m covers several hundred km<sup>2</sup>, with vertical closure of hundreds of meters, and can contain hundred million barrels of recoverable hydrocarbons. Upper Jurassic, Lower Cretaceous, Eocene and Oligocene sediments are considered the source rocks with good generative potential for hydrocarbons. There are strong direct hydrocarbon indicators on seismic data.