

HYDROCARBON RESOURCES MANAGEMENT AS THE MAIN TREND IN FORECASTING CHINA'S ECONOMIC GROWTH IN THE 21ST CENTURY

Sidnev A.V., Guo Min, Chen Keyong

Ufa State Petroleum Technical University, Ufa, Russia

The research is being conducted under the State Science and Technology Programme of Ufa State Petroleum Technical University “Sustainable use of Natural Resources and Modernization in Petroleum and Gas Technologies” (of 2012) and the Programme of Beijing Petroleum University “China’s Energy Projects and Solutions” (of 2010).

Hydrocarbon resources of the Peoples’ Republic of China are located within ten continental oil-and-gas basins and on the West China’s shelf. These continental basins, including Songliao, Erlang, Bohaiwan, Ordos, Huabei, Sichuan, Changtang and others, differ in size and study coverage, but all of them suggest the necessity and potential possibility of oil and gas exploration in sedimentary rocks. A number of basins in the east (Songliao, Sichuan, etc.) are now the main regions in China that supply the republic with energy resources. However, they remain undeveloped for the most part due to their spatial separateness. According to “Oil and Business” (1999), “Oil, Gas and Law” (1998), “Energy” (1998) and other journals, oil production in China amounted to 187 mt or 0.15 t per capita in 2001. This is a very small figure to provide qualitative growth to the country striving to strengthen its positions among the economically developed countries of the world [1].

The Chinese government has concerns about the situation. Seeking for better geological understanding of mineral resources these regions are rich in, it is actively developing domestic oil industry and promoting cooperation with foreign companies in survey, exploration and exploitation of oil and gas fields. In this respect, the continental shelf of the East China Sea stretching in the form of a wide belt along the eastern margin of the Chinese Subplate is of primary economic importance. The total length of the China’s coastline exceeds 1,800 km. The area of the continental shelf with its depths of 200 m and more measures 1,300,000 km². This is a considerable territory which shows reliable signs for oil and gas and is characteristic of intense seismic prospecting activities, including over 350,000 km of seismic profiles and over 300 prospecting and exploratory wells. Many of them contain oil and gas accumulations.

Oil and gas fields have been found within Ordovician, Paleogene and Neogene limestones and sandstones of the Baibuwan, Inghai and Zhuijiang basins. By now foreign petroleum corporations such as Shell, Onako and Mobil have already invested over \$5 billion to perform pre-development works in the shelf areas of China. This has resulted in finding new large Meso-Cenozoic sedimentary basins in the Chinese part of the continental shelf with a great number of geological formations promising for oil and gas. These are the Yellow Sea, the East China Sea, Western Taiwan, Inghai and Baibuwan. There exist general understanding of their structure and potential.

Today three-quarters of the oil output in China (almost 140 mt) comes from three large but rather exhausted oil fields on the north-eastern coast. In search for new oil deposits China pays much attention to geological prospecting within large oil basins in the north-west of the country (Tarim, Dzungaria and Zaidam). These efforts have been crowned with considerable success. Over the past six years oil production in this region has almost doubled from 15 mt (in 1995) to 28 mt (in 2002).

The north-western part of China is a poorly explored region, and an increase in output is not a mere coincidence. Tarim is the largest basin in this region (560,000 km²) rich in oil and fresh water. This is very important, since the Taklamakan Desert is situated just in the centre of the basin. The development is being performed in the Isiklik oil field, the Cocoya gas condensate field and the Tabei oil and gas field. Oil-bearing sedimentary rocks include Carboniferous, Permian, Triassic, Jurassic, Cretaceous and Paleogene sandstones and cavernous limestones up to 10,000 m thick in total (within the depressions).

The Dzungaria Basin (130,000 km²) is situated northward, in the Xinjiang Province. Here, oil-containing rocks are represented by Permian, Triassic and Jurassic lens-shaped sandstones and conglomerates, with a total thickness up to 14,000 m. The large Karamai oil field is being exploited since 1958 in the extreme north-west of the basin. Another ten oil fields have been discovered in recent years. Shallow depths of occurrence (400 to 1600 m), large oil-saturated interval in the Permian and Carboniferous sections (800-900 m in total), high oil and gas flow rates as well as high-quality viscous oils make this basin, along with Tarim, a very promising site for China's oil and energy industries in the 21st century [2].

In Central Asia China has its main presence throughout Kazakhstan. The latter is immediately adjacent to the basins being studied in the north-western regions of China. Since 1997 the China National Petroleum Corporation (CNPC) has acquired 60 percent of the shares in the Aktyubinsk and Uzen oil-producing enterprises and started its rail deliveries to Xinjiang using the Emba-Almaty-Druzhba-Karamai route almost 4000 km long. Because of high-cost rail transportation of crude oil to China and unstable oil prices, CNPC continues to seek other ways to improve sales of oil produced in Kazakhstan, including exchange with Russia via Zabaikalsk, use of the Russian oil pipeline network and a project to construct its own pipeline from Kazakhstan to Xinjiang. These projects offer good opportunities for China to cope with the problem of oil fuel supplies and to stimulate economic growth and employment in its socially disadvantaged north-western provinces.

It conclusion it should be stated that:

(1) The results of explorations carried out in the 1980s and 1990s within the China's oil basins, especially in the western and south-western parts of the country, is now out of date and need to be revised and re-estimated using presently available higher computing technologies and programmes. This is to be actively done in the nearest future;

(2) The key task for oil industry workers of China is to improve exploitation and oil production conditions in the oil fields under development thanks to

applying various enhanced-oil-recovery methods. In Russia this is a good additional approach to the development of oil-producing regions.

References

1. Meng Yang, Sidnev A.V. On main trends in China's hydrocarbon resources management over the 21st century. Mineral raw material base in the Republic of Bashkortostan: Reality and prospects; Materials of the Republican Science and Technology Conference. Ufa, April 5-6, 2002. Ufa, Tau Publ., 2002, pp. 228-229.
2. Chai Lin et al. Issues on geoenery development in West China over the 21st century. International Journal of Applied and Basic Sciences, 2010, no.12, pp.11-12.