

# **GEOLOGICAL FACTORS AND OIL PROSPECTS IN THE WEST KOREA BAY BASIN**

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Geologically it is certain that the West Korea Bay seabed has oil prospects. For more than two decades, the DPRK has conducted extensive aeromagnetic, gravimetric and seismic surveys to determine the petroleum resources of the Bay. In 1980 and 1981, the Norwegian firm GECO conducted surveys in the Basin for the DPRK covering a total length of 4,500 kilometers within an area of 15,000 square kilometers. More recently, integrated geophysical surveys with a grid of two by four kilometers, covering a length of 4,500 kilometers, were carried out in areas covering 16,000 square kilometers. Seven wells have been drilled, yielding oil in several of the wells.

The results of both the integrated geophysical exploration and the drilling of a few wells have brought to light the geological composition and hydrocarbon assemblage of the Basin.

The West Korea Bay is enclosed by the Korean, Shandong and Liaodong Peninsulas. The continental shelf of the West Korea Bay belonging to the maritime economic zone of the Democratic People's Republic of Korea totals an area of more than

23,000 square kilometers, of which sedimentary basins, which contain oil prospects, total 18,000 square kilometers.

In the West Korea Bay waters, the Anju, Onchon and West Korea Bay basins are the extensions of onshore geological formation.

The West Korea Bay Basin tectonically lies in the eastern margin of the Korea-China Platform, and between the Shandong-Liaodong and Shandong-Haeju uplifted zones.

The basement, made of thick carbonate rocks (5,000 meters) of the Late Proterozoic and Early Paleozoic, is overlain by the Mesozoic (6,000 – 10,000 meters thick) and Cenozoic (4,000 – 5,000 meters thick) sediments.

The source rocks are the Jurassic black shale (more than 3,000 meters thick), Cretaceous black shale (1,000 – 2,000 meters thick) and pre-Mesozoic carbonates (several thousands meters thick). The reservoir rocks are the Mesozoic – Cenozoic sandstones of high porosities and pre-Mesozoic fractured carbonate rocks.

The petroleum traps are of the anticlinal, fault-sealed, buried hill and stratigraphic types.

Oil shows have come from the Tertiary and Mesozoic strata, and from the carbonate rocks of the Upper Proterozoic and the Lower Paleozoic.

In the Tertiary, oil shows were found from Eocene sandstone of the lower section of the Oligocene. They fluoresce in yellow under luminescent light and are properly dissolved by organic solvent.

Liquid crude oil flowed from the Eocene sandstone and sandstone of the lower section of the Oligocene into the wells drilled on the onshore Anju Basin. It is relatively light paraffinic oil, and the content of sulphur is very low.

Oil shows in the West Korea Bay Basin are known especially from the Mesozoic. Liquid oil came from many of the wells penetrated in psammities underlying the red, calcareous shale of the Lower Cretaceous. Oil was recovered from one well in DST. The well yielded 550 BBL/day on test.

Oil shows came from sandstones between the Upper Jurassic black shales. In some of the wells drilled where these show recurred, oil droplets in the circulating mud were observed. In addition to these, oil shows came from fractures of the Lower Paleozoic carbonate rocks of some wells drilled, where heavy lost circulation occurred. This led to the failure of the test job.

As explained above, the Meso-Cenozoic sediments have been deposited thickly in the West Korea Bay Basin, and sufficient components to generate oil, good reservoirs and different types of traps exist.

In conclusion, if detailed geophysical surveys were conducted to find accurately various styles of traps followed by drilling exploration, commercial oil fields would be discovered.

It is my hope that sincere cooperation with our neighbors and other friendly countries will result in the actual development of oil in the West Korea Bay Basin.