



Petroleum Geology of Mangyshlak and Adjacent Regions, Western Kazakhstan

This study by **Blackbourn Geoconsulting** features an extensive analytical programme covering biostratigraphy, geochemistry, sedimentology and petrography.

The Mangyshlak region is one of the major hydrocarbon provinces of Western Kazakhstan. It includes the South Mangyshlak Trough, the Buzachi Arch and the North Ustyurt Trough.

The study area includes the less well explored Ustyurt plateau to the east, and therefore encompasses most of the area between the Caspian and the Aral seas.

The chief reservoirs lie within the Mesozoic clastic succession, although there are subordinate Tertiary reservoirs, especially in the east of the province. The main source rocks have variously been considered to be of Palaeozoic or Mesozoic (Jurassic or Triassic) age.



The Kazakhstan authorities are actively promoting investment opportunities for western companies in both exploration and production. Several joint ventures are already progressing successfully in the region. Furthermore, the Mangyshlak Peninsula extends into the Caspian Sea, and structural trends continue across the sea into parts of the Russian Federation on the opposite coast, so the study also has a wider regional significance.

Complete sections of the hydrocarbon-bearing rocks of the Mangyshlak region (Permian to Recent) outcrop in the Karatau and Aktau mountains of the Mangyshlak Peninsula. During 1994, field teams comprising geologists from Britain, America, and Kazakhstan carried out a thorough new study of several of these sections. Emphasis was placed on the economically important Jurassic, but the study included rocks ranging in age from Permian to Late Miocene, all of which are excellently exposed.

Detailed field logs of over 1100m of section are included in the report, primarily from the Jurassic. Sections covering the complete exposed stratigraphic range were examined, and around 275 samples were taken for analysis. These were subsequently studied in laboratories in Britain and America in order to investigate the petrography, biostratigraphy and geochemistry of the samples.

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Petrography: 172 samples were examined by optical petrography. Detailed results of point-count and grain-size analysis are presented, together with numerous illustrative photomicrographs. The petrography of the various stratigraphic units is described, concentrating on potential reservoir horizons; controls on reservoir quality are discussed.

Biostratigraphy: Biostratigraphic work was undertaken by GeoStrat Ltd. of Motherwell, Scotland. 145 samples from seven sections and other miscellaneous localities were examined. Palynological and micropalaeontological analyses were conducted on most samples, with nannofossil analysis on selected samples. A proposed West Kazakhstan biostratigraphic zonation scheme, covering the Jurassic and Early Cretaceous, is presented and discussed. Characteristic species are illustrated by plates.

Geochemistry: DGSi (now Baseline DGSi) of Dallas conducted the geochemical analyses. 58 outcrop samples, including two Cretaceous oily sands from the Tyubedzhik oil seep, were analysed to determine organic facies and thermal maturity. Detailed analyses of eight representative oils from Mangyshlak and the adjacent southern sector of the Precaspian Basin were carried out, and conclusions drawn regarding the likely source(s) of the oils.

Associated Report

More detailed information on the reservoir geometry and sedimentological development of the outcrops described in this report is contained in Blackbourn Geoconsulting's "**Karatau Outcrop Study**".

The report, in five volumes features:

- Nearly 200 text pages; numerous figures and enclosures
- Extensive review of existing literature on the geological development, stratigraphy and petroleum geology of Mangyshlak and Ustyurt
- Database of all known oil and gas fields in Mangyshlak and Ustyurt, including structure, reservoir properties and oil characteristics. Most fields are illustrated with structure maps and summary well logs
- Over 220 colour plates including outcrop photographs, petrographic photomicrographs and biostratigraphic plates
- Set of 12 map enclosures illustrating the palaeogeography, facies, thickness, depth etc. of various stratigraphic units, regional geological structure, locations of oil and gas fields, and infrastructure
- Detailed 1:200 field logs, in full colour, of 1100+m of field sections logged

Timing and Cost

This report was first produced in 1996. Key sections and the field database have since been updated.

The report is currently available at a cost of **US \$32,000**. For further details on this report, please visit www.blackbourn.co.uk/reports/mangyshlak.html or contact Dr Graham Blackbourn at:

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