

AAPG HEDBERG CONFERENCE
“Paleozoic and Triassic Petroleum Systems in North Africa”
February 18-20,2003, Algiers Algeria

Petroleum System of Southeastern Sahara Platform (ILLIZI-BERKINE)

Ahmed Chaouche & Harry Dembicki Jr.
Anadarko Petroleum Corporation

Of the more than 15 Paleozoic basins in North Africa, many of which are world class petroleum provinces, the Illizi and Berkine basins are among the most prolific. Petroleum exploration started in these basins in the early fifties and significant discoveries are still being made today. As a result of exploration efforts in these two basins, 10 billion barrels of oil and 20 TCF of gas have been discovered so far, with the potential for significant additional reserves.

The petroleum geology of the Illizi and Berkine basins is controlled to a large degree by the evolution of structural style, which was controlled by large-scale plate tectonics. The structural evolution has in turn influenced the distribution and quality of reservoir facies, the timing and stage of source rock maturity, and the migration and preservation of crude oil. The Illizi and Berkine basins shared a common geologic history during the early stages of basin development. However, during the late Paleozoic and into Mesozoic times, geologic events in these two basins became more independent.

During the deposition of source rocks in the Silurian and Devonian, the organic input into the sediments was predominated by material with marine algal affinities. In the Silurian, organic input consisted mainly of graptolites, chitinozoans and achritarchs, while during the Devonian tasmanites and spores were abundant. These algal dominated materials generate fluids with strong similarities in their genetic markers such that making oil to source rock correlations based on biomarkers alone is very difficult.

To understand why these basins are as prolific as they are, the characteristics of their source rocks will be examined. Oil-to-source rock correlations will then be made using a combination of parameters including biomarkers, the C7+ fraction, and isotope data. This combined approach will allow specific source rocks to be related to specific fluids in the basins. Comparisons will also be made to other hydrocarbon fluids in North Africa and the Middle East.

The results of hydrocarbon mass balance calculations indicate that potential reserves in the Illizi and Berkine basins far exceed proven reserves. This suggests significant volumes of hydrocarbons may still to be found.