P4-3 NON-COMPACTED CLAYS AND THEIR ROLE IN THE GAS-BEARING OF THE PLIOCENE DEPOSITS OF THE DIVJAKA-BALLAJ-KRVEVIDH REGION

M. GJOKA, L. NDREV, F. SAZHDANAKU and P. BAKO
Oil and Gas Institute, Fier, Albania

Divjake-Ballaj-Kryevidh structure is part of the Kreshpan-Divjake-Durres range and is located in the northwestern part of the Peri-Adriatic Depression. On surface, this structure evidences with the presence of two ondilations in the Pliocene deposits (Helmesi & Rrogozhina suites) with southeast-northwest orientation. In depth these deposits lay transgressively over Messinian-Tortoniane ones. Further to north, these deposits dip under the Adriatic Sea and rise again in the Durres-Bishti Palles structure.

The dimensions of the structure are 25×5 km and it has a shape of brachianticline on which several undulations are evidenced. The eastern flank dips with small angle whereas the western flank is inclined and faulted. In addition to this, on the basis of seismic profiles reprocessed by using advanced programs and interpreted by Land-Mark workstation, several other faults with smaller amplitudes are evidenced. These faulted parts have in general played the role of the migration paths for fluids. In the cases of the contacts with clay thicknesses, these faults have served as screens for accumulation of the hydrocarbons (Fig. 1).

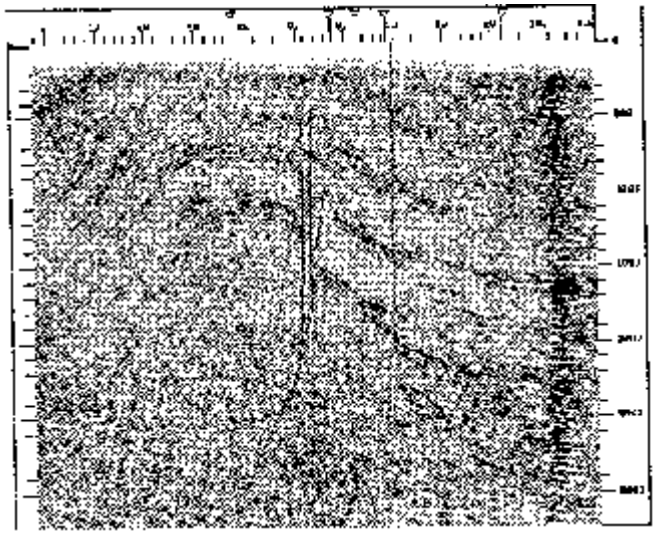

Fig.1 *Seismic line 195/87.*

The gas bearingness it is proved both Messinian and Pliocene deposits and in place reserves are about 7 billion m^3. The deposits of Helmesi Suite in which are discovered the gas-bearing reservoirs of Pliocene age is are divided in four lithological and stratigraphical units with a total thickness that ranges from 1300 to 2100m depending to the location of these in relation o structure. Starting from bottom upward these are: Conglomerate and sandy clay unit with g.*sphearoidinellopsis*; Sandstone clay unit with g.*margaritae*, Sandy clay unit with g.*punticulata* and Clay unit with presence of sandstone beds with g.*crassaformis*.

The sedimentation environments are mainly of a turbidity character and in the upper part are of a deltaic character. The depositions have been mainly formed as a result of the handling of the sedimentation material from marine flows while distribution has been conditioned by the sea bottom relief. From the data of seismic profiles 113/85, 118/85 and of other profiles, it results that sea bottom relief is characterised by a channel tha permeates the northern half of the structure. The sandstones, in general, extend in the eastern flank and with their passage to the top; they extend along the marker. Gas-bearingness relates to formations of lithologic and lithology-structural types. Based on thermobaric conditions of the gas pools it has resulted that the main factor that has influenced the migration of the hydrocarbons has been the movement of water during compaction stage. Taking into consideration the result collected and interpreted for sonic logs of 42 wells, it is evidenced that within the thicknesses penetrated by these wells there are a lot of zones with uncompacted clays distributed in all parts of the structure, both horizontally and vertically (2).

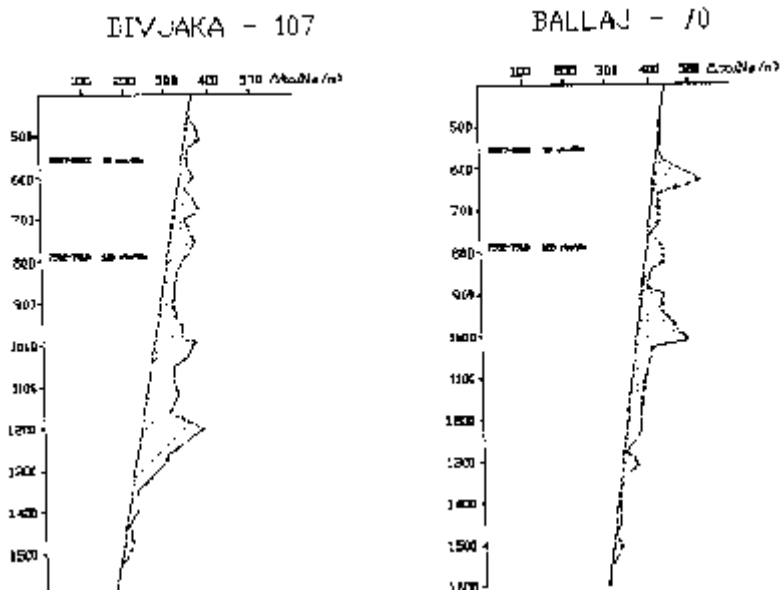

Fig.2: *The plot interval time (Δt) Vs depth.*

The interpretation of the data showed that there is not any regulation in the sitribution of these zones. These zones are mainly concentrated in the thicknesses with low content of sandstones as well as with limited distribution of the sandstone bodies. In many tested beds, deposits with pressure gradients lower than normal is evidenced as well. These values are in general encountered in the parts of the section with higher percentage of sandstones and with great dimensions. Studying and interpretation of the logs for determination of the pore-water salinity in shales have showed that about 100 to 200 m over the base of Pliocene deposits there is an increase in the value of mineralization. Based on correlations of the well thicknesses and their comparison with seismic data it is evidenced that gas-bearing beds in the hypsometrical upper locations as a result of lithological changes correlate with undercompacted clay sections. The increase of the salinity of pore water passing from clay deposits to sandstone ones supports the migration of the fluids. Studying of the values of the pressure gradient in a lot of tested beds shows that these one range from 1.22 to 1.26 and sometimes to 1.34 atm/10 m. The efforts to explain and correlate these values with tectonic effects under conditions of the presence of the undercompacted clays have not been successful.

In the conditions of the organic matter presence in the entire Pliocene section and its degree of maturity for generation of biogen gas, the presence of non-compacted clays and sandstones of optimum dimensions for gas accumulation and storage, the geophysical methods have played a significant role in the orientation of reservoir development operations. The proven gas-bearing formation thickness ranges from 450 to 800 m. As a result, success ration has been significance increased by orienting the operations in higher performance areas.

The complete paper material shall be associated by maps, geological, seismic and graphic profiles of well correlations as well as graphics of different measurements of well diagraphies for the presence of non-compacted clay zone.

References

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