

SOURCE POTENTIAL AND MATURITY TRENDS OF LOWER PERMIAN SEDIMENTS IN THE PUNJAB PLATFORM AND ADJOINING AREAS, PAKISTAN

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In the present study attempt has been made to evaluate the source rock potential of the Lower Permian sequences comprising the Tobra, Dandot and Warchha Formations. The study indicates that these formations are the possible source of gas discovered in the Punjab Platform. Organic petrographic and geochemical study of cutting / cores from twenty two wells and outcrop samples were carried out during this study. The organic petrographic results show that on the average vitrinite is the main maceral type inertinite is the second; while small percentage of liptinite is present in these sediments. The percentage of inertinite increases in the sandstone and siltstone facies. Organic richness varies from 0.3 to 4.75%. On the average it is fair to good. The hydrogen index of the samples from Piranwal-1 well ranges from 29 to 165 mgHC/g TOC. The organic petrography and limited rock-Eval data suggest that source is the mixture of Kerogen type II, type III and type IV.

Maturity in the Piranwal-1 well increases from 0.9 to 1.18% and Tmax varies between 422 to 534° C. The iso- reflectance map shows that the vitrinite reflectance increases from east to west. The Cretaceous and Paleocene source rocks are relatively thinner and are not deeply buried to be mature in most part of the Punjab Platform area. Only the Permian and older sequences are buried deep enough (1800 to 2800m) to be mature. In order to charge the reservoirs in Punjab Platform area, the hypothesis of long range migration through carrier beds is being invoked. A petroleum system based on the Permian carbonaceous shale and probable coals is, therefore, being proposed here in order to steer the focus of exploration towards small sub-basins of Paleozoic age, in the depression areas instead of paleohighs as the case has been in the past.