Predrill assessment/prediction of sandstone porosity and permeability in frontier and mature areas

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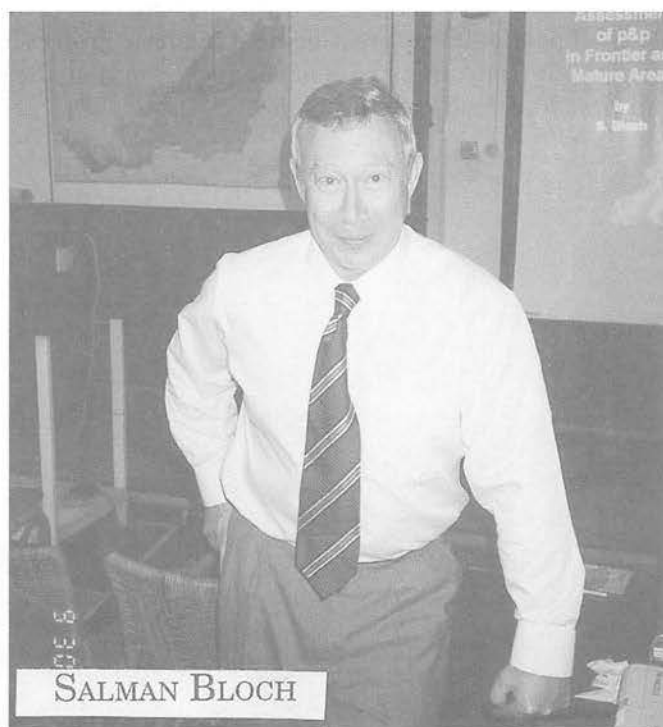
Laporan (Report)

Salman Bloch of Texaco Upstream Technology, Houston, TX, USA, gave the above talk on Monday 4th March 2002 at 3.00 pm at the Geology Department, University of Malaya. The speaker is a Distinguished AAPG lecturer. The talk was organised by the Society's Petroleum Geology Working Group.

Abstrak (Abstract)

Lateral and vertical distribution patterns of porosity and permeability in sandstones are generally controlled by a limited number of geologic variables (lithology, temperature history and effective overburden pressure history). Empirical evidence indicates a high degree of correlation between porosity/permeability and the cumulative effect of these variables. Importantly, the variables (input data) often can be estimated prior to drilling with reasonable confidence.

The choice of the predictive techniques utilized in a given project depends on the availability of empirical data in the area of interest. However, regardless of the amount of data available, the most effective approach involves use of multiple predictive techniques. Comparative analysis of results obtained through the utilization of different approaches is helpful in reducing the amount of uncertainty. Porosity prediction techniques include porosity-depth curves, porosity-vitrinite reflectance algorithms, multiple regression analysis, experimental results, and empirically-based diagenetic "models". Permeability predictions utilize permeability-porosity regressions, multiple regression analysis, and the relationship between present-day permeability and the initial (depositional) permeability in sandstones not affected by a heavy diagenetic imprint. The presentation includes numerous case studies of predrill reservoir quality prediction in sandstones with a wide range of lithology, diagenetic alteration, burial/temperature history, and age.

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