Ceramah Teknik (Technical Talk)

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ALLUVIAL BASIN FILLING PROCESSES AND QUANTITATIVE DETERMINATION OF CHANNEL AND CHANNEL-BELT DIMENSIONS USING CORED AND LOGS

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Report

The talk on "Alluvial Basin Filling Processes and Quantitative Determination of Channel and Channel-Belt Dimensions Using Cored and Logs" by Dr. Robert S.(Bo) Tye of Petro Tel Inc, Plano, Texas was attended by about 20 members of the society including students, academic staff ad petroleum industry professionals. The very interesting lecture was held at 10 am in the Department of Geology lecture hall of the University of Malaya on the 8th of October 2004.

Lee Chai Peng

Abstract

Alluvial Basin Filling Processes and Quantitative Determination of Channel and Channel-Belt Dimensions Using Cored and Logs

Channel-belt, crevasse-splay, and lacustrine-delta deposits comprise the most common sand-prone depositional settings in alluvial basins. Subsidence, sediment supply, and avulsion processes are primary controls on a basinis alluvial architecture. Avulsion starts the process of channel-belt formation, but prior to the development of a mature channel belt, depositional lows on the floodplain and lakes must be filled. This is accomplished through crevasse-splay and lacustrine-delta deposition. Splay and delta geometry and sediment-distribution patterns are controlled by the river-mouth processes, basin shape, and bathymetry. Thickest splay and deltaic sandstones occur in linear, dip-elongate and upward-coarsening distributary-mouth bar and levee lobes that are separated by mud-filled channels and interdistributary troughs. As the channel belt lengthens and widens,, much of the floodplain, crevasse-splay, and lacustrine-delta deposits are reworked and incorporated into channel belt. Thus, channel belts are he primary reservoir targets.

An objective in exploration for and development of fluvial reservoirs is determination of the thickness and width of sandstone-conglomerate bodies (mainly channel-belt deposits). This problem is addressed using theoretical, experimental and field studies. The approach involves: (1) models for the lateral and vertical variation of ltihofacies and petrophysical-log response of river-channel deposits, with explicit recognition of the different superimposed scales of strata; (2) distinction between single and superimposed channel bars, channels and channel belts; and (3) interpretation of maximum paleochannel depth from the thickness of channel bars and the thickness of sets of cross strata formed by dunes.

Fluvial reservoirs from the Travis Peak Formation were reinterpreted using this approach. In the original interpretation, channel-belts width and connectivity of channel-belt sandstone bodies were overestimated because of over-zealous well-to-well correlation, and inappropriate use of width/thickness data from supposed analogs. The value of this new approach to quantifying channel-belt dimensions and its impact on reservoir characterization and management is demonstrated with exampled from Alaska and Venezuela.