Paper 39

Reservoir Connectivity Analysis: understanding of fluid distribution within productive intervals in Tabu and Tapis fields, Malay Basin

MOHD ROHANI ELIAS[1], BILL JAMES[2], PETER VROLIJK[2] AND ROD MYERS[2]

[1]ExxonMobil Exploration & Production Malaysia, Inc.
Menara ExxonMobil
Kuala Lumpur City Centre (KLCC)
P.O. Box 10857
50728 Kuala Lumpur

[2]ExxonMobil Upstream Research Company
Houston, Texas

Reservoir Connectivity Analysis (RCA) is a work-process that synthesizes and integrates sound geologic interpretation derived from multiple sources of data. The techniques build a model for field plumbing and fill history consistent with fluid elevations and pressure observations. The primary goals of the analysis are to:

1. Establish original fluid contact elevations
2. Identify the position of connections between reservoir compartments
3. Investigate possible reservoir connectivity reasons behind some anomalous production
4. Identify potential by-passed oil opportunities for future in-fill drilling

Warta Geologi (Newsletter of the Geological Society of Malaysia), Vol. 29, No. 6, November-December 2003

RCA was conducted at Tabu and Tapis as part of the on-going field study effort (2002–2003). Productive reservoir intervals in both fields are highly compartmentalized mainly due to the complex interplay between stratigraphy and post depositional structural movement.

Fluid contact controls include not only spill points (through saddles or around fault tips) but also breakover elevations separating oil or water legs across flanks, capillary gas and oil leak through internal seals. Isolated stratigraphic traps can control contacts in certain fill history scenarios. Examples interpreted at Tabu and Tapis include perched oil in gas caps and down-dip movement of oil legs isolated by late gas displacement.

A model for fill history is coupled with the plumbing geometry to build a complete and internally consistent description of the pathways for displacement of oil and free gas.

The RCA results in better understanding of the fluid distribution and reservoir compartmentalization in Tabu and Tapis fields. It is a necessary process to properly understand how petroleum fluids are distributed and connected in a field, especially in a faulted and dominantly channelized reservoir field. It is ideally suited for development and production applications where data density limits the number of subsurface scenarios.