Permanent reservoir monitoring up for workshop discussion again in Norway next year

The third in EAGE’s series of workshops focusing on permanent reservoir monitoring (PRM) is to be held once again in Norway, this time in Oslo, on 16-19 March 2015, with the theme ‘Pro-active Reservoir Management – PRM and beyond’.

The Third EAGE Workshop on PRM will explore the themes illuminating both the business aspects and technical challenges of PRM from a reservoir-centric perspective.

They start with the premise that besides basic production/pressure data in wells, the importance of 4D seismic data, especially offshore, need not be argued, given its track record in several key basins around the world. ‘Conventional’ 4D seismic data, being ‘infrequently’ acquired (say every three years or so), has proven to be extremely valuable when it comes to things like optimising development drilling campaigns.

Yet the installation of permanent systems allows shortening the cycle from years to months. We like to call this ‘frequent 4D’, and this compares to ‘conventional 4D’ just as movies compare to pictures. Frequent data allows us to improve our understanding of the complex reservoir dynamics, reducing uncertainty, impacting decisions, and thereby translating into value. Furthermore, by obtaining those insights earlier, we are also able to influence a new class of decisions with shorter cycle times, such as field/well management decisions. We like to think that ‘frequent 4D’ opens the door to ‘pro-active reservoir management’.

The background is that reservoirs are complex, geology often is very complex, and we are reminded of the three laws of reservoir heterogeneity offered by D.H. Johnston in Practical Applications of Time-Lapse Seismic Data (SEG DISC 2013) that 1) All reservoirs are heterogeneous, 2) All reservoirs are more heterogeneous than we think initially, and 3) All reservoirs become more heterogeneous the more we study them. This set of laws no doubt is an expression of the increasing amount of detail that becomes unveiled as we progress our studies to smaller and smaller length scales.

Now add to this the increasingly sophisticated mechanisms for reservoir recovery, be it depletion/compaction/aquifer movement, various flavours of water flood, or more exotic schemes involving miscible or immiscible gas, heat, or other elixirs, and any interested outsider should marvel at the recovery performance the global oil industry is able to achieve in such challenging conditions.

Apart from generous amounts of hard work and some ingenuity, the key here is data, in particular dynamic data. So, is the acquisition of ‘frequent 4D’ through permanent or long-lived installations the solution to Johnston’s dilemma? That may be too optimistic a question, but we think that the addition of such data will go a long way towards that goal, especially when combined with additional relevant measurements, such as in-well and at the seafloor. Some of these measurements can synergistically be acquired along with ‘frequent 4D’ data. The implications will certainly be part of next year’s workshop discussion.