

What is the Best Frequency to Update a Reservoir Model?

Greg Walker and Lydia Danard
Talisman Energy, Calgary, AB, Canada.

The value of an accurate predictive model is in finding cost effective targets. Production optimization, which requires no additional investment other than surveillance and history matching should be highly efficient in terms of capital use. The cost to entry is a model that has better accuracy than the size of the project being attempted, otherwise it is difficult to justify both the project and the surveillance required in a business context.

Prior discussions on uncertainty faced the difficulty of how to value a reduction in uncertainty. In the case of no change in the depletion plan, and therefore no change in the expenditure and ultimate recovery, where is the value? With the reserves for P1 now based on reasonable (90% likelihood of exceeding), there is an additional time-value to reducing uncertainty, which can be unlocked by tightening the feedback loop between planning and acquiring surveillance, and the integration through history matching.

The DD&A benefit for making an accurate assessment of reserves sooner rather than later can be significant, especially when dealing with new or unconventional resources.

The technique under discussion in this paper is Closed Loop Reservoir Management, and the computer assisted components. The field has gone through an evolution from assisted history matching, to planning future production strategies with the cheap surveillance of pressure and rate measurements. The next step is active surveillance, for things that take money and scheduling such as seismic surveys, well production logging, and interference tests.

One barrier to entry is getting a believable model. Synthetic cases with production optimization that altering settings at a period of a day or faster do not help the business case for implementing such systems, due to the large computational requirement and operational issues for implementation.

Using the case study from the Closed Loop ATW in June 2008, we present a proxy for calculating the best frequency to update the system including some estimates of the cost of implementation. The result is that the updates only need to be of a frequency less than 6/yr, and the proxy can estimate the value of implementing the system. Now all we need are more case studies from the industry to support or refute our model.