Reservoir Dynamic Simulation

Dynamic reservoir simulation modeling is used to manage the uncertainty in maximizing hydrocarbon recovery by proposing drilling locations which optimize oil (and gas) production rates with the most efficient depletion or pressure maintenance strategy. Our reservoir simulation consultants create dynamic 3D models, representing the properties of the rock and containing fluids while predicting the variation in saturation over time due to production and injection of fluids under various operating scenarios. These models honor physical models and available geological, petrophysical and reservoir engineering data which have been collected beforehand from the formation or which is known to be representative of analogous fields.

InSite Oil consultants conduct sensitivity studies to determine the optimum field development plan, both technically and economically, to provide a reliable estimate of oil and gas reserves. In cases where the field is already in production, our consultants use the simulation model to match the history of fluids production and reservoir pressure to fine tune the prediction of oil, gas and water production over time and to propose measures to optimize the hydrocarbon recovery by modifying the exploitation scheme of the reservoir.

Our consultants’ extensive reservoir simulation expertise includes, but is not limited to:

- Modeling black oil and compositional modeling including PVT fluid characterization (phase behavior and Equation of State) using commonly used commercial reservoir simulators (such as ECLIPSE, VIP, and CMG):
  - Complex reservoir architectures including heavy faulting, natural fractures and tight reservoirs.
  - All drive mechanisms including natural depletion, gas cap expansion, analytical and numerical aquifers, gravity drainage and compaction.
  - Vertical and horizontal well configurations and all types of artificial lift (sucker rod pumping, ESP, PCP, gas lift and jet pumps).
  - Improved oil recovery (IOR) modeling (waterflooding, gasflooding and WAG) including pilot studies prior to full-field development.

Conducting gas-condensate and volatile oil field development studies:

- Gas cycling and pressure maintenance to maximize liquid recovery.
- Forecasting of LNG and LPG production rates and composition over time.

We apply the latest technology and industry standard software together with highly competent in house engineering and geoscience staff to build geostatistical and dynamic reservoir simulation models. We are experts in the use of Petrel RE and Eclipse developing both blackoil and compositional models, with extensive experience gained from studying oil and gas fields worldwide. We prefer working in-house using the resources of your company or we can arrange for the leasing of the relevant software for an all-inclusive service.