

New Advances in Probabilistic Oil Volume and Recovery Prediction for Tengiz Field, ROK

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Probabilistic methodologies have yielded new insights into oil volume and oil recovery for Tengiz Field, Republic of Kazakhstan. Tengiz is one of the deepest super giant fields. Knowledge of the uncertainties inherent in oil recovery is a key to proper management of this Field.

Both structured Monte Carlo and Experimental Design techniques have recently been applied to investigate the interaction of key reservoir uncertainties at Tengiz. These probabilistic approaches have provided information about the most likely oil volume and production forecast. Equally important, they give important new insights into the probable ranges of oil volume and production.

Several reservoir studies were used to build a stratigraphic framework and facies fabric of the new probabilistic model. These include a study of outcrop analogs in Northern Spain, and a sequence stratigraphic synthesis of the Field using logs, core and seismic data.

Structured Monte Carlo approaches have been used to quickly build static models and assess the impact of uncertainties on Tengiz oil volume. These uncertainties include structural elevation, variogram parameters, saturation constants, and the extent of porous facies.

Investigation of the uncertainty in dynamic performance is much more computationally intense than the static models. Experimental Design techniques were used to minimize the number of simulation runs required to investigate oil recovery. Several variables have been investigated, including wellbore hydraulics, vertical to horizontal permeability ratio, etc.
