

Petrotechnical Assessment Delivers In-Depth Evaluation of Eagle Ford Shale in Less Than 1 Month

Petrophysics, reservoir modeling, and simulation identify production drivers and forecast recovery

CHALLENGE

Obtain a thorough quicklook evaluation of potential oil recovery from Eagle Ford shale assets to support strategic economic decisions.

SOLUTION

Deploy Schlumberger specialists to conduct a rapid, in-depth assessment and then collaborate with operator's experts.

RESULTS

Completed project in less than a month; identified production drivers, oil in place, and potential long-term recovery; enabled operator to develop firm plans for asset.



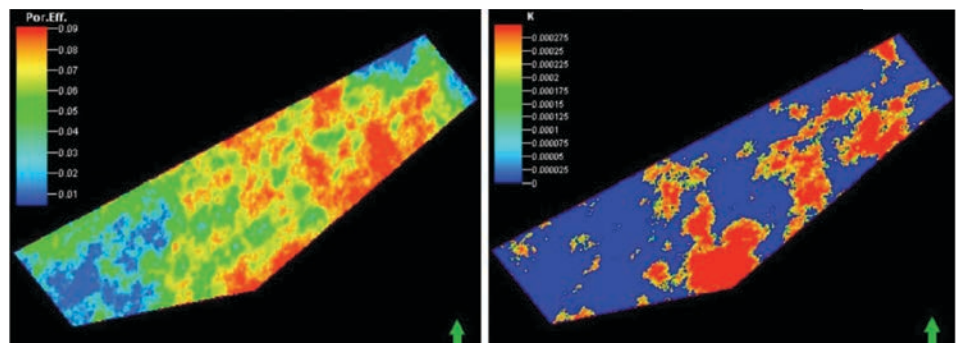
Overcoming technical constraints in unconventional play

An independent operator holding leases in the oil window of the prolific South Texas Eagle Ford shale play found that it would soon need to make a critical economic decision about the fate of its assets. The operator needed questions answered about the key production drivers, oil in place, effective drainage area of a typical horizontal well with multistage fracture completions, and oil recovery expectations over a 10-year period.

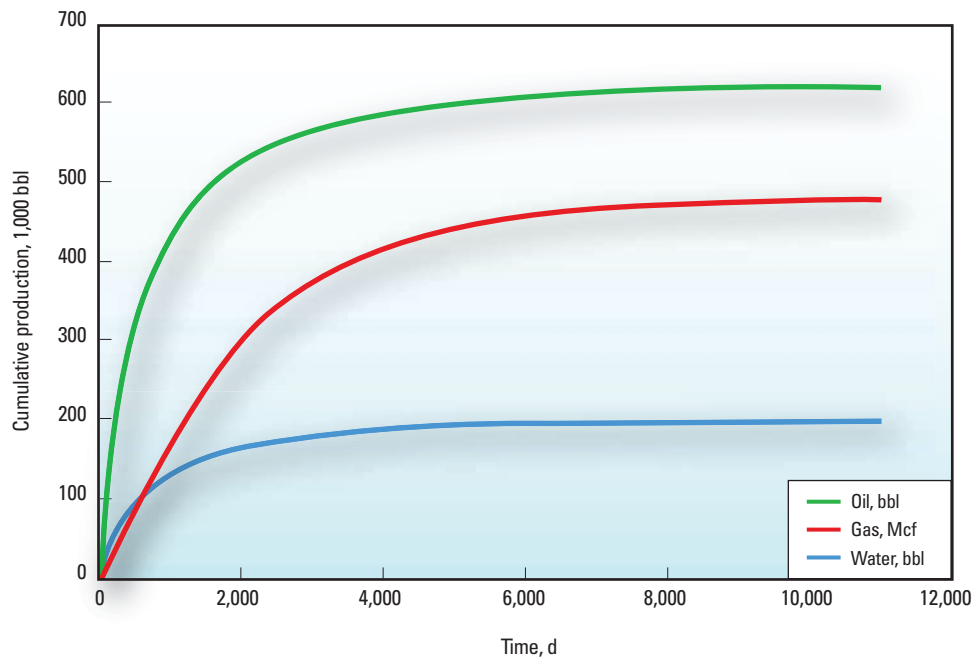
Not only were decision makers on a short timeline, they also faced major technical constraints; existing well data for petrophysical analysis were limited—both in number and quality—and no cores were available. Despite the current practice of drilling horizontal laterals with multistage completions, the operator's well and production data came only from vertical wells with single-stage completions.

Forecasting potential long-term production

Because the operator lacked the experience and modeling tools to conduct a full evaluation, its management approached Schlumberger to develop a reliable quicklook petrotechnical evaluation of its assets—despite limited time and data. In collaboration with the operator, Schlumberger petrotechnical specialists with experience in the Eagle Ford area performed a rapid petrophysical analysis of digital log data from 21 vertical wells. Using the Petrel* E&P software platform, the team built a 3D static reservoir model and populated it with petrophysical properties to calculate original oil in place (OOIP).



Petrotechnical experts built a static reservoir model in the Petrel platform to calculate effective porosity (left) and permeability (right), which were used to identify OOIP values in the study area.



Schlumberger experts performed history matching and ran production forecasts for a typical 5,000-ft multistage fractured horizontal well. Results indicated that a properly engineered well could recover more than 600,000 bbl over 12,000 d [30 years].

Using ECLIPSE software, the team built a typical vertical well simulation model and performed history matching with production data from eight wells to derive formation permeability and estimate drainage area. In addition, petrotechnical experts modified the completion to represent a single-stage hydraulic fracture treatment and ran the model to predict oil and gas production for a 10-year period. Next, the experts constructed a typical 5,000-ft [1,524-m] horizontal well simulation model, assuming a 14-stage hydraulic fracture treatment, and ran the model to forecast potential recovery. A sensitivity analysis was performed to rank the main production drivers in the study area and specify uncertainties.

Facilitating more informed decision making

Schlumberger completed the entire asset evaluation in less than 1 month, answering the operator's primary questions.

The results of petrophysical analysis and reservoir modeling indicated the Eagle Ford acreage under consideration contained significant volumes of oil in place. The report provided a reliable estimate of oil per acre. Petrotechnical specialists found that the two highest-ranking production drivers in the study area were natural fractures and hydrocarbon pore volume. They were able to forecast low, median, and high oil and gas cumulative production estimates for up to 30 years.

Through collaboration, Schlumberger delivered a working model of the asset, which provided the operator's management team with information to estimate the play's long-term value and make better-informed economic decisions. As a result, they developed a firm plan to move the asset forward and meet strategic objectives.